

**ADVANCED MANAGEMENT  
ACCOUNTING  
(DBC37)  
(BACHELOR OF COMMERCE)**



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**Chapter – 1****MANAGEMENT ACCOUNTING****Objectives :**

After reading this unit you should be able to

- understand the concept of management accounting
- distinguish between financial and management accounting
- discuss the functions, scope and limitations of management accounting
- go through organization for management accounting in addition to the role of a management accountant.

**Structure :**

- 1.1. Concept of Management Accounting**
- 1.2. Limitations of Financial Accounting**
- 1.3. Distinction between Financial and Management Accounting**
- 1.4. Importance of Management Accounting**
- 1.5. Functions of Management Accounting**
- 1.6. Scope of Management Accounting**
- 1.7. Limitations of Management Accounting**
- 1.8. Tools of Management Accounting**
- 1.9. Organization for Management Accounting**
- 1.10. Role of Management Accountant**
- 1.11. Self Assessment Questions**
- 1.12. Reference Books**

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**1.1. CONCEPT OF MANAGEMENT ACCOUNTING**

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Management Accounting is one of the branches of accounting. It provides the relevant information to the management for decision making. It provides necessary information to the management for discharging its functions. These functions are : planning, organizing, staffing, directing and controlling. Further, it provides necessary data for management for effective and efficient control of the business.

Management Accounting is not mere recording and compiling of income and expenditure but also an effective tool of forecasting, planning and regulating business or economic activity of a concern. It helps the management in budgeting and budgetary control, production planning and control. Till recently very few people looked upon Management Accounting as a subject distinct from accounting. Management Accounting is comparatively new field in the area of accounting. Data process by high speed computers has left traditional accounting far behind in the task of serving the decisional needs of management.

Management Accounting is highly sensitive to management needs. However, it assists the management and does not replace it. It represents a service the phase of management rather than service to management from an outsider.

The Management accounting covers all those services by which the accounting department can assist the management in the formation of policy, taking a decision, control of its execution and the appreciation of effectiveness. It eliminates intuition which is not at all dependable from the field of business management and attempts at broadening the services of accounting to management. It has opened new lines of thought on work measurement and has indicated the advantages still to be obtained from more precise form of control. It not only provides meaningful accounting information to various levels of managers but also equips them with analytical and measurable tools.

### 1.1.1 Management Accounting – Definitions:

Many experts have defined the term management accounting. They are given below:

1. **Charles T. Horngren:** "Management Accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation and communication of information that assists executives in fulfilling organisations objectives."
2. **Robert N. Anthony:** "Management Accounting is concerned with accounting information that are useful to management."
3. **Batty:** "Management Accountancy is the term used to describe the accounting methods, systems and techniques which , coupled with special knowledge and ability, assist management in its task of maximizing profits or minimizing losses".
4. **Management Accounting Practices Committee (MAPC) of U.S.A.:** "Management Accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation and communication of financial information used by the management to plan, evaluate and control."

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## 1.2 LIMITATIONS OF FINANCIAL ACCOUNTING

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Financial Accounting is concerned with recording, classifying and summarising financial transactions pertaining to an accounting period. The basic objective is to provide a commentary to the shareholders and outside parties on the financial status of an enterprise in the form of a profit and loss account and balance sheet. The profit or loss of business operations is revealed through these statements year after year, observing the statutory requirements of the Companies Act, 1956.

Cost Accounting, on the other hand, aims at providing cost data for managerial planning, controlling and decision-making. It provides a complete explanations as to how the scarce inputs are put to use in business. The sources of efficiency or inefficiency are revealed through periodical reports. The profit or loss relating to each job, department or product can also be found out easily.

Financial Accounting provides a post-mortem examination of past events and, hence, not amenable for exercising control measures. It does not offer a running commentary on the profitability of various jobs, departments or processes in an organization. These serious limitations have ultimately paved the way for the emergence of cost accounting. Let us now examine the limitations of financial accounting in greater detail:

1. **Financial accounting discloses only the net result of the collective activities of the business** as a whole. It does not indicate the profit or loss of each department, job, process or contract.
2. **Expenditure is not split up according to departments, process and products** and, hence, prices of articles manufactured cannot be fixed accurately.
3. **Financial accounting does not indicate the remunerative prices which may be quoted in times of depression.**
4. **It does not ensure proper control over materials** and supplies, wages, labour and overheads.
5. **Expenses are not classified as direct and indirect items** and are not assigned to the product at each stage of production to show the controllable and uncontrollable items of overhead cost.
6. **It does not provide any measure to judge the efficiency of the concern.**
7. **Financial Accounting is purely historical**, since the data is summarised at the end of the accounting period. Prompt cost information on a day-to-day basis is not available.
8. **It does not provide a complete analysis of losses** due to idle time, idle plant and equipment.
9. **It does not offer cost data for comparison with previous periods.**

Despite these limitations, financial statements remain the basic documents from out of which out information is obtained.

As we are aware, the trading and profit and loss accounts portray overall results of working of an enterprise during a specified period. Whereas costing, with its objective and analytical approach, discloses the detailed information relating to profit or loss. The information contained in financial statements is digged, analysed and presented in a convenient form, facilitating management planning and control.

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### 1.3. FINANCIAL ACCOUNTING – MANAGEMENT ACCOUNTING – COST ACCOUNTING

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

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

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

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

#### 1.3.1 Differences between Financial Accounting and Management Accounting

	<b>Basis for Difference</b>	<b>Financial Accounting</b>	<b>Management Accounting</b>
1.	<b>Objective</b>	The primary objective of financial accounting is to ascertain profit and to find out financial status of a concern. It provides financial data of the organisation to the shareholders and creditors.	The primary objective of management accounting is to provide accounting informatic to the management in day to day operations for taking proper decisions.
2.	<b>Nature</b>	Financial Accounting is concerned almost exclusively with historical records and past performance.	Management accounting is concerned with future plans and policies.
3.	<b>Dependency</b>	Financial accounting is not dependent on management accounting.	Management accounting depends on financial accounting for vital information.

	<b>Basis for Difference</b>	<b>Financial Accounting</b>	<b>Management Accounting</b>
4.	<b>Application of Accounting Principles</b>	It adheres to Generally Accepted Accounting Principles.	Such accounting principles are not considered.
5.	<b>Approach</b>	Financial accounting is historical in approach. Financial accounts are the results of past events, only past expenses and incomes are recorded.	Management accounting is predictive in approach. It is concerned more with future. Thus, all information are in the form estimates and Budgets for future.
6.	<b>Presentation</b>	These accounts are presented in a specific form either prescribed by law or by convention.	He no such form is prescribed. The information can be presented in any way suitable to the management needs.
7.	<b>Control</b>	It does not lay emphasis on control.	Management accounting controls the performance of the organisation by preparing performance reports for each responsibility centre.
8.	<b>Valuation of Stock</b>	Stocks are valued on the principle of "cost or market price whichever is lower".	No such principle is followed for valuation of stocks.
9.	<b>Statutory obligation</b>	Financial accounting is guided by statutes	Management accounting is not statutory
10	<b>Audit</b>	Audit of financial accounts is compulsory	Audit of management accounts is not compulsory.

### 1.3.2 Differences between Cost Accounting and Management Accounting:

	<b>Basis for Difference</b>	<b>Cost Accounting</b>	<b>Management Accounting</b>
1.	<b>Objective</b>	The primary objective of cost accounting is to set routine, budgets and standards. It is mainly aimed at knowing the per unit cost of output.	Th primary objective of management accounting is to measure actual performance measure actual performance and report to the management for taking corrective actions by detecting the mistakes.
2.	<b>Scope</b>	It is primarily concerned with cost allocation.	Its scope is wider. It covers financial accounting an tax accounting.

	<b>Basis for Difference</b>	<b>Cost Accounting</b>	<b>Management Accounting</b>
<b>3.</b>	<b>Applicability</b>	It is generally applicable to manufacturing concerns.	Management accounting methods and techniques are applicable to all concerns.
<b>4.</b>	<b>Data used</b>	Here quantitative figures are used.	Here both quantitative and qualitative costs are used.
<b>5.</b>	<b>Transactions</b>	Cost accounting embraces internal as well as external transactions.	Management accounting is concerned with internal transactions.
<b>6.</b>	<b>Future Activities</b>	Cost accounting does not attach importance to future activities.	Future activities are primarily considered.

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## 1.4. IMPORTANCE OF MANAGEMENT ACCOUNTING

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Management accounting assists the management in achieving better results by making a clear shift in emphasis from mere recording of transactions to their analysis and interpretation. It concerns with the tools and techniques of formulation of budgets and presetting of standards as well as evaluation of deviations in actual performance and also implementation of prompt remedial measures. In fact, management accounting broadens the services of accounting to management. The importance of management accounting can be learned from the following.

- 1. Helps in maximising profits:** Management Accounting helps in maximising the profits. The constant effort of the Management accountant is to suggest the ways and means of cost reduction. It increases the efficiency of various business functions. Further, the management aims to control the cost of production and this will help to increase the profits. Increase in profits will benefit different persons as follows:
  - i. Customers can be charged a lower price.
  - ii. Workers can be paid higher wages and the service conditions of the working staff can be improved.
  - iii. The owners may be given a higher rate of return on the capital employed.
  - iv. The Government may get higher income in the form of taxes.
  - v. The reputation of the company will increase.
  
- 2. Helps in planning:** The Management accounting helps to plan the business activity in a systematic manner. It involves forecasting, and planning of future operations of the business in the light of the past as well as present achievements.
  
- 3. Helps in analysis and interpretation of data:** Management accounting is concerned with analysis and interpretation of financial data. Thus, data becomes more useful and reliable. For this purpose engineering records, case studies, minutes of meeting

productivity reports, special service and other business documents are greatly relied upon.

4. **Helps in preparing budgets:** The techniques of management accounting are widely used and accepted for preparing budgets. These budgets are compared with actual results and thus an effort is made to find out and correct the variances, if any.
5. **Helps in decision making:** Management accounting furnishes accounting data and statistical information required for the decision making process in management which vitally affects the survival and the success of the business. There are always many courses open for management and selection of the best alternate is decided by the techniques of the Management Accounting. Thus, it is useful for selection of the best alternative.
6. **Helps in control:** Management Accounting is an useful technique for control on wastes. This is done by using techniques of standards and budgeting which is a vital part of management accounting. Different techniques of management accounting will help in the effective control of the business operations.

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## 1.5. FUNCTIONS OF MANAGEMENT ACCOUNTING

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The management accounting function is to assist and advise management in taking appropriate decisions. As such, it is vitally important that the information is presented in the most comprehensive and effective manner. It is, therefore, the duty of the management accountant to evolve an efficient and suitable system of reporting and presentation of cost of other financial information to the management. The reporting system should be designed to meet the needs of individual concerns and should be frequently reviewed and adjusted in accordance with the requirements. The main functions of Management Accounting are given below:

1. **Planning function:** Management accounting is very useful in planning. Before planning management has to evaluate past and future strategy. The Management Accounting provides past data on the basis of which future line of action can be chosen. Management accounting provides costing and statistical data to be utilized in setting goals and framing policies. Management accounting assists in planning for a specific purpose as well as overall planning for the organization.
2. **Decision making function:** Accounting data required for decision making purpose is supplied by management accounting through resort to a process of classification and combination of data. In fact, before taking up any scheme, management has to study various alternatives. The selection of best alternative is recommended.



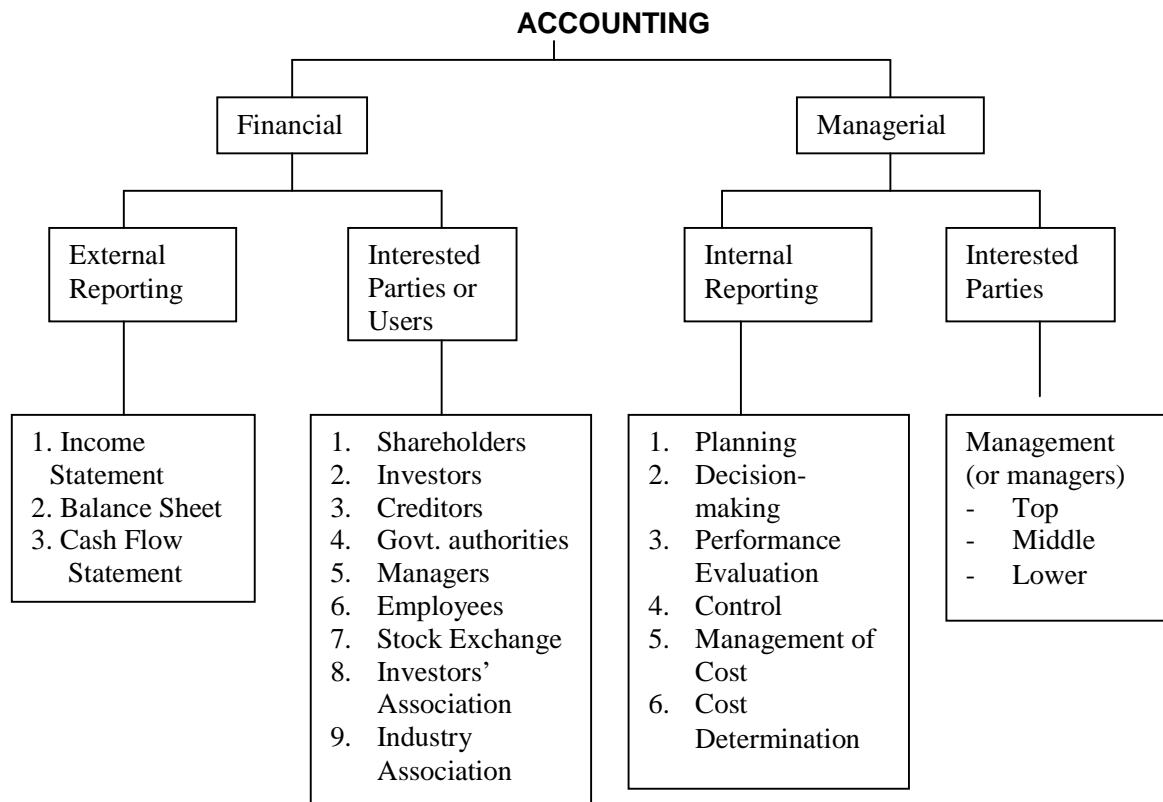
3. **Formulation of business budgets:** Management 'accounting is very useful in planning which involves the setting up of objectives, a search for optional strategies for achieving business objectives and helpful in selection of the most appropriate alternative course of action.
4. **Organisation function:** Management accounting helps in establishing sound organisation by dividing the whole organisation into different cost centres. Fixing and controlling of responsibilities and costs at each of these centres leads to efficient business structure. A sound system of internal control and internal audit for each of these centres and the constant review of the procedures helps the people concerned to be alert and makes possible improvements.
5. **Co-ordination Function:** Management Accounting involves establishing sound leadership in order to maintain high standard and co-operation among the employees. The superiors should be able to identify the needs and gaps in the satisfaction among the employees. This is made possible through periodical departmental profit and loss accounts, budgets and reports prepared by each department.
6. **Control function:** Management accounting facilitates management in controlling the destiny of the organisation. The standards for performance are maintained and any deviation from them is measured and estimated. Measuring actual performance against approved operating plans, standards and budgets are interpreted and reported to the heads of the departments at higher levels. All these help the management in controlling the overall performance of the organisation. Cost control techniques and functional control enables the management to delegate the authority easily and successfully.
7. **Protection of business interests:** Management accounting is useful to interpret and report the effects of external influences on the achievement of business goals. This function lays stress on the continuous appraisal of economic and social forces and government which are directly associated with the operation of the business. Further, the management accounting provides internal check and control for the protection of the business assets.
8. **Provision of data:** Management accounting provides concise information covering entire field of business activities at relatively for long interval to the top management.

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## 1.6. SCOPE OF MANAGEMENT ACCOUNTING

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The scope of Management Accounting is very wide and broadbased and it include within its fold, a variety of aspects of business operations. The following are some of the areas of specialization included within the ambit of management accounting.



1. **Financial Accounting:** Historical data presented in financial accounting is the basis for planning the future course of action.
2. **Cost Accounting:** Cost Accounting provides various techniques such as marginal costing, standard costing etc., which help the management in a number of ways.
3. **Tax Accounting:** Tax planning with different departments, filing of tax returns and keeping the management informed of its tax burden falls within the scope of Management Accounting.
4. **Internal Audit:** Internal audit undertaken for performance appraisal, strengthening of internal control procedures as an aid to the final statutory audit, also comes within the purview of Management Accounting.
5. **Forecasting:** Management Accounting covers forecasting the future in all possible states of nature and evaluation of available alternatives that backdrop.
6. **Budgetary Control:** Formulation of budgets, their comparison with actuals and analysis of variances is a part of Management Accounting.
7. **Reporting:** Reporting to management of the various activities of the organisation is an integral part of Management Accounting. Reports are made in uniform intervals of time, the length of the time interval being dependent on the nature of information.
8. **Office Services:** Management Accounting might also be expected to deal with data processing, filing, copying, duplicating, communication etc., and report about the utility of different office machines.

The Scope of Management Accounting and Financial Accounting can be observed from the following figure. Through this one can exactly find out the role of the Management Accountant and Financial Accountant.

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## 1.7. LIMITATIONS OF MANAGEMENT ACCOUNTING

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The following are the limitations of management accounting.

1. **Accuracy of information:** The management accounting depends upon the cost and financial accounting records for information. Therefore, the accuracy of information furnished by management accounting and the reliability of conclusions derive therefrom depends upon the accuracy of these information.
2. **Use by management:** Management accounting is only a tool. It cannot replace management. The usefulness of the management accountancy depends upon the extent to which the data provided by it are used by the management in taking decisions. The whole utility will go waste if management accountant lacks capability.
3. **Misleading conclusions:** Management accounting requires a blending of knowledge of different fields – accountancy, statistics, economics and law. Improper or insufficient knowledge of all these aspects may lead to misleading conclusions.
4. **High cost:** The installation of management accounting requires a blending of knowledge of different fields – accountancy, statistics, economics and law. Improper or insufficient knowledge of all these aspects may lead to misleading conclusions.
5. **Management accounting is at initial stage:** Management accounting is a new technique and is still in evolutionary stage. New ideas and techniques are being introduced now and then. Therefore, it is essential to keep a continuous track of latest theories and developments in the field.
6. **Opposition to change:** The old techniques of accounting are in use since long. Thus, change for new approach is opposed by many. The accounting staff will hesitate to new approach, thus, introduction of management accounting will need more efforts to motivate employees for accepting new approach.
7. **Lack of statutory recognition:** In our country, the results shown by management accounting do not get legal recognition. The income tax department does not consider the profits shown by management accounting techniques.
8. **No set of rules:** There is hardly any prescribed set rule of management accountants, some one may prepare funds flow statement in vertical form, while others may follow horizontal form.

9. **Limited use:** The management accounting is a new technique. Its use is limited to big business houses and it may be of little use to small undertakings.
10. **Intuitive decision making:** Though the main contribution of management accounting has been the elimination of intuitive management, there is always a temptation to take an easy course of arriving at decisions by intuition rather than following the path of scientific decision making.

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## 1.8. TOOLS OF MANAGEMENT ACCOUNTING

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Management accounting helps the management in solving the operational problems of the concern. It aims at presenting the accounting information to help management in formulation of policies and increasing the operational efficiency so as to maximise profits or minimise losses of the undertaking. In order to fulfil its task of helping the management in the managerial functions – planning, coordinating, controlling and appraisal of activities, management accounting uses the following tools and techniques.

### 1.8.1 Financial Planning:

The success of a business enterprise depends upon the careful preparation of a prudent financial plan for the business. By estimating in detail the current and future requirements of funds for operations and capital expenditure purposes, the management gets the information and, thereby the ability, to utilise the resources to the optimal level and avoid wastage. Financial plan also helps to determine the optimal capital structure of the firm.

It is the function of the management accountant to prepare the financial plan taking into account t'—company policy and the forecasts of his production and marketing colleagues. It is his responsibility to coordinate the plans of each area. Once the financial forecasts are ready, the management has an opportunity to review the projected plans and modify them to match the resources of the firm. Thus, the maximum utilisation of available funds can be ensured. The advantages of financial planning are:

1. It points out to management what funds are needed, and when, and for what duration, if the specific plans and programmes of the company are to be implemented.
2. It highlights to management what resources are needed, and enables management to consider suitable alterations to plans before commitments are made.
3. It also serves as a basis for review and control whereby deviations from the expected performance can be promptly identified and necessary corrective actions taken without delay.

### **1.8.2 Financial Analysis:**

Financial Analysis is the process of identifying the financial strengths and weaknesses of the firm by properly establishing relationships between the items of financial statements viz., Balance Sheet and Profit and Loss Account. The analysis and interpretation of financial statements is an important tool of management accounting. Proper analysis and interpretation of financial data makes it more meaningful and places it in proper perspective. The data becomes more meaningful by proper analysis in relation to other data. For this purpose important technique that is used is preparation of comparative financial statements, trend analysis, funds flow techniques and ratio analysis etc. This analysis and interpretation of various financial statements provide information to take decisions and forming policies.

### **1.8.3 Budgetary Control:**

Budgetary control is an important managerial tool. The basic purpose of budgetary control is to improve the efficiency and the profitability of the concern. Budgetary control serves as invaluable aid to management through planning, coordination and control.

Budget presents the plans, objectives and policies of an enterprise in numerical terms. It is a short-term operational plan used as a tool by management for planning as well as controlling the activities of the organisation and also ensure the coordination among the different departments in the organisation to achieve its predetermined goals. The use of budget to monitor and regulate the operational activity of the organisation in a systematic manner is called "budgetary control". A budgetary control system secures control over costs and performances in various parts of an enterprise by:

1. Establishing budgets;
2. Comparing actual results with budgeted ones; and
3. Taking corrective action or revising the budget if necessary.

### **1.8.4 Standard Costing:**

Another important tool of Management Accountant is Standard costing. Standard costing is a system in which cost of each unit of batch or job is predetermined on the basis of normal levels of activity and efficiency. In this way, standards, are set with which actual expenditure when incurred are compared. Differences between actual expenditures and the predetermined standards are technically known as 'Variances.' Standard costing is designed to give costs of operation or process rather than products so that variances may be traced to their source.

### **1.8.5 Marginal Costing:**

Marginal costing is comparatively a new area in the field of accounting. It is a useful technique which guides management in pricing, decision making and assessment of

profitability. It is the cost which arises from the production of additional output. It classifies costs into fixed and variable ones. This distinction forms the basis of marginal costing.

Marginal costing regards as product costs only those manufacturing cost which have a tendency to vary directly with the volume of output. It is an important tool in the hands of management to take decisions. Marginal costing includes the discussion of cost-volume-profit analysis and break even analysis. It helps the management in taking sound and scientific decisions regarding production and distribution.

### **1.8.6 Funds Flow Statement and Cash Flow Statements:**

The effectiveness of the financial management can be understood by statement of changes in the financial position. Our business activities generate income which is used again in generating more income. In other words, we can say that the additional funds generated during a particular year as compared to its previous year is applied in various uses. The effectiveness of the management lies in the fact that the income is generated without sacrificing the financial health of the business concern. Statement of changes in the financial position, therefore, supply us information concerning financing and investing activities of the business. These statements also show the changes in the financial position of the business for a period. It summarises the sources from which funds have been obtained and the uses to which they have been applied.

**Funds flow Statement:** The funds flow statement deals with the presentation of a statement which summarises for the period the resources made available to finance the activities of an enterprise and the uses the which such resources have been put. The statements of sources and application of funds is a useful tool in the financial manager's analytical kit. It gives an insight into the most detailed analysis and understanding of changes in the distribution of resources between balance sheet dates. Funds flow statements help a lot in financial analysis and control, future guidance and comparative studies.

**Cash Flow Statement:** Cash flow statement shows the movement of cash between two periods. This statement shows various causes of variances in cash balance. Like funds flow statement this statement also shows inflow and outflow of cash between two time periods. Cash flow statement is unlike funds flow statement, highlights only total cash inflow and closing cash at the end. It speaks about short term financial positions of a company. It speaks about the speed of cash being collected from debtors, stock and other current assets, on the other hand, the use of cash in paying current liabilities.

### **1.8.7 Human Resources Accounting:**

Human Resource Accounting means accounting of people as organisational resources. It means the measurement of the cost and value of people in organisations. More formally human resource accounting can be defined as the process of identifying, measuring and

communicating information about human resources and it ought to be viewed as a metaphor. Human resource accounting is not only a system of accounting for the cost and value of people to organisations, it is also a way of thinking about the management of people in formal organisations.

#### **1.8.8 Responsibility Accounting:**

Responsibility Accounting represents a method of appraising the performance of various divisions of organisation. It is a system of accounting that recognises various responsibility centres and reflects the plan and action of each of these centers by assigning particular revenues and cost to these plans. It is also known as Profitability Accounting and Active Accounting. The Responsibility Accounting collects and reports planned and actual accounting information about the input and output of responsibility centres.

#### **1.8.9 Revaluation Accounting:**

This tool is also of a recent origin. It ensures the maintenance and presentation of the capital of enterprise. It is an important tool of management accounting. It involves more extended estimation and prediction of things to come requiring a high order of intellectual ability for their economic analysis.

#### **1.8.10 Statistical and Graphical Techniques:**

A large number of statistical and graphical techniques has been evolved to be used in management accounting. Examples of some of these techniques generally used are: Investment chart, Current assets chart, Master chart, Chart of sales. Statistical techniques are also increasingly used in management accounting. Method of least squares, Regression lines, Linear programming and Statistical quality control etc., are usually used for the purpose.

#### **1.8.11 Financial Reporting:**

Finally, the Management Accountant has to provide management at all levels with necessary factual data and information so as to enable them to carry out the various functions most efficiently. The ability of accounting to translate activities involving people, things and even abstract relationship into monetary terms facilitates the communication process. Proper planning, controlling and decision making etc., all depend upon effective communication for financial reporting. Various charts and graphs are also used in financial reporting.

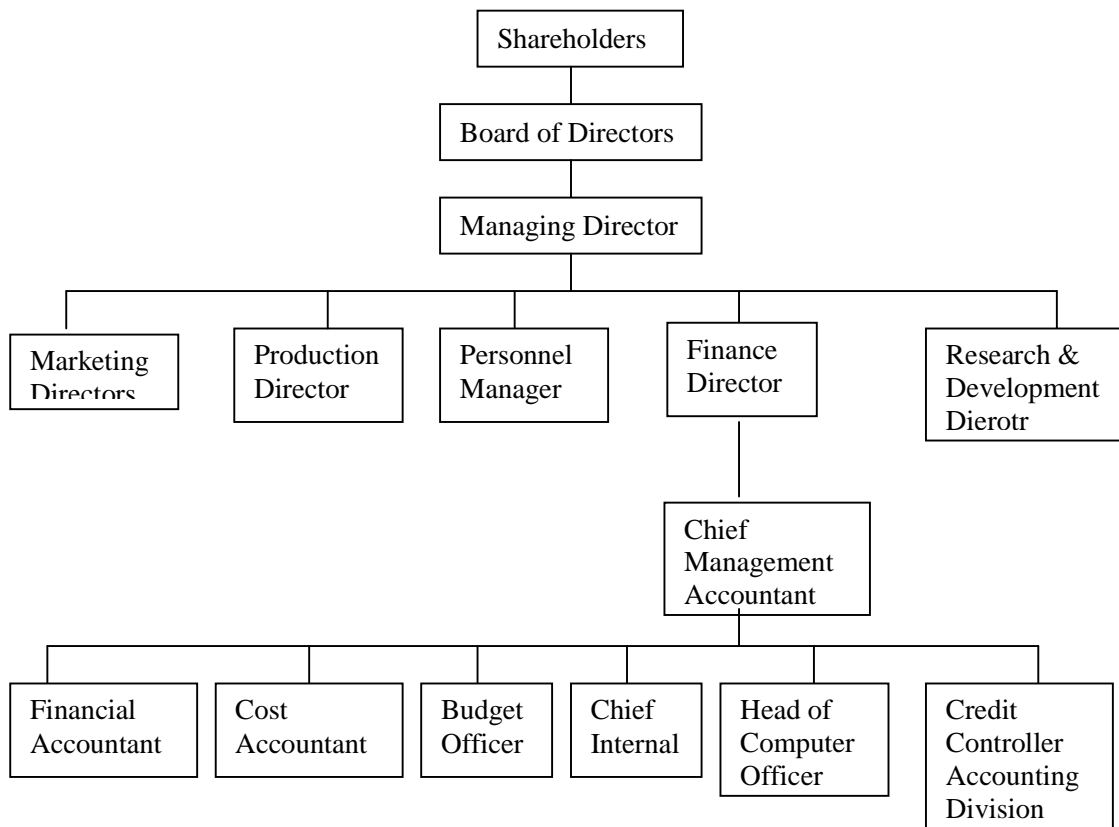
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### **1.9. ORGANISATION FOR MANAGEMENT ACCOUNTING**

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The organisation of the Management Accounting System should provide relevant information for all levels of management to achieve maximum efficiency. The organisation chart

should be adopted keeping adequate provisions for modifications, if any, required for years to come, particularly so when a firm expands or shrinks on account of financial booms or stringencies. The following is the typical organisation chart of a manufacturing company. From this chart we can observe the place and the role of the Management Accountant.




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## 1.10. ROLE OF MANAGEMENT ACCOUNTANT

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### 1.10.1 Role of Management Accountant:

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

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



Accountant or Chief Accounts Officer, Controller of Accounts, Finance Controller or Finance Director.

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

### 1.10.2 Functions of Management Accountant:

The functions of the Management Accountant have been exhaustively spelt out by the Management Accountant Institute as well as National Industrial Conference Board of the United States, in a greater detail. But all the same, they devolve mainly on the seven-point concept of modern accountant. But with the passage of time, the functions of the management accountant have been vastly expanded. The following are the functions of a management accountant.

1. **Planning function:** It includes profit planning, programmes, investing and financing, sales forecast, expense budgets and cost standards. The plan as such should involve the necessary procedures to implement the plan effectively.
2. **Reporting and Interpreting:** Another important function of management accountant is to compare performance with operating plans and standards and to report and interpret the results of operations to all levels of management. This function includes the designing, installation and maintenance of accounting and cost systems and records, the determination of accounting policy and preparation of other reports as required.
3. **Advise to Management:** The Management Accountant has to evaluate the effectiveness of the policies, organisational structure and procedures in attaining the business objectives. He has to measure and report on the validity of the various business policies and objectives. For this purpose he keeps in touch and consults all segments of management responsible for policy or operations of business related to the attainment of objectives. On the basis of this evaluation, he advises the top management with a view to improve efficiency and performance of his accounting function.
4. **Administration of tax matters:** The Management Accountant will supervise all matters relating to tax accounting. This requires preparation of returns on the basis of taxable income of the enterprise. All the papers duly filled in have to be submitted to the income tax authorities in time.

5. **Government Reporting:** He will see that all the statements that have to be submitted periodically to the Government agencies are prepared correctly in time. It is also his duty to explain any complexity that may arise.
6. **Protection of Firm's Assets:** Another important function of the management accountant is to protect physically the assets of the business. This function requires adequate internal control and auditing and assuring proper insurance coverage.
7. **Constant vigil on environmental changes:** Last but not the least, the function of management accountant is to continuously appraise economic and social forces and government influences and interpret their effect on business. The Management accountant has to see that as far as feasible the organisation conforms to management's plans and policies. He has, therefore, to make thorough study of all the external influence that may exert their effect on the business and interpret them and report to the top management.

### 1.10.3 Responsibilities of a Management Accountant:

The role of Management Accounting is largely advisory in nature. His authority of restricted to his own department. His function is to bring to the notice of the management the various aspects related to a particular division and explain the consequences of selecting a particular alternative. The Management Accountant tenders sound advise for improving the efficiency of all the phases of the management, he cannot be considered to be an expert in solving the problems of production or marketing. At best, he can discuss with different levels of management such problems in detail and the financial implication of the alternative solutions suggested.

Thus, the modern management accountant place a dual role in organisations. In the first place, he acts as a watchdog for top management. In this role, he is responsible to the tope management for the integrity and reliability of the performance reports he submits. Secondly, he assumes a helper's role in which he is responsible for helping departmental managers in planning and control operations.

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## 1.11 SELF ASSESSMENT QUESTIONS

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1. Define Management Accounting.
2. Discuss the concept of Management Accounting.
3. Explain the limitations of Financial Accounting.
4. Explain the importance of Management Accounting.
5. "The Managerial objectives of accounting are to provide us data to help management to plan and control operations" Discuss and mention the main objectives of managerial Accountancy.
6. Distinguish between Financial Accounting and Management Accounting.

7. Distinguish between Cost Accounting and Management Accounting.
8. Explain the functions of the Management Accounting.
9. What is Management Accounting? Discuss the scope and limitations of the management accounting.
10. Explain briefly the tools and techniques of Management Accounting.
11. Draw an organisation chart showing the role of Management Accountant in a manufacturing company.
12. Discuss the role of the Management Accountant in an organisation. Briefly state his functions.
13. Discuss the principal functions of management accounting and show how it helps in solving managerial problems in key areas of the business.
14. "Management Accounting is nothing more than the use of cost and financial information for management purpose." Explain the statement and clearly distinguish between Financial Accounting and Management Accounting.
15. "Management Accounting is the presentation of accounting information in such a way so as to assist the management in the creation of policy and in the day to day operation of the undertaking" Elucidate.
16. "Any form of Accounting which enables a business to be conducted more efficiently can be regarded as Management Accounting." Elucidate.
17. Describe how management accounting satisfies the various needs of management for arriving at appropriate business decisions.

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**Chapter – 2****MANAGEMENT INFORMATION SYSTEM****Objectives :**

After studying this unit you should be able to

- understand the concept of management information system
- evaluate the importance of MIS
- discuss the role of computers in Management Information System
- go through the types of management information system

**Structure :**

- 2.1 Concept of MIS**
- 2.2 Evolution of MIS**
- 2.3 MIS and its uses**
- 2.4 Role of Computers in MIS**
- 2.5 Types of MIS**
- 2.6 Self Assessment Questions**
- 2.7 Reference Books**

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**2.1 CONCEPT OF MIS**

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Based on different facets of the organisational functions the Management of Information System (MIS) came into existence in a phased manner. In good olden days, the organisational data was processed and presented to the managers in the form of reports regularly. This was called Management Information System. Subsequently, there was a little modification in the form of differentiating between data and information. When data are analysed information is produced. According to the modern concept of MIS, it is information that is needed but not the mass of data.

John Naisbitt in his famous book “Megatrends : Ten New Directions Transforming our Lives” argues that the people who have access to information are increasing their influence in organisation. Today, 13% of the total US workforce is employed in manufacturing while 60% produce or process information. Indian companies are also realising that, in a fast moving world, information is what will make the difference between success and failure.

A Management Information System can be evolved for a specific objective if it is evolved after systematic planning and design. It calls for an analysis of a business, management views and policies, organisation culture and the management style. The information should be

generated in this setting and must be useful in managing the business. This is possible only when it is conceptualised as a system with an appropriate design.

Firms engaged in similar business need not have same information system. This is because the people working in the two organisations are different. Naturally, the design of MIS also will differ. Model may be the same but contents may differ. The components of MIS include an information system, a pre-defined set of business goals and mission, application of pure and social sciences, application of principles and practices of management, use of database and knowledge base, computers and information technology. Thus, MIS is a product of multi-disciplinary approach to the business management. It is a product, which needs to be kept under a constant review and modification to meet the corporate needs of the information. It is a prescribed design for the organisations' growth.

MIS can also be seen from a different angle. In every organisation databases exist. Considering each database as a subsystem, several subsystems are evolved. MIS can be seen as an assembly of several of these subsystems. This constitutes the physical view of the MSI. These subsystems may range from data collection, transaction processing and validating, analysing and storing. These subsystems could be at a functional level or a corporate level. The primary objective of MIS is to provide information for decision making. It continuously interacts with the internal and the external environments of the business and provides a corrective mechanisms in the system. The MIS, therefore, is a dynamic concept subject to change, with a change in the business management process. It is developed considering the organisational fabric, giving due regard to the people in the organisation, the management functions and the managerial control.

### 2.1.1 Definition:

The Management Information System is popularly known as the Information System, the Information and Decision System, the Computer – based Information System.

**Wehrich and Koontz** defined Management Information system as a formal system of gathering, integrating, comparing, analysing and dispersing information internal and external to the enterprise in a timely, effective, and efficient manner.

1. The MIS is defined as a system which provides information support for decision making in the organisation.
2. The MIS is defined as an integrated system of man and machine for providing the information to support the operations, the management and the decision making function in the organisation.
3. The MIS is defined as a system based on the database of the organisation evolved for the purpose of providing information to the people in the organisation.
4. The MIS is defined as a Computer-based Information System.

Thus, MIS is a system to support the decision making function in the organisation. In today's world, the MIS is a computerised business processing system generating information for the people in the organisation to meet the information needs for decision making to achieve the corporate objectives of the organisation. Every individual in an organisation is continuously looking for some information which is needed to perform his/her task. Hence, the information is people-oriented and it varies with the nature of the people in the organisation. Since the people are instrumental in any business transaction, a human error is possible in conducting the same. Since a human error is difficult to control, the difficulty arises in ensuring a hundred per cent quality assurance of information in terms of completeness, accuracy, validity, timeliness and meeting the decision making needs. In order to get a better grip on the activity of information processing, it is necessary to have a formal system which should take care of the following points.

- ❖ Handling of a voluminous data.
- ❖ Confirmation of the validity of data and transaction
- ❖ Complex processing of data and multidimensional analysis.
- ❖ Quick search and retrieval.
- ❖ Mass storage
- ❖ Communication of the information system to the user on time
- ❖ Fulfilling the changing needs of the information.

The management information system uses computers and communication technology to deal with these points.

### 2.1.2 Elements of MIS:

An effective system of MIS collects data from all possible sources, the information is properly processed and stored for use in future. The following are the element of MIS.

1. **Knowledge of required information:** The first element of MIS is the determining of informational needs of the organisation. What type of information will be required and what will be the sources. Thus, only desired information will be collected.
2. **Screening information:** The collection information should be properly processed, sorted and stored as these will be used at a future date.
3. **Time and quantum of information:** Another element of MIS is to be determine the time and quantum of information needed. The collected information is sent to the desired managerial level with the specified time. So that timely action can be taken.

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## 2.2. EVOLUTION OF MIS

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Without information, a business simply cannot survive. Information flows are essential to the life and health of a business. Just as the flow of blood is to the life and health of an

individual. This applies to small organisations as well as to large ones. Indeed, superior information systems have enabled many small companies to more than offset the economies of scale enjoyed by their bigger competitors. It has been said that the recipe for a good decision is "90 per cent information and 10 per cent inspiration." Information is the catalyst of management and the ingredient that coalesces the managerial functions of planning, operating and controlling.

By examining the basic information needs of a company (large or small) and what constitutes a satisfactory management information system, we can gain a better understanding of how information needs become more complex as organisation's operations expand. The increase in company size results in an increase in information collecting, processing and distribution. It now becomes necessary to handle many customer accounts and many production records with many more interrelationships. In addition to the increased records, information needs and associated difficulties, there are now the problems connected with delegation of authority and responsibility. It is now necessary to assign people to supervise their people, and this development expands communication lines and compounds these problems.

As the need for information grows, additional people and equipment must be added to handle the information. Typewriters and calculators are purchased and additional clerks are hired. The next step is to procure tabulating and punched-card equipment. Finally, each generation of electronic computers is acquired as it becomes available to take advantage of the latest information processing technology. Management plans, organizes, staffs, directs and controls. The communication network for information has increased fantastically. A succession of delegation of duties and authority has lengthened the lines of communication and has increased the complexity of the communication network a thousand fold. The functions of the company and of its management are essentially the same regardless of size, but the complexities associated with size have vastly increased the need for information in order to manage the organisation.

The objective of developing or improving a management information system can be explained largely in terms of the new Mr.Owner's problems: (1) to provide the type of information environment that will integrate the basic operating functions and (2) to provide management with access to information relative to complex activities by decentralised organisations. Both (1) and (2) need to be done with approximately the same case. It is apparent that change will continue to take place in management and in the operation of organistaions. To handle the changes properly, the manager of today must learn what to do with information, to deal with the resultant increased complexity. In other words, the manager must be prepared to take an active part in the design and installation of management information systems. There are six characteristics of the type of information that lends itself best to computer use:

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<b>1. Speed</b>	:	Computers are extremely valuable if speed is required in processing data.
<b>2. Quantity</b>	:	Large amounts of data can be processed very quickly.
<b>3. Repetitiveness</b>	:	The more repetitive the task, the more profitable it is to automate this task.
<b>4. Complexity</b>	:	Problems with several interacting variables can be solved quickly and accurately.
<b>5. Exact input</b>	:	Computers require inputs that are exact. Intuition and judgement are not attributes of machines.
<b>6. Accurate output</b>	:	Great accuracy can be obtained as needed; also, accuracy is not affected by boredom and fatigue.

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These six characteristics are clearly present in production-related information. Because the information needed for effective management of production/operations has all these characteristics, these system are probably the most adaptable to automation if any in the company. Moreover, because of the requirement for timeliness in handling large quantities of data, the greater advances in improvements and economy are likely to be made in the production/operations area.

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## 2.3. MIS AND ITS USES

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Considering an organisational similar to a human body, information of an organisation is like blood to the human body and MIS of an organistaion is like the heart of a human body. The heart supplies pure blood to all pars of the body including the brain. The heart regulates and controls the incoming impure blood, process it and sends it to the destination in the required quantity. Exactly, MIS plays a similar role in an organisation. Appropriate data is collected from various sources, processed and sent to all destinations in need of the information. The destination may comprise an individual, a group and the mangers at different levels.

### 2.3.1 Effective Management Decision Making:

MIS provide information needed for effective management decision making. MIS help a business improving its operational efficiency, promoting organisational innovation, or building strategic information resources. This in turn helps the management to have competitive advantage in dealing with customers competitors, suppliers, Government and Public. MIS also helps management by building a strategic information base in improving productivity, bringing down costs, developing new products, services, and process. The following are the specific uses of MIS to a business firm.



1. **Customer Service:** MIS helps the management in attending the customer needs immediately and efficiently.
2. **Locking in Customers:** By creating exclusive computer communications with customers for order entry and exchange of product and service. MIS brings down the gap and retains the customers.
3. **Customer Data Base:** From collecting sales data to building a rich data warehouse of information about individual customer's purchases, preferences, demographics, and profitability. Companies can 'data-mine' their proprietary databases to detect different customer need clusters and make differentiated offerings to each cluster.
4. **Individual Section:** From selling the same offer in the same way to everyone in the target market to individualizing and customizing messages and offerings. Customers will be able to design their own product features on the company's Web page.
5. **E-Commerce:** From attracting customers to stores and having salespeople call on offices to making virtually all products available on the Internet. Consumers can access pictures of products, read the specs, shop among on-line vendors for the best prices and terms, and click to order and pay. Business-do-business purchasing is growing fast on the Internet. Purchasing agents can use bookmarked Web sites to shop for routine items. Personal Selling can increasingly be conducted electronically, with buyer and seller seeing each other on their computer screens in real time.
6. **Relationship Marketing:** Relationship marketing has the aim of building long-term mutually satisfying relations with key parties – customers, suppliers, distributors in order to earn and retain their long-term preference and business. The ultimate outcome of relationship marketing is the building of a unique company asset called a marketing network. A marketing network consists of the company and its supporting stakeholders (customers, employees, suppliers, distributors, retailers, and agencies, university scientists, and others) with whom it has built mutually profitable business relationships.
7. **New Businesses:** Information technologies make whole new products and services possible. Hardware, software and information resources can be imbedded in new customer services or products.
8. **Market Intelligence:** By assembling and manipulating data on demographics and competitors, the computers can help spotting untapped niches, develop new products, and avoid inventory crunches.

9. **Sales Productivity:** Giving salespeople portable computers so they can get messages faster and enter orders directly adds up to quicker deliveries, better cash flow, and less paperwork.
10. **Product Development:** By providing a toll-free number of consumer questions and complaints, the MIS can capture ideas for product improvement and new products.
11. **Financial Management:** By setting up computer links between the treasurer's office and banks, the managers can obtain financial information faster-and that means better cash management.

The MIS satisfies the diverse needs through a variety of system such as query systems, analysis systems, modelling systems and decision support systems. The MIS helps in strategic planning, management control, operational control and transaction processing. The MIS helps the clerical personnel in the transaction, the status of a particular record and reference on a variety of documents. The MIS helps the junior management personnel by providing the operational data for planning, scheduling and control, and helps them further in decision making at the operations level to correct an out of control situation. The MIS helps the middle management in short-term planning, target setting and controlling the business functions. It is supported by the use of the management tools of planning and control. The MIS helps the top management in goal setting, strategic planning and evolving the business plans and their implementation. The MIS plays the role of information generation, communication, problem identification and helps in the process of decision making. The MIS, therefore, plays a vital role in the management, administration and operations of an organisation.

### 2.3.2 MIS and Management Functions:

The value of MIS is the management of various functions. The management of marketing, finance, production and personnel becomes more efficient when supported by a good MIS. The tracking and maintaining of the functional targets becomes easy. The targets create a structured database and knowledge base for all the people in the organisation. The information is available in such a form that it can be used straight away or blending and analysis, saving the manager's valuable time. The functional managers are informed about the progress, achievements and shortfalls in the activity regularly.

MIS uses a dictionary of data, entity and attributes respectively, designed for information generation in the organisation. Since all the information systems use the dictionary, there is common understand of terms and terminology in the organisation bringing clarity in the communication. The MIS calls for a systemization of the business operations and improves the administration of the business by bringing a discipline in its operations as everybody is required to follow and use systems and procedures.

MIS improves managerial efficiency because the flood of information motivates an enlightened manager to use a variety of tools of the management. It helps him to resort to such exercises as experimentation and modelling. The use of computers enables him to use the tools and techniques which are impossible to use manually. It improves the decision making ability considerably. Since the MIS works on the basic systems such as transactions processing and database, the drudgery of the clerical work is transferred to the computerised system, relieving the human mind for better work.

### 2.3.3 Management and Decision Making:

Much of management is decision making, according to one of the many approaches to management. While there are several views of what constitutes management, according to the decision oriented view, management mainly comprises the planning, organising, coordinating, directing and control. Each one of these functions may be at the strategic, tactical or operational level.

**Planning:** Strategic level planning requires considerable amount of environmental information like shifting markets, changing technology as well as internal information like core competitive strength of the organisation. Tactical planning activities of information pertaining to materials and production capacities which are internal as well as external to the organisation. Operational planning like staff scheduling requires large amount of internal information e.g., schedules, attendance, up times of equipment.

**Organising:** Strategic organising needs external and internal data to decide on restructuring as well as to forge strategic partnerships. Tactical organising requires changing wage-level of the organisation as well as that of competitors. Operational organising needs data relating to skills and training requirements of the operational staff.

**Coordinating:** Strategic coordination calls for industry-wide data corresponding to technology availability. Tactical coordination calls for plant-wise and supplier-wise bottleneck data that reflect deficiencies, both inside and outside the organisation. Operational coordination requires itemised breakup of plant and machinery performance, failures etc.

**Directing:** Strategic directing functions such as introduction of office automation requires detailed cost-benefit analysis of new technologies. Tactical directing e.g., innovative marketing strategy, needs detailed market and production data, operational directing function requires detailed data pertaining to the individual managers skills.

**Control:** Strategic control decisions like total quality management needs detailed performance data and bench marking data from outside the organisations. Tactical control decisions like maintaining steady market share in the medium run would necessitate continuous monitoring of plant data. Operational control may call for techniques of statistical process control which

involves the collection of substantial sampling information that must be collected and processed continuously during the entire production period.

In essence, each and every area of managerial decision making, be it planning, organising, coordinating, directing or control, calls for substantial amount of information processing. While these functions of management need information support for decision making there are subtle differences between the decisions that can significantly benefit from information and decisions that are unlikely to benefit substantially, be the availability of information. This subtle differences between the decisions in a managerial context, was very ably pointed out by the pioneering decision theorist and Nobel Laureate, Simon. According to him, all decisions, cutting across the disciplines and levels of management, can be classified into programmed decisions and non-programmed decisions.

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## **2.4. ROLE OF COMPUTERES IN MIS**

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Translating the real concept of the MIS into reality is technically, an infeasible proposition unless computers are used. The MIS relies heavily on the hardware and software capacity of the computer and its ability to store, process, retrieve and communicate with no serious limitations.

The variety of the hardware having distinct capabilities, makes it possible to design the MIS for a specific situation. For example, if the organisation needs a large database and very little processing, a computer system is available for such a requirement. Suppose the organisation has multiple business locations at long distances and if the need is to bring the data at one place, process, and then send the information to various locations, it is possible to have a computer system with a distributed data processing capability. If the distance is too long, then the computer system can be hooked through a satellite communication system.

The ability of the hardware to store data and process it at a very fast rate helps to deal with the data volumes, its storage and access effectively. The software, an integral part of a computer system, further enhances the hardware capability. The software is available to handle the procedural and non-procedural data processing. For example, if you want to use a formula to calculate a certain result, an efficient language is available to handle the situation. If you are not required to use a formula but have to resort every time to a new procedure, the non-procedural languages are available. The software is also available to transfer the data from one computer system to another.

The advancement in computers and the communication technology has made the distance, speed, volume and complex computing an easy task. Hence, designing the MIS for a specific need and simultaneously designing a flexible and open system becomes possible, thereby saving a lot of durdgerly of development and maintenance of the system. The concept of user-friendly systems and the end user computing is possible, making information processing a personalised function. However, the application of the management principles and practices

in today's complex business world is possible only when the MIS is based on a computer system support.

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## 2.5 TYPES OF MIS

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In the process of management, a manager uses human skills, material resources and scientific methods to perform all the activities leading to the achievement of goals. In the management of any activity, a manager comes across human conflict, conflict of goals, conflict between alternative resources, conflict to time, conflict of approach or method and the conflict of choice. The manager uses a variety of tools, techniques and skills while executing the management process of planning, organising, staffing, coordinating and controlling.

### 2.5.1 Types of MIS:

Management information system is of two types

1. **Management Operating System:** The operating meeting the information needs of lower and middle level managements. The information supplied generally relates to operations of the business. The figures about finance raw materials, labours, production, sales etc. are supplied to see the pace of work and make necessary changes, if need so arise.
2. **Management Reporting System:** The reporting system is designed to supply information to top level management for decision-making. The information is presented in a way which enables the management to take quick decisions. Sometimes, comparative information to the past. The object of this information to present before management the seal position of the activities. Decision-making requires full information about all important activities of the organisation.

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## 2.6 SELF ASSESSMENT QUESTIONS

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1. Explain the concept of MIS. State its meaning, role and impact.
2. Discuss the evolutionary process of management information system.
3. Discuss the advantages of MIS
4. How do you integrate MIS and Management functions?

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10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

**Chapter – 3****MIS - DESIGNING THE BUSINESS PROCESS****Objectives :**

After studying this chapter we should be able to

- understand how to design the business process in MIS
- find out MIS and its support to business activities
- know the components of information system
- explain the steps in installing MIS and data processing.

**Structure :**

- 3.1 Designing the Business Process**
- 3.2 MIS and its support to Business Activities**
- 3.3 Components of Information System**
- 3.4 Steps in Installing MIS**
- 3.5 Steps in the Data Processing**
- 3.6 Self Assessment Questions**
- 3.7 Reference Books**

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**3.1. DESIGNING THE BUSINESS PROCESS**

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The capabilities offered by computers, software and telecommunications is a key factor in designing the business process. Business processes include such things as developing a new product, ordering goods from a supplier, processing an insurance claim and creating a marketing plan.

Information Technology (IT) can have a critical and important impact on the designing the business processes. To determine how the use of technology can support new processes, it is useful to apply to framework for understanding the impact of IT. Possible organisational impacts of technology include routinizing transactions, bridging geographical boundaries, automating human tasks, and facilitating simultaneous completion of tasks.

**3.1.1 Steps in Business Process:**

1. **Development of Organisation Mission and process objectives:** First the mission of the organisation is to be defined. The business objectives are time and cost reductions as well as 'quality improvement.' These objectives should be quantified (e.g., we will increase productivity by 40 per cent) and prioritized.

2. **Identification of processes to be redesigned:** It is important to identify critical or bottleneck processes. Two approaches for doing so are: the exhaustive approach and the high-impact approach. In the exhaustive approach, management identifies all the business processes and priorities them. In the high-impact approach, management selects candidate processes by asking, what is broken? The exhaustive approach can be quite time-consuming, while the high-impact approach focuses on the most critical items.
3. **Understanding and measuring existing processes:** It is important to understand the problems of the current system. Since a baseline is needed in order to measure the outcomes of the redesigned process, the time, cost, and outcomes of the current process must be defined before the reengineering effort begins.
4. **Identification of IT levels:** The range of opportunities and ideas for using information technology to support business processes can be investigated and expanded through brain storming. Participants in this process should be functional-area specialists, information system professionals, and managers representing various units that could be potentially affected by the process.
5. **Designing and building a prototype of the process:** A prototype of the reengineering process should be implemented. The prototype should be designed to satisfy the original process-design objectives. As you will see, experience gained from implementing the prototype will offer some new ideas and will contribute to an iterative approach to developing a new technology-supported process.

Information technology has created a competitive edge for many organizations. Once a competitor introduces an information-based service, such as a frequent flight bonus program, other firms in the industry catch up, eliminating the innovator's original competitive advantage and raising the stakes of participating in a industry. Strategic information systems become a strategic necessity – a part of doing business. The focus today should be not to use information technology for its own sake, but rather to identify competitive uses of technology that reinforce the firm's basic capabilities.

In capabilities-based competition, competitive success depends on transforming key processes into capabilities that provide superior value to the customer. The following rules apply:

1. Set aggressive, customer-oriented goals.
2. Make sure that employees have the skills and resources they need to achieve the chosen capability.
3. Align measurements and rewards. For example, if the goal is to provide more effective customer service, then you should measure employee's performance in terms of their ability to provide effective customer support.



4. Have the CEO provide leadership for the transformation. Without top management support, the transition to a customer-focussed, market-driven organisation will not happen.
5. Drive down business decision making to those directly participating in the key business processes, the sales and service staff.

IBM Credit's deal structures use information systems to authorise credit decisions, and accounts payable representatives use an integrated database to authorise payments to suppliers. The single most significant factor making it possible to decentralise decision making to the individuals responsible for key business processes, is the use of information technology.

As we move through the 1990s and beyond, the strategic uses of information technology in focussing upon reinforcing capabilities-based competition. That is, technology must support key business process like customer service, order follow-up and inventory control. Although many of these uses of technology may not be innovative, they are rapidly becoming an integral and essential part of doing business. Strategic information systems provide a competitive edge, but they are also becoming a strategic necessity.

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### **3.2. MIS AND ITS SUPPORT TO BUSINESS ACTIVITIES**

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One of the first challenges managers face is understanding how they can use information technology to support business activities. The concept of the value chain helps explain which business activities can be analyzed and transformed through the use of information technology. The value chain divides a company's activities into value activities, the distinct activities it must perform to do business.

Value of activities consists of primary activities and support activities. Primary activities include inbound logistics, operations, outbound logistics, marketing and service. For a manufacturing organisation, activities that support in bound logistics include delivery and handling of incoming materials. Operations activities include manufacturing-related functions such as parts assembly and quality assurance. Out-bound logistics activities support order processing and shipping goods and services to customers. Marketing and sales activities include advertising, promotion and sales force management. The company also organises activities to support repair and maintenance of its goods and services.

Support activities include the resources that support the primary activities of the business. They provide the organisation, human resources and technologies to deliver primary activities. The firm's organisation, which includes activities such as general management, legal work and accounting, support the entire value chain.

The way one activity is performed may affect the performance of others. As an example, investments in a more expensive product design and superior materials may reduce after-sale service costs. To obtain a competitive edge, a firm must be able to perform its value activities at

a lower cost than its rivals or in a way provide its buyers with added value or service. The value chain of a particular industry works within a larger system of activities called the value system. The value system includes the value chain of suppliers, of the firm, of the channels through which the firm distributes its products and services, and of the ultimate buyer.

The company's products and services sometimes pass through channel value chains on their way to the ultimate buyer. A channel value chain occurs between a supplier and a buyer, for example, a dealer or distributor. In the case of the automobile industry, the dealership provides a channel value chain between the manufacturer and the automobile buyer. Information technology can provide a more effective interface between the buyer and the channel.

### 3.2.1 Inter-Organisational Systems:

Information systems that link suppliers and buyers, manufacturers and distributors and distributors and buyers are known as inter-organisational systems (IOSs). These systems benefit both participants. The manufacturer gets timely information about buying trends, and the pharmacists get delivery of their orders. Large retailers enable customers to view merchandise using electronic catalogs and to place orders using terminals and personal computers. With technology, these retailers can give customers access to information about a wide range of products and services.

Information technology also supports operations, process control systems monitor oil refinement, chemical production, and even assembly of ingredients in the manufacture of paints and cookies. These systems assure quality, timely production, and economy in using raw materials.

In addition to supporting primary value activities, information technology can also support the secondary activities of the value chain, as shown below.

<b>Secondary Activity</b>	<b>Use of Information Technology</b>
<b>Management communications</b>	Electronic mail
<b>Human resources</b>	On-line access to personnel files with a skills database
<b>Technology</b>	Computer-aided design and manufacturing
<b>Procurement</b>	On-line access to supplier's inventory files

Managers can use electronic mail to give their employees timely feedback about project-related activities. Workers can also supply feedback to help their managers diagnose problems and reallocate resources more effectively. An on-line personnel information system with a skills database can support the management of human resources. A database is a repository of information that can be organised for inquiry and reporting purposes. A skills database is a valuable tool that enables management to identify employees with skills needed for particular

assignments on a timely basis. For example, a sales manager can query an employee database for individuals who have college degrees in marketing, the ability to speak German, and a willingness to relocate.

Because information technology affects business at every level, more managers are using it to support and control their business activities. As a result, technology is being distributed “to the desktop,” and managers at all levels of the organisation are using desktop workstations to make decisions about day-to-day activities. Using these desktop workstations, managers can gain access to shared databases and communications networks.

### **3.2.2 Applications of Information Technology:**

The information technology application has an impact upon the individual, the functional unit, and the organisations as a whole. The application of information technology changes the way one does business. It means changing the nature of the product or service delivery or entirely transforming the way of functional unit or an entire organisation does business. For example, for years Sears, a Multinational Company, has maintained extensive database on customer sales histories and buying preferences that allow the company to target its marketing and promotion strategy to high-potential prospects. Now, Sears is selling access to its customer data-bases, thus offering a service that is totally different from its traditional line of business i.e., retailing. An information-based service has in some ways transformed Sears' original business.

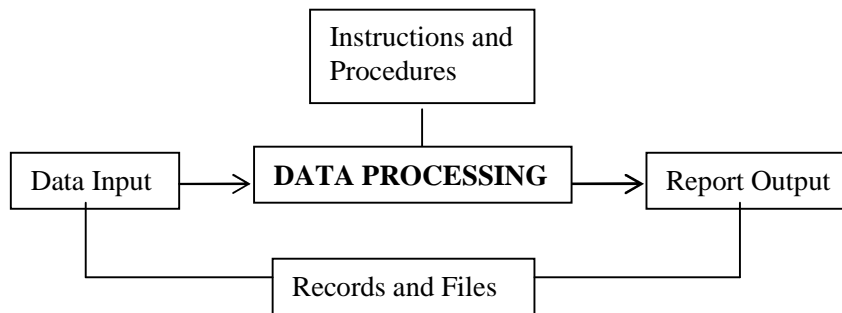
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## **3.3. COMPONENTS OF INFORMATION SYSTEM**

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An information system consists of five basic components, as shown below. In a manual system, human beings perform the five basic functions; in a computer-based system, the functions are performed by equipment. In either type of system, the basic functions are:

1. entering data into the system;
2. processing the data (rearranging input data and processing files);
3. maintaining files and records;
4. developing procedures that tell what data are needed and when, where they are obtained, and how they are used, as well as providing instruction routines for the processor to follow; and
5. preparing report output.



**Fig. Basic Components of an Information System**

People's knowledge and store of information is what can be acquired and stored in their memory or some peripheral source. The information must then be retrieved and manipulated to be useful. To augment memory, people use a variety of devices, including books, forms and records. We are concerned here with the two major sources of storage and manipulation for information systems i.e., records and the computer. If it were not for records, the size and reliability of data storage would be restricted to what people could remember. Records were the earliest device for assisting in the data processing task, consisting first of pictures and marks; writing later relied on alphabets and numerals. The "alphabet" for processing business data consists of 20 numerals, 26 letters and 25 special characters. This "alphabet" may be represented by punched holes in cards, by positive and negative charges on magnetizable material, by electrical impulses over wires and cables, and by radio signals. This encoding is necessary to provide a scheme that is efficient for processing purposes.

Although many managers are awed and sometimes confused by the computer, its operation is essentially no more complex than that of the manual system just described. Indeed, if we make the transition from manual to computer-based system by drawing an analogy between them, there should be no difficulty in understanding the functions and operations of the computer.

The field of computers is called electronic data processing, and the computer is nothing more than an electronic data processor, with its components the same as those of the manual system. However, it accepts data in the form of alphanumeric (alphabetic and numerical) characters. If we wish to convert our manual inventory system to computer, the input data would be the same for both systems; only its input form would be different. The computer processes these data. For example, it adds items received and deducts items issued to update the inventory record, but it does all this electronically. The alphabetic and numerical characters, normally received as electrical impulses sent from a terminal, are sensed and are represented in electronic form within the computer. The subsequent arithmetic or processing operations are accomplished electronically; hence the computer can be described as an electronic data processor. A discussion on the components of information system can help more understanding.

### 3.3.1 Input:

The function of entering data into the computer system is performed by an input device. Unlike the manual system with its human processor, the input to the computer must be in machine-acceptable form. Normally, this input takes the form of punched cards, magnetic media (tape, disk, diskette), and direct input from terminal keyboards.

### 3.3.2 The Central Processor:

The central processor is the most significant component of the computer. As in the case of inventory control clerk in the manual system, it consists of a control section, which coordinates the system components, and the arithmetic/logic unit, which performs the same functions (add, subtract, multiply, divide, compare, shift, move, store) as the clerk-calculator combination of the manual system. However, the CPU (Central Processing Unit) of the computer accomplishes these tasks at fantastically increased speed and accuracy. This meager processing logic, accompanied by the five simple functions, accounts for the almost infinite variety of tasks the computer can perform.

The arithmetic/logic section performs the arithmetic and logic operations. The former portion calculates, shifts numbers, sets the algebraic sign of results, rounds, compares and performs the other tasks of calculation. The logic section carries out the decision-making operations to change the sequence of instruction execution, and it is capable of testing various conditions encountered during processing.

### 3.3.3 Storage:

Storage is somewhat like a huge electronic filing cabinet, completely indexed and accessible instantly to the computer. All data must be placed in storage before being processed by the computer. Storage consists of internal, which is a part of the processing component and external. To understand how programme of instructions permit the computer to process data, we must examine the concept of computer memory to see how information and instructions can be stored within the computer. The information can be (1) instructions (programmes) to direct the processing unit (2) data (input, in process, or output), and (3) reference data associated with processing (tables, code charts, constant factors etc.) Because the computer memory is the storehouse of this information, it is important to understand how it is represented in memory.

External storage (consisting of records and files, reference data and other programmes) is of two types.

1. Direct access, disk, diskette, magnetic drum, and data cell devices providing random-order mass data storage that can be accessed randomly, without having to read from the beginning of the file to find the desired data.

2. Sequential magnetic tape that is sequentially ordered and that must be read from the beginning in order to read or write a desired record.

### 3.3.4 Output:

Output devices produce the final results of the data processing. They record information from the computer on a variety of media, such as cards and magnetic media. They print information on paper. Additionally, output devices may generate signals for transmission over teleprocessing networks, produce graphic displays, microfilm images and take a variety of special forms. For the most part, basic business applications take the output form of a paper printout. The output from the inventory accounting system would be (1) a printout containing an inventory status report and (2) an updated inventory master file.

The computing power of minicomputer and microcomputer platforms has increased so greatly that many firms using mainframe computer systems have opted to downsize to minicomputer systems. The major reason for downsizing is to reduce costs. Mainframe computer systems usually cost much more to acquire and less to operate than minicomputer or microcomputer systems do. Smaller computer systems are also usually less expensive to scale up or down to fit an increased workload. Regardless of their size and shape or how they are classified, however, all computer systems contain similar basic components. For example, all computer systems contain a central processing unit (CPU) and one or more devices to get data into and out of the CPU.

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## 3.4. STEPS IN INSTALLING MIS

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The installation of management information system requires the following steps.

1. **Preliminaries:** The introduction of MIS requires a proper study of business objective, plans, policies etc. It will enable in deciding the type of data required, its sources and the levels at which required. The organisational structure should be able to supply the required information. The success of MIS will depend upon the support of top level management. The management should also be able to supply the requisite finance for installing the MIS.
2. **Planning:** The informational needs to top, middle, and lower levels of management should be studied so that the system is planned according to the need of different levels. The functions of each level of management should also be studied. The questions like, what data is needed? When is it needed? Who needs it and; in what form is it needed? Should be studied for making the system effective otherwise utility of management will be zero.
3. **Execution:** MIS can effectively be applied only when every person in the organisation is involved in it. The persons should also be given training for

implementing this system. The manual and mechanical devices necessary for processing data should also be selected. Standard proformas etc., should be decided for collection information.

- 4. Follow up:** The follow-up of the system is very essential. The problems and difficulties faced in the system and additional requirement should be pointed out: The review of MIS will enable us to spot the weak spots and a corrective action will make the system more effective. It should be determined, whether the information supplied was sufficient or not. Was the information relevant and critical? Was the frequency of reporting justified? The answer to these questions will help in making changes in the system. Without a proper review, the system will cease to be effective and useful after sometime. It should constantly be reviewed with the change in business environment.

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### 3.5. STEPS IN THE DATA PROCESSING

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In any information system application, the method generally followed is to design modular and hierarchical steps of processing, leading to an output in a report form or information having certain 'value', specific or perceived, as seen by the user. The steps involved are data processing, transaction processing, application processing and system processing.

Data is the smallest atomic entity in the information system which is basic to build the information system. The character of data decides the quality of information it offers to the user. If the data is taken care of properly, its usage will ensure quality output. Hence, in any information system, significant care is taken in building the data as a first level input to the system.

#### 3.5.1 Classification of Data:

The data can be classified in a number of ways to provide a better understanding. Data is generally classified in the following manner.

- 1. Action versus no-action data:** The data which induces action is called an action data. The information which communicates only the status of a situation is a no-action data. 'No stock' report calling a purchase action is an 'action data', but the stock ledger showing the store transactions and the stock balances is a no-action data.
- 2. Recurring versus non-recurring data:** The information generated at regular intervals is a recurring data. The monthly sales reports, the stock statements, the trial balance etc., are the examples. The financial analysis or the report on the market research study is a non-recurring data.

- 3. Internal versus external data:** The information generated through the internal sources of the organisation is termed as an 'internal data', while the information generated through the government reports, the industry surveys etc. is termed as an 'external data', as the sources of the data are outside the organisation.

### **3.5.2 Levels of Management and Requirement of Data:**

There are three distinguishable levels of management in an organisation – corporate management, executive managements, and operating management. The activities and information requirements of these levels of management are discussed below:

### **3.5.3 Hierarchy of Corporate Management:**

Corporate management generally consists of the board of directors, chief executive (called the managing director or president), and functional heads. The corporate management is responsible for strategic planning and overall financial monitoring of the firm.

Strategic planning is concerned with defining the nature of business, setting its long-term objectives, and formulating its major policies. For strategic planning to be meaningful the external environment needs to be monitored for identifying emerging opportunities and threats. Information on the following is required for this purpose.

- a. Technological advances and new product development,
- b. Changes in governmental policies, regulatory framework, and legislation,
- c. Competitive developments in the market,
- d. Supply position of inputs,
- e. Shifts in consumer preferences,
- f. Developments in the economy,
- g. Possibilities for mergers and amalgamations.

For monitoring the overall financial and physical performances of the firm, information on the following is required.

- a. Sales in physical and financial terms
- b. Breakdown of sales, region-wise and customer-wise
- c. Production levels of various products
- d. Inventories
- e. Receivables
- f. Funds Flow
- g. Cash balance
- h. Cash Structure
- i. Profit margins
- j. Return on Investment.



### 3.5.4 Executive Management:

Executive management consists of managers responsible for certain product groups or markets or certain aspects of a function. Their responsibility is to translate corporate strategy (formulated in the process of strategic planning) into programmes, control organisational performances by monitoring achievements, and take appropriate remedial action. Shaped by strategic planning, objectives, facilities, organisation and financial factors are more or less accepted as given for purposes of the executive management. Within this framework, executive management seeks to promote the achievement of objectives as effectively and efficiently as possible. It is concerned with tasks such as budget formulation, decision on routine capital expenditures, choice of product improvement, working capital planning, and measurement, appraisal and control of performance.

The information required for executive management consists of the following:

- a. Revenues, costs, profits (sales, costs, profit margins and profit before tax for each product group and region)
- b. Working capital (inventories, receivables, bank borrowings, trade creditors and cash)
- c. Order bookings
- d. Rejections and complaints
- e. Critical operational and marketing variables
- f. Performance reports
- g. Special studies.

### 3.5.5 Operating Management:

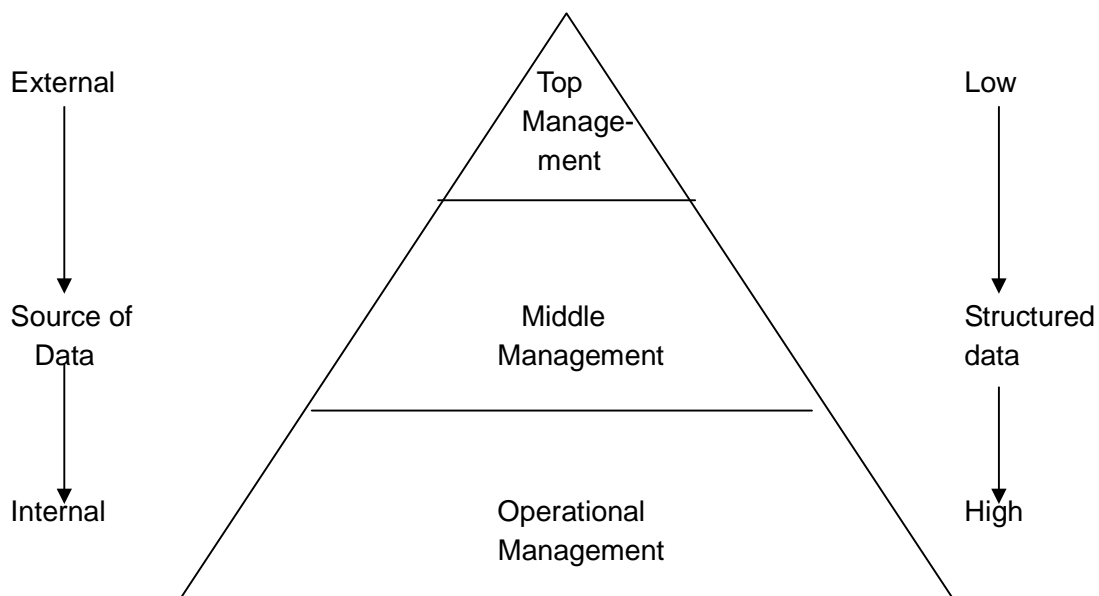
Operating management is represented by executives entrusted with specific operational tasks such as obtaining particular inventory items, scheduling and monitoring individual jobs through the shop floor, selling certain goods and services in the market place, and taking specific personnel actions. The operating management is responsible for executing various tasks within the framework of plans, programmes, and schedules defined by the executive management.

Operating management required information of the following kind.

- i. Production quantity and value
- ii. Sales volume and price realisation
- iii. Inventory position of individual items (raw materials, stores suppliers, finished goods)
- iv. Capacity utilisation
- v. Yield
- vi. Productivity of labour and machinery
- vii. Rejections
- viii. Overtime Payments

- ix. Production cost (materials, suppliers, utilities)
- x. Marketing and distribution costs.

The action information, the recurring information and the internal information are the prime areas for computerisation and they contribute qualitatively to the MIS. The timing and accuracy of the action information is usually important. The mix of the internal and the external information changes, depending on the level of the management decision. At the top management level, the stress is more on the external information and at the operational and the middle management level, the stress is more on the internal information. The source and kind of data required vis-à-vis levels of management in the organisation is shown below.



### Organisation and data

The data can also be classified as under, in terms of its application.

1. **Planning data:** Certain standard norms and specifications are used in the planning of any activity. Hence, such information is called the 'planning data'. The time standards, the operational standards, the design standards are the examples of the planning data.
2. **Control data:** Reporting the status of an activity through a feedback mechanism is called the control data. When such data shows a deviation from the goal or the objective, it will induce a decision or an action leading to control.
3. **Knowledge data:** A collection of information through the library reports and the research studies to build up a knowledge base as information source for decision

making, is known as knowledge information. Such a collection is not directly connected to decision making, but the need of knowledge is perceived as a power or a strength of the organisation.

The data can also be classified based on its usage. When the information is used by everybody in the organisation, it is called the organisation data. When the information has a multiple use and application, it is called the database information. When the information is used in the operations of a business, it is called the functional or the operational data. Employee and pay-roll information is organisation data used by a number of people in a number of ways. The material specifications, or the supplier information is database information stored for multiple users. Such information may need security or an access control. Information like sales, or production statistics is functional, meeting the operational needs of these functions.

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### 3.6 SELF ASSESSMENT QUESTIONS

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1. Discuss the critical and important impact on 'designing of business process'.
2. What rules apply to the competitive success which depends on transforming the key process into capabilities that provide superior value to the customer?
3. Describe the information technology support activities to business.
4. What are the strategic uses of information system?
5. What are the basic components of an information system?
6. What are the varying needs of organisation served by the computer system Hardware?
7. Distinguish between 'data' and 'information'.
8. Define data. Explain the various steps in data processing.
9. Discuss the various methods of data and information collection with suitable examples.
10. Discuss the steps in involved in installing MIS programme.
11. Explain the steps in data processing
12. How do you classify data.

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**Chapter – 4****BUDGETS – BUDGETARY CONTROL****Objectives :**

After reading this unit you should be able to :

- understand the meaning of budget and budgetary control
- find out the essentials of a budgetary control system
- understand the budgetary control organization of a company.
- Know the advantages and limitations of budgetary control.

**Structure :**

- 4.1 Introduction**
- 4.2 Budgetary Control**
- 4.3 Essentials of a Good Budgetary Control System**
- 4.4 Budgetary Control Organization**
- 4.5 Advantages of Budgetary Control**
- 4.6 Limitations of Budgetary Control**
- 4.7 Self Assessment Questions**
- 4.8 Reference Books**

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**4.1. INTRODUCTION**

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Cost accounting aims at ascertaining costs accurately. Additionally, it seeks to control costs through careful planning. To this end, management tries to fix targets for all important activities in advance. A comparison of actual performance with these pre-determined targets is then made and reasons for variance are looked into with a view to reduce costs and thereby improve performance continuously. Budgetary control is an important managerial tool that helps to achieve these objectives.

**4.1.1 Meaning of Budget:**

**The Institute of Cost and Management Accountants, London,** defines budget as a financial and/or quantitative statement prepared to a definite period of time, of the policy to be pursued during that period for the purpose of attaining a given objective.

**George R. Terry:** “A budget is an estimate of future needs arranged according to an orderly basis covering some or all the activities of an enterprise for a definite period of time.

**H.J.Weldon:** A budget is thus, a standard with which to measure the actual achievement of people, department etc.

**Hemass C. Heiser:** Budget is an overall blue print of a comprehensive plan of operations and actions expressed in financial terms.

Thus, the essential features of a budget are:

1. It is statement in terms of money or quantity or both.
2. It is prepared for a definite future period.
3. It is prepared in advance.
4. Its purpose is to attain a given objective.

Budget presents the plans, objectives and policies of an enterprise in numerical terms. It is a short-term operational plan used as a tool by management for planning as well as controlling the activities of the organisation and also ensure the coordination among the different departments in the organisation to achieve its predetermined goals. In a broad sense, a budget constitutes a statement of planned or expected results (of any proposed course of action) in quantitative terms for a specified future period. It may be expressed either in financial or physical terms like machine hours, man hours, units or products, or in any other numerically measurable terms.

#### 4.1.2 Budgetary Control

The use of budget to monitor and regulate the operational activity of the organisation in a systematic manner is called 'budgetary control'.

**The Institute of Cost and Management Accountants, London,** defines budgetary control as 'the establishment of budgets, relating the responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results either to secure by individual action or to provide a firm basis for its revision.

A budgetary control system secures control over costs and performances in various parts of an enterprise by:

1. establishing budgets;
2. comparing actual results with budgeted ones; and
3. taking corrective action or revising the budget if necessary.

As stated above, Budgeting means the process of preparing budgets. It is an act of planning the activities of a firm and expressing the same in numerical terms. Budgetary control is the act of adhering to the plan.

Rowland and Harry have stated the difference between budgets, budgeting and budgetary control. According to them, budgets are the individual objectives of a department, etc., whereas

Budgeting may be said to be the act of building budgets. Budgetary control embraces all and in addition includes the science of planning the budgets themselves and the utilisation of such budgets to effect an overall management tool for the business planning and control. In the words of Van Sickle, “the budget is the financial plan. Budgetary control results from the administration of the financial plan.”

#### 4.1.3 Forecast and Budget

Forecast is a statement of probable events. Budget is an operating and financial plan of a firm. At planning stage, it is essential to prepare forecasts of probable courses of action for the business in future. Plans or budgets are prepared on the basis of these forecasts. A forecast is, therefore, the basis for the budget. The following are the differences between ‘forecast’ and ‘budget’.

#### Differences between a Forecast and Budget

Forecast	Budget
1. It is concerned with probable events	It is concerned with planned events
2. It is prepared for a long period	It is usually prepared for each accounting period.
3. It deals with only a limited activity of business, e.g., sales forecast purchase forecast	It deals with the entire unit.
4. Forecasting may not be very precise and it may lack control orientation	It is definite and precise and is an important control tool.
5. It is a preliminary step in budgeting	It begins when forecasting ends Forecasts are converted into budgets.

## 4.2 BUDGETARY CONTROL

Budgetary control could be described as ‘forward costing’ establishment of budgets and then their application with a view to ensure control over the activities of concern. The basic purpose is to improve the efficiency and profitability of the concern.

#### 4.2.1 Objectives of Budgetary Control:

The following are the objectives of budgetary control.

1. To provide a detailed plan of action for a business over a period of time;
2. To coordinate the different units and activities of the organization with a view to utilize resources judiciously;
3. To motivate organizational members to perform well; and

4. To exercise control on cost through comparison of actual results with budgeted ones and initiating rectificational steps promptly.

#### 4.2.2 Distinction between Budgeting and Budgetary Control:

Budgeting and Budgetary control are accounting exercises which act as a tool of management at all level. Budgeting differs from budgetary control in the following respect.

Budgeting	Budgetary Control
1. Budgeting is the preparation in advance of the quantitative as well as financial statements to indicate the intention of the management in respect of the various aspects of the business.	Budgetary Control is a system by which budgets are used as a means of planning and controlling all the aspects of a business.
2. Budget is a statement showing the probable items of work to be carried out by the various departments specifying the quantities and monetary values.	Budgetary control is a means of control by which the actual position is compared with that planned for to enable the management to take appropriate action if there are any deviations.
3. Budget is a plan of operations expressed in monetary terms	Budgetary control is the very essence of financial control.
4. It is an overall statement in financial terms of the plan of operations. It includes the sales to be made, the expenses to be incurred and the income to be received during the budget period.	Its main objective is to control all aspects of production and selling. The results revealed by the budgets if found unsatisfactory indicates a need for change in policy itself.
5. Budget should be prepared by the department to which it relates.	Budgetary control is employed by a budget committee or controller.

#### 4.3. ESSENTIALS OF A GOOD BUDGETARY CONTROL SYSTEM

The following are the essentials of good budgetary control system.

1. **Management Support:** Top management's support and cooperation is essential for successful implementation of the budgets. It should take interest in setting the targets and finalising the budgets. It should also in constantly monitor the actual performance to find out the deviations, if any and take curative steps. Then the top management should motivate the personnel and reward the good performers.
2. **Determination of Organisational Objectives:** The organisational goal should be quantified and clearly stated. These goals should be set within the framework of

corporate objectives and strategies. A well defined corporate policies and strategies are pre-requisites to budgeting.

- 3. Creation of Effective Organisation Structure:** There should be a well-planned organisational structure with clearly defined authority and responsibility of different levels of management. Role and responsibilities of Budget Committee and its president must be made known to the people in the organisation.
- 4. Existence of accurate and reliable accounting system:** The organisation should have good accounting system so as to generate precise, accurate, reliable and prompt information which is essential for successful implementation of budget system.
- 5. Participation of all level of staff:** This is the fundamental requirement. If the budgets are prepared from “the bottom up,” they will in general work as they were intended to be. The top management must understand and give enthusiastic support to the system. In fact, it requires education and participation at all levels.
- 6. Need for flexibility in budgeting:** If conditions change from those prevailing at the time of making the budget, the budget must be recast. If the budget is subject to annual review, it can deal with several conditions as they may arise. The flexible budget, also called variable or sliding scale budget, takes both fixed and variable manufacturing costs into account.
- 7. Budget period:** The usual budget period is the normal financial year, but not necessary so. In most of the business, operations from month to month are not uniform. They have seasonal periods during which purpose, quarterly or even monthly as regards time coverage, budgets can be divided into two types: (a) period budgets covering a fixed period of time generally one year, and (b) continuous budgets where monthly or quarterly budgets are continuously extended.
- 8. Codes and headings:** For budgeting, accounting and costing to be meaningful, it is important that an ideal scheme of classifying codes and headings is adopted. Code numbers or symbols avoid the use of long and complex account titles. The data feeding, tabulation and analysis becomes easier with this process of budgeting.
- 9. Integration of budgets:** The various budgets must be integrated so that they reflect the operating plans for the specified future period. A budgetary control system, to be successful, must develop this attribute.
- 10. Control Statements:** For implementing the system of budgetary control, it is necessary that control statements are to be submitted periodically. These serve as feed back reports on whose basis further planning could be made. Reports will be rendered as necessary – daily, weekly and monthly. Generally the daily reports will be for the lower



levels of management and they will be followed by summaries at longer intervals – weekly and monthly for the higher levels of management.

11. **Communication of Results:** Finally, the communication systems should be established for management reporting and information service so that information pertaining to actual performance is presented to the concerned manager timely and accurately so that remedial action is taken wherever necessary.

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## 4.4. BUDGETARY CONTROL ORGANISATION

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The following steps should be considered in detail for sound budgets and for successful implementation of the budgetary control system.

### 4.4.1 Organisation for Budgeting

**(i) Budget Centre:** The organisation must have a clear perspective of the objectives that are sought to be achieved through budgetary control. After outlining such objectives, budget centres must be established. A budget centre is a section of an undertaking defined for the purpose of budgetary control. A budget centre must be clearly demarcated to facilitate the formulation of various budgets with the help of the heads of the departments concerned. For example, the production manager must be consulted for the preparation of the production budget. The responsibility of each executive must also be clearly defined.

**(ii) Budget Manual:** It is a written document or booklet containing standing instructions regarding the procedures to be followed and the time schedules to be observed. It is usually maintained in a loose-leaf form so as to facilitate easy alterations from time to time. The main purpose behind the Budget Manual is to inform line executives beforehand about the procedures to be followed rather than issuing frequent instructions from the controller's office, and thereby avoid friction between line and staff officials.

The budget manual clearly states the functions of various officials connected with the formulation of budgets. It sets out steps in the preparation of various budgets including submission, review, approval and final adoption. It also indicates the time table for budget operations and the records, reports and forms to be maintained for the purpose.

### 4.4.2 Responsibility for Budgeting

**Budget Controller:** The budgetary control organisation is usually headed by a top executive known as Budget Controller. He should be a man of wide experience and should possess thorough knowledge regarding budget matters, since he is expected to command the respect of all members in the organisation. The budget controller is a staff man providing advice to management on various important issues (i.e., preparation of budgets, informing management of the need to revise budgets, collecting information as to how the budgets

could be operated more efficiently etc.), and is answerable to the Chairman of the company directly.

**Budget Committees:** The Budget Controller may have a budget committee under him to help in his work. It will have the representatives from various departments like production, finance, marketing, administration and accounts. The members of the committee discuss the budget figures thoroughly before coming out with a mutually agreed programme for the organisation.

#### 4.4.3 Fixation of the Budget Period

**Budget Period:** It refers to the period of time covered by a budget. The length of budget period depends on the nature of business, the production period, the control aspect etc. Industries experiencing a high rate of change generally go for annual budgets (Ex.: electronics, consumer goods industries), whereas in industries like ship-building, the period of budget may vary between 5 to 10 years.

#### 4.4.4 Determination of the Key Factors

**Budget Key Factor:** Key factor is also known as limiting factor or governing factor. It has been defined as the factor the extent of whose influence must first be assessed in order to ensure that the functional budgets are reasonably capable of fulfilment. It proves to be an obstacle in the achievement of the targeted figures constrained in the functional budgets. Stated otherwise, it is a factor of such importance that it influences all other budgets so that the coordination must be centered round it. The following are the examples of key factors:

- (a) **Materials:** Non-availability of supply in terms of quality as well as quantity.
- (b) **Labour:** Shortage of skilled labour; problems of high turnover.
- (c) **Working Capital:** Shortage due to lack of funds, Inefficient use of working capital.
- (d) **Plant:** Constraints of finance, space etc., shortage of plant capacity due to import restrictions.
- (e) **Management:** Limited availability of expertise, technical and managerial.

#### 4.4.5 Reporting on results

**Budget report:** Establishing budgets is in itself of no use unless a comparison is made regularly between actual performance and budgeted performance, and the results brought to the notice of management through reports. The budget reports should be prepared in such a way that will reveal the responsibility of a department or an executive and give full reasons for the variances so that proper corrective action may be taken.

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## 4.5 ADVANTAGES OF BUDGETARY CONTROL

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Budgetary control makes all the difference between drifting in an uncharted sea and following a well planned course towards predetermined destination. It serves as invaluable aid to management through planning, coordination and control.

### 4.5.1 As an Aid in Planning

- i. **Habit of thinking ahead:** Budgetary control forces management to follow the principle of 'look before you leap'. It compels management to make an early study of problems and outline ways of tackling the same.
- ii. **Pooled judgement and experience:** It reflects the combined efforts of best brains in the organisation. The combined judgement, experience of executives can be used to determine the most profitable course of action for future use.
- iii. **Realistic goals and policies:** It gives planning a reality and sense. It helps the enterprise to clarify the goals and policies to be pursued in operational and realistic terms.
- iv. **Planned way to secure economy:** This is a planned approach to expenditure and financing of the business so that economy is achieved in the use of resources. The resources are used to the best advantage. It directs enterprise activity towards maximisation of efficiency, productivity and profitability.
- v. **Reduces uncertainty:** Uncertainty is reduced to minimum. It forces executives to map out future courses of action clearly. These are periodically examined, restated and reformulated in the light of changed circumstances. This helps an organisation to face future challenges with confidence.

### 4.5.2 As an aid in Co-ordination:

- i. **Establishes co-ordination:** Budgetary control forces executives to think as a group. All the departments in an organisation tend to move in a well-coordinated manner, trying to implement the planned courses of action in a systematic way. There is very little room for internal friction.
- ii. **Relates business activity with general economic trend:** Budgetary control helps management to coordinate the activities of the business to the signals of high and low economic trends. The danger signals in the economy are promptly taken care of. The entire organisational machinery is kept ready to overcome environmental and competitive challenges.

### 4.5.3 As an Aid in Control

- i. **Indicates weaknesses:** It establishes divisional and departmental responsibility. As a result executives cannot seek shelter behind a mountain of rules and regulations for their inefficiency. They cannot indulge in buck-passing when budget figures are not met. By pin-pointing responsibility for inefficient performance, budgeting helps management trace weakspots early and take remedial steps.
- ii. **Prevents waste:** Budgeting wages a continuous war against wastages of all kinds. It conducts a searching analysis of all items of expenditure and keeps them under check. There is a conscious attempt to channel activities through profitable channels. Capital is put to profitable use.
- iii. **Facilitates standard costing:** The use of performance standards especially in operational activities and financial matters help the adoption of standard costing technique.
- iv. **Management by exception:** Budgetary control helps in finding out deviations from pre-planned courses of action. Management can probe into the causes and concentrate on important factors causing the trouble.
- v. **Motivates people:** The method of evaluating performance against standards set in advance, enables employees to find out their strengths and weaknesses. It makes them work for assigned goals, show performance and obtain the rewards. In other words, they are made to earn their rewards by showing superior performance.

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## 4.6 LIMITATIONS OF BUDGETARY CONTROL

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Budgetary control is not always on the credit side of the ledger. It has its own limitations. These include:

1. **Accuracy is open to doubt:** Budgetary control begins with formulation of budgets which are more estimates. The adequacy of budgetary control, therefore, depends upon the accuracy with which these estimates are made. Budgeting based on inaccurate forecasts is useless as a yardstick for measuring performance.
2. **Constant review needed:** Budgeting should be a flexible exercise. When conditions change, budget estimates lose their usefulness. The effectiveness of a budget, thus, depends on how the budget revisions are made in the light of changed circumstances. Usually budget makers do not show much interest in reviewing the budgets. In that case budget becomes a self-defeating exercise.
3. **Cost may be prohibitive:** The cost involved in installation and maintenance of the budgetary control system is somewhat prohibitive. Small concerns may find it to be

a luxury. Again, revising budget becomes a strenuous and demanding job and small concerns may find these revisions too taxing and troublesome.

4. **Impersonal approach:** Budgetary control does not guarantee success automatically. There is, however, an erroneous impression that budgeting brings about success. There is no doubt that budgeting direct enterprise activities along right routes. But this impersonal approach needs to be supported by proper administration. Top management must be willing to cooperate and extend its continued blessings to budget planners and administrators. Sufficient training and education must be imparted to employees before budgets are translated into meaningful action. This would not only help in overcoming employee resistance to changes but also enable the organisation to bring about cost consciousness among employees.

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## 4.7 SELF ASSESSMENT QUESTIONS

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1. What purpose is served by instituting a Budgetary Control System to any organization having both manufacturing and selling activities? Discuss the main factors to be considered in framing the Purchase Budget in such an organization.
2. Distinguish between a Forecast and Budget
3. What are the objectives of Budgetary Control?
4. Describe briefly the purpose and uses of a system of budgetary control and explain its relation to the financial accounts of a company.
5. What additional advantages do you consider likely to follow the adoption of Budgetary Control by a manufacturing business in which standard costing technique is already employed?
6. Distinguish between budget and budgeting.
7. State the difference between Budget and Budgetary Control.
8. "Budgets are not merely accounting documents, they are blue prints for managerial action during a budget period." Examine this statement.
9. State the essentials of a good budgetary control system.
10. State the essentials of a good budgetary control system.
11. What is Budget Centre?
12. What is Budget Manual?
13. What are budget committees?
14. "A budget is an aid to management and not a substitute for management." Explain.
15. How does budgetary control serve as a planning and control device? Point out its limitations and the requisites for successful operation.
16. "For the success of a system of budgetary control it is essential that there should be a sound organisation for budget preparation, budget maintenance, and budget administration." Discuss.
17. What are the essentials of an effective system of budgetary control?
18. What is Zero based Budgeting?

19. What is Performance Budgeting?
20. What is Flexible Budget? Explain
21. Write short notes on the following:
  - a. Capital Expenditure budget
  - b. Zero based budget
  - c. Performance budget
22. Explain the latest developments in the field of budgeting and budgetary control.

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## 4.8 REFERENCE BOOKS

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2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
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4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
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9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

**Chapter – 5**

# CLASSIFICATION OF BUDGETS

**Objectives :**

After reading this unit you should be able to

- explain the type of budget in an organization
- know the differences between fixed and flexible budgets
- analyse the current developments in budgeting

**Structure :**

- 5.1 Types of Budgets**
- 5.2 Fixed and Flexible Budgets**
- 5.3 Current Developments in Budgeting**
- 5.4 Self Assessment Questions**
- 5.5 Exercises**
- 5.6 Reference Books**

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## 5.1 TYPES OF BUDGET

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Budgets may be classified on the basis of scope, the capacity or efficiency to which they are related, the condition on which they are based and the periods they cover.

Though budgets can be classified according to various points of view, the following basis of classification are generally followed in practice.

- a. Functional classification
- b. Classification on the basis of time factor.
- c. Classification on the basis of flexibility.

**5.1.1 Functional Classification:**

A master budget is the summary budget for the entire enterprise and embodies the summarised figures for various activities. It is the consolidation of all functional budgets. A functional budget is a budget which relates to any of the functions of an undertaking; e.g., production, sales, finance etc.

**Functional Budgets:** The following are the principal functional budgets:

- (a) **Sales Budget:** The sales budget is a forecast of total sales expressed in terms of money and quantity. In practice, quantitative budget is prepared first, then it is translated into monetary terms.
- (b) **Production Budget:** It is a forecast of the production for the budget period. It may be expressed in units or standard hours. A standard hour is the quantity of output or amount of work which should be performed in one hour. While preparing the production budget, the production executive will take into account the physical facilities like plant, power, factory space, materials, labour availability for the period.
- (c) **Materials Budget:** It shows the details of raw materials to be consumed. It is expressed in terms of physical quantities and values of materials to be issued from the stores for production purpose. This budget provides that right materials of right quantity and quality are procured.
- (d) **Labour Budget:** It shows the details of labour requirements in quantity, with estimated costs. This budget gives detailed information relating to the number of employees, rates of wages and cost of labour hours to be employed.
- (e) **Manufacturing Overhead Budget:** It shows the estimated costs of indirect materials, indirect labour and indirect manufacturing expenses during the budget period to achieve the predetermined targets.
- (f) **Administration Cost Budget:** This comprises the salaries and expenses of administrative office and management for a specified period. It is prepared with the help of past experience and expected changes in future.
- (g) **Selling Expenses Budget:** All expenses concerned with sale of products to customers are included in this budget. It is generally prepared territory-wise by the sales manager of each territory, on the basis of past records.
- (h) **Research and Development Budget:** This budget lists all the research and development activities together with their likely costs.
- (i) **Cash Budget:** It is prepared after all the functional budgets are prepared by the chief accountant either on a monthly or weekly basis. It shows the sum total of the requirements of cash in respect of various functional budgets and of estimated cash receipts for a stipulated period.
- (j) **Capital Expenditure Budget:** This budget shows the estimated expenditure on fixed assets like plant, land, machinery, building etc. It is a long-term budget, usually set for three



to five years. The budget requires frequent revision because of changes in cost of land, buildings, machinery and equipment. It gives an indication of the cash requirements. If financial resources are not available with the company, arrangements have to be made to raise them from outside. The following are the advantages of capital expenditure budget.

- i. It estimates the capital expenditure requirements and accordingly provides or arranges for it.
- ii. The priority of procuring assets can be determined. Those assets which are very important and unavoidable is given first preference and others are postponed to a later period.
- iii. It serves as a tool of controlling capital expenditure.

**Illu.1: From the following information prepare a monthly cash budget for the three months ending 31<sup>st</sup> December, 2002.**

Month	Overheads				
	Sales	Materials	Wages	Production	Admn. Selling etc.
<b>2002</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>
<b>June</b>	<b>3,000</b>	<b>1,800</b>	<b>650</b>	<b>225</b>	<b>160</b>
<b>July</b>	<b>3,250</b>	<b>2,000</b>	<b>750</b>	<b>225</b>	<b>160</b>
<b>Aug.</b>	<b>3,500</b>	<b>2,400</b>	<b>750</b>	<b>250</b>	<b>175</b>
<b>Sept.</b>	<b>3,750</b>	<b>2,250</b>	<b>750</b>	<b>300</b>	<b>175</b>
<b>Oct.</b>	<b>4,000</b>	<b>2,300</b>	<b>800</b>	<b>300</b>	<b>200</b>
<b>Nov.</b>	<b>4,250</b>	<b>2,500</b>	<b>900</b>	<b>350</b>	<b>200</b>
<b>Dec.</b>	<b>4,500</b>	<b>2,600</b>	<b>1,000</b>	<b>350</b>	<b>225</b>

- i. Credit terms are: (a) Sales – 3 months to debtors. 10% of sales are on cash. On an average, 50% of credit sales are paid on the due dates while the other 50% are paid in the month following (b) Creditors for material – 2 months.
- ii. Lag in payment: Wages  $\frac{1}{4}$  months, overheads –  $\frac{1}{2}$  months.
- iii. Cash and Bank Balance on 31<sup>st</sup> October expected Rs.1,500
- iv. Other information (a) Plant and Machinery to be installed in August at a cost of Rs.24,000. It will be paid for by monthly instalments of Rs.5,000 each from 1<sup>st</sup> October; (b) Preference share dividend @ 5% on Rs.50,000 are to be paid on 1<sup>st</sup> December; (c) Calls on 250 equity shares @ Rs.2 per share expected on 1<sup>st</sup> November; (d) Dividends from investments amounting to Rs.250 are expected on 31<sup>st</sup> December; (e) Income tax (advance) to be paid in December Rs.500

**Solution:**

**Cash Budget**  
**Period: 3 months ending 31<sup>st</sup> December, 2002**

Details	October Rs.	November Rs.	December Rs.
Balance b/d	1,500.00	537.50	350.00
Receipts (Estimated)			
Sales	3,212.50	3,462.50	3,712.50
Capital	-	500.00	-
Dividends	-	-	250.00
Total (A)	4,712.50	4,500.00	4,312.50
Payments:			
Creditors	2,400.00	2,250.00	2,300.00
Wages	787.50	875.00	975.00
Overheads:			
Production	300.00	325.00	350.00
Adm., Selling and Distribution	187.50	200.00	212.50
Pref. Dividend	-	-	2,500.00
Income tax	-	-	500.00
Plant and Machinery Rs.500 each	500.00	500.00	500.00
Total (B)	4,175.00	4,150.00	7,337.50
Balance c/d (A-B)	537.50	350.00	(-) 3,025

**Calculation of Amount of Sales:**

2002 Month	Sale Rs.	October Rs.	November Rs.	December Rs.
June	3,000	1,350.00	-	-
July	3,250	1,462.50	1,462.50	-
Aug.	3,500	-	1,575.00	1,575.00
Sep.	3,750	-	-	1,687.50
Oct.	4,000	400.00	-	-
Nov.	4,250	-	425.00	-
Dec.	4,500	-	-	450.00
Total	-	3,212.50	3,462.50	3,712.50

**Wages Calculation:**

$\frac{1}{4}$  Wages of September and  $\frac{3}{4}$  wages of October

Thus  $(\frac{1}{4} \times 750) = 187.50 + (\frac{3}{4} \times 800) \text{ Rs.}600 = \text{Rs.}787.50$

The wages of other months will be calculated on the same pattern.

**Illu.2: The following are the details regarding the budgeted and actual production for six months ending 31<sup>st</sup> December, 2001.**

	Unit 40,000 Budgeted Rs.	50,000 Actual Units Rs.
<b>Material consumed 45,000 units</b>	<b>1,35,000</b>	<b>55,000 = 1,90,000</b>
<b>Wages at 3 hours per unit</b>		
Rs.1.50 per hour	1,80,000	2,45,000
Variable Overhead at Rs.2 PU	80,000	1,25,000
Fixed overheads	75,000	1,00,000
<b>Total</b>	<b>4,70,000</b>	<b>6,60,000</b>

**During the budgeted period:**

- i. Production is expected to go up to 60,000 units
- ii. The prices of materials are expected to increase further in the same manner as they had increased over the budgeted price.
- iii. Labour charges are expected to increase by 50 paise per hour above the actual rate shown above through efficiency is expected to decline by 20%
- iv. Fixed overheads are expected to increase by 20%
- v. Loss of materials is expected to be uneffected.
- vi. Variable overheads are expected to increase by 10%

**Prepare a production budget for the six months ending 30<sup>th</sup> June, 2002**

**Solution:**

**Production Cost Budget**

	Budget - 6 months Ending December 2001		Actual - 6 months Ending December, 2001		Budget - 6 months Ending June, 2002	
Production Level		40,000		50,000		60,000
Material	45,000 × 3	1,35,000	45,000 × 3	1,90,000	65,000 × 3.978	2,58,570
Wages	3 hr × 1.50	1,80,000	3 hr × 1.633	2,45,000	3 hr – 36 mts. 2.133	4,60,728
Variable Overheads	2 × 4,000	80,000	2.5 × 500	1,25,000	2.75 × 60,000	1,65,000
Fixed Overheads		75,000		1,00,000		1,20,000
		4,70,000		6,60,000		10,04,298

**Working Notes:**

1. Material cost increase is 15% over Budget figures. For six months ending June, 2002 an increase of 15% over Rs.3,455 is assumed.
2. Efficiency decrease by 20% leads to 20% more time i.e., 36 minutes. Total time required i.e. 2,16,000 hours. Per hour rate increases by 50 paise to Rs.2,133.

**Illu.3: The sales director of Navabharat Manufacturing Company reports that next year he expects to sell 54,000 units of a certain product. The production manager consults his store keeper and casts his figures as follows:**

**Two kinds of raw materials A and B are required for manufacturing the product. Each unit of the product required 2 units of A and 3 units of B. The estimated opening balances at the commencement of the next year are:**

**Finished product – 10,000 units; A – 12,000 units; B – 15,000 units.**

**The desirable closing balances at the end of next year are:**

**Finished product – 14,000 units; A – 13,000 units; B – 16,000 units.**

**Prepare the Materials Budget for the next year.**

**Solution:****Materials Budget for the year ending.....**

	Finished Products Units	Raw Materials	
		A Units	B Units
Desired Production @ 2 units for A and 3 units for B	54,000	1,08,000	1,62,000
Add: Opening Balance	10,000	12,000	15,000
	64,000	1,20,000	1,77,000
Less: Closing Balance	14,000	13,000	16,000
Estimated Sales	50,000	-	-
Materials to be purchased	-	1,07,000	1,61,000

**5.1.2 Preparation of Master Budget:**

The Master budgets combine all functional budgets into one harmonious unit. It is a summary plan of overall proposed operations developed by management for the company, covering a specific period. It is a summary budget incorporating its functional budgets which is finally approved, adopted and employed. This budgeting contains the details of sales budget, production budget, cash budget etc. When it is complete, the budget committee will review all the details and if approved, it will be submitted to the board of directors. Once it is accepted and approved it becomes the target for the company during a specific period to achieve the desired targeted results.

**Illu.4: A Glass Manufacturing Company requires you to calculate and present the budget for the next year from the following information:**

	Rs.
<b>Sales:</b>	
<b>Product A</b>	<b>3,00,000</b>
<b>Product B</b>	<b>5,00,000</b>
<b>Direct materials Cost</b>	<b>60% of Sales</b>
<b>Direct Wages</b>	<b>20 Workers @ Rs.150 per month</b>
<b>Factory Overheads:</b>	
<b>Indirect labour i.e.,     Works Manager Rs.500 per month     Foreman Rs.400 per month</b>	
<b>Stores and Spares</b>	<b>2½% on sales</b>
<b>Depreciation on machinery</b>	<b>Rs.12,600</b>
<b>Light and Power</b>	<b>Rs.5,000</b>
<b>Repairs and Maintenance</b>	<b>Rs.8,000</b>
<b>Other Sundries</b>	<b>10% on direct wages</b>
<b>Administration, selling and distribution expenses</b>	<b>Rs.14,000 per year</b>

**Solution:**

**Master Budget**

	Rs.	Rs.
<b>A. Sales Budget:</b>		
Budgeted Sales:		
Product A		3,00,000
Product B		5,00,000
		<u>8,00,000</u>
Less: Administrative, selling and distribution expenses		14,000
Net sales value		<u>7,86,000</u>
<b>B. Product Cost Budget</b>		<b>4,80,000</b>
Direct materials 60% of sales		36,000
Direct wages (20 × 150 × 12)		
Prime Cost		5,16,000
Factory overhead		
Variable : Stores & spares (2 ½ % of sales)	20,000	
Light & power	5,000	
Repairs & maintenance	8,000	33,000
		<u>5,49,000</u>
Fixed : Indirect labour:		
Works manager	6,000	

		Rs.	Rs.
	Foreman	4,800	
	Depreciation	12,600	
	Sundries	3,600	27,000
			5,76,000
<b>C.</b>	<b>Expected Profit (A-B)</b>		<b>2,10,000</b>

### 5.1.3 Classification according to time factor:

In terms of time factor, budgets are broadly of the following three types.

- 1. Long-term Budgets:** They are concerned with planning the operations of a firm over a perspective of five to ten years. They are usually in terms of physical quantities.
- 2. Short-term Budgets:** They are usually for a period of a year or two and are in the nature of production plan in monetary terms.
- 3. Current Budgets:** They cover a period of month or so and they will be adjusted to current conditions or prevailing circumstances.

### 5.1.4 Budgets based on Flexibility:

On the basis of flexibility budgets may be classified into a) fixed and b) flexible budgets.

**Fixed Budget:** Fixed budget is a budget in which targets are rigidly fixed. Such budgets are usually prepared from one to three months in advance of the fiscal year to which they are applicable. Thus, twelve months or more may elapse before figures forecast for the December budget are used to measure actual performance. Many things may happen during this intervening period and they may make the figures go widely out of line with the actual figures. Though it is true that a fixed, or static budget as it is sometimes called, can be revised whenever the necessity arises, it smacks of rigidity and artificially so far as control over costs and expenses are concerned.

**Flexible Budget:** Flexible budget or variable budget is one which provides estimates for different levels of activities. It is a budget which, by recognising the difference in behaviour between fixed and variable costs in relation to fluctuations in output or turnover, is designed to change appropriately with such fluctuations. A flexible budget may, for example, provide estimates for 50%, 60%, 70% and 80% production capacities. The actual production can be compared with the appropriate estimate in the budget.

## 5.2 FLEXIBLE BUDGET

As stated above budget may be established, either as a fixed budget or a flexible budget. A fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained. It does not change with the change in the level of activity actually attained and does not conform with the budgeted one. As a result, fixed budgets can be established only for a small period of time when the actual output is not anticipated to differ much from the budgeted output. Obviously, fixed budgets have only limited application and are ineffective as managerial tools.

### 5.2.1 Need for Flexible Budget

A flexible budget is a budget designed to change in accordance with the level of activity actually attained. It is also known as **variable or sliding scale budget**. It is prepared in such a way as to present the budgeted cost for different levels of activity. It is more realistic and practical in that the changes expected at various levels of activity are given due weightage. Flexible Budgeting is desirable in the following cases:

- (i) Where sales are not predictable and certain because of the peculiar nature of the business e.g. business dealing in luxury or semi-luxury goods.
- (ii) Where the venture is a new and accurate demand forecasting is a tedious task, particularly when there is a question of specific customers' tastes and fashions.
- (iii) Where the business is subject to the vagaries of nature such as soft drinks etc.
- (iv) Where the production cannot be estimated because of uncertainties as regards availability of material or labour.

### 5.2.2 Features of flexible budgets

1. They are prepared for a range of activity instead of a single level.
2. They provide a sound basis for comparison because they are automatically geared to changes in volume.
3. They provide a ready-made budget for a particular volume.
4. These are based upon adequate knowledge of cost behaviour pattern.

**Illu.5: Prepare a flexible budget for the production of 80% and 100% activity on the basis of the following information.**

<b>Production at 50% capacity</b>	<b>5,000 units</b>
<b>Raw Material</b>	<b>Rs.80 per unit</b>
<b>Direct Labour</b>	<b>Rs.50 per unit</b>
<b>Direct Expenses</b>	<b>Rs.15 per unit</b>
<b>Factory Expenses</b>	<b>Rs.50,000 (50%) fixed</b>
<b>Administration expenses</b>	<b>Rs.60,000 (variable)</b>

**Solution:****Flexible budget**

Capacity of Output units	50%	80%	100%
	5,000	8,000	10,000
	Rs.	Rs.	Rs.
Raw material	4,00,000	6,40,000	8,00,000
Labour	2,50,000	4,00,000	5,00,000
Direct expenses	75,000	1,20,000	1,50,000
Prime Cost	7,25,000	11,60,000	14,50,000
Factory expenses			
Variable	25,000	25,000	25,000
50% fixed (50,000)	25,000	40,000	50,000
Factory cost	7,75,000	12,25,000	15,25,000
Administration expenses			
Fixed 40% (60,000)	24,000	24,000	24,000
Variable (60%)	36,000	57,600	72,000
Total cost	8,35,000	13,06,600	16,21,000

**Illu.6: With the following data at 60% activity prepare a budget at 80% and 100% activity.**

**Production at 60% capacity, 600 units**

**Materials Rs.100 per unit**

**Labour Rs.40 per unit**

**Expenses Rs.10 per unit**

**Factory expenses Rs.40,000 (40% fixed)**

**Administrative expenses RS.30,000 (60% fixed)**

**Solution:****Flexible budget**

Level of Activity	60%	80%	100%
Output (Units)	600	800	1,000
Variable Expenses:	Rs.	Rs.	Rs.
Material	60,000	80,000	1,00,000
Labour	24,000	32,000	40,000
Expenses	6,000	8,000	10,000
Factory expenses	24,000	32,000	40,000
Administrative expenses	12,000	16,000	20,000
Total Variable cost	1,26,000	1,68,000	2,10,000
Fixed Expenses:			
Factory expenses	16,000	16,000	16,000
Administrative expenses	18,000	18,000	18,000
Total cost	1,60,000	2,02,000	2,44,000



**Illu.7: Prepare a flexible budget at 60%, 80% and 100% capacities from the following information.**

- a. Fixed expenses Rs.1,49,500
- b. Semi-variable expenses of 50% capacity – Rs.89,500
- c. Variable expenses at 50% capacity – Rs.2,67,000

Semi variable expenses remained constant between 40% and 70% capacity, increase by 10% between 70% and 85% capacity and 15% between 85% and 100% capacity. Sales at 60% are Rs.5,10,000, at 80% capacity Rs.6,80,000 and at 100% capacity Rs.8,50,000. Assume that all products are sold.

**Solution:**

<b>Flexible budget</b>			
	60% capacity	80% capacity	100% capacity
Sales (A)	5,10,000	6,80,000	8,50,000
Variable expenses	3,20,400	4,27,200	5,34,000
Semi-variable expenses	89,500	98,450	1,02,925
Fixed expenses	1,49,500	1,49,500	1,49,500
Total expenses (B)	5,59,400	6,75,150	7,86,425
Profit/Loss	(-) 49,400	4,850	63,575

**Illu.8: The following data are available in a manufacturing company for a yearly period.**

	Rs. (lakhs)
<b>Fixed Expenses</b>	
Wages and Salaries	9.5
Rent, Rates and taxes	6.6
Depreciation	7.4
Sundry administration expenses	6.5
<b>Semi-variable expenses (at 50% of capacity)</b>	
Maintenance and repairs	3.5
Indirect labour	7.9
Sales department salaries	3.8
Sundry administrative expenses	2.8
<b>Variable expenses (at 50% of capacity)</b>	
Material	21.7
Labour	20.4
Other expenses	7.9

Assume that the fixed expenses remain constant for all levels of production, semi-variable expenses remain constant between 45% and 65% of capacity, increased by 10% between 65% and 80% capacity and by 20% between 80% and 100% capacity. Sales at various levels are:

	Rs. (lakhs)
50% capacity	100
60% capacity	120
75% capacity	150
90% capacity	180
100% capacity	200

Prepare a flexible budget for the year and forecast the profit at 60%, 75%, 90% and 100% of capacity.

**Solution:**

**Flexible Budget**

	50% Rs. (Lakhs)	60% Rs. (Lakhs)	75% Rs. (Lakhs)	90% Rs. (Lakhs)	100% Rs. (Lakhs)
(A) Sales	100	120	150	180	200
Variable expenses					
Material	21.70	26.04	32.55	39.06	43.40
Labour	20.40	24.48	30.60	36.72	40.80
Other expenses	7.90	9.48	11.85	14.22	15.80
Semi-variable expenses:					
Maintenance and Repairs	3.50	3.50	3.85	4.20	4.20
Indirect labour	7.90	7.90	8.69	9.48	9.48
Sales dept.salaries	3.80	3.80	4.18	4.56	4.56
Sundry administrative Expenses	2.80	2.80	3.08	3.36	3.36
Fixed Expenses:					
Wages and salaries	9.50	9.50	9.50	9.50	9.50
Rent rate and taxes	6.60	6.60	6.60	6.60	6.60
Depreciation	7.40	7.40	7.40	7.40	7.40
Sundry administrative Expenses	6.50	6.50	6.50	6.50	6.50
(B) Total cost	98.00	108.00	124.80	141.60	151.60
Profit (A-B)	2.00	12.00	25.20	38.40	48.40

**Illu.9:** A factory is currently working to 50% capacity and produces 10,000 units. Estimate the profits of the company when it works to 60% and 80% capacity and offer

**your critical comments. At 60% working material cost increases by 2% and selling price falls by 2%. At 80% raw material cost increases by 5% and selling price falls by 5%.**

**At 50% capacity working the product costs Rs.180 per unit and is sold at Rs.200 per unit. The unit cost is Rs.180 is made up as follows:**

	Rs.
<b>Material</b>	<b>100</b>
<b>Labour</b>	<b>30</b>
<b>Factory overhead</b>	<b>30 (40% fixed)</b>

**Solution:**

### Flexible Budget

	50% 10,000 Units		60% 12,000 Units		80% 16,000 Units	
	Per Unit	Amount	Per Unit	Amount	Per Unit	Amount
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Material	100	10,00,000	102	12,24,000	105	16,80,000
Labour	30	3,00,000	30	3,60,000	30	4,80,000
<b>Factory overheads</b>						
Fixed	12	1,20,000	10	1,20,000	7.50	1,20,000
Variable	18	1,80,000	18	2,16,000	18	2,88,000
<b>Administrative overheads</b>						
Fixed	10	1,00,000	8.33	1,00,000	6.25	1,00,000
Variable	10	1,00,000	10	1,20,000	10	1,60,000
Total cost	180	18,00,000	178.33	21,40,000	176.75	28,28,000
Sales	200	20,00,000	196.00	23,52,000	190.00	30,40,000
Profit	20	2,00,000	17.67	2,12,000	13.25	2,12,000

## 5.3. CURRENT DEVELOPMENTS IN BUDGETING

### 5.3.1 Zero Based Budgeting (ZBB):

Zero Based Budgeting is a relatively new approach to budgeting. This is increasingly employed in the budget preparation of such items as the administrative costs, special programmes, and other clearly identifiable projects. The key element in ZBB is future objective orientation of past objectives. Instead of taking the last year's budget and adjusting them for

finding out the future level of activity and preparation of budgets therefrom. ZBB forces managers to review the current, ongoing objectives and operations.

ZBB is, therefore, a type of budget that requires managers to rejustify the past objectives, projects, and budgets and to set priorities for the future. The essential idea of ZBB that differentiates from traditional budgeting is that it requires managers to justify their budget request in detail from scratch without any reference to the level of previous appropriations. It tantamounts to recalculations of all organisational activities to see which should be eliminated founded at reduced level, founded at the current level of increased finances must be provided.

### **5.3.2 Performance Budgeting:**

The basic aim of performance budgeting (also known as programme budgeting) is to focus attention on the work to be carried out, services to be rendered rather than things to be spent for or acquired. It concentrates attention on physical aspects of achievement. Here, there is not only a financial plan but also a work plan in terms of work done. It takes a systems view of activities by trying to associate the inputs of the expenditure with the output of accomplishment in terms of services, benefits etc.

### **5.3.3 Responsibility Accounting:**

It is method of accounting in which costs are identified with persons assigned to their control rather than with products of functions. In this system division of units of an organisation under specified authority of a person are developed as a responsibility centre and evaluated individually for their performance.

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## **5.4 SELF ASSESSMENT QUESTIONS**

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1. What do you consider to be the purposes and special features of a flexible budget?
2. "A budget is an aid to management and not a substitute for management." Explain.
3. How does budgetary control serve as a planning and control device? Point out its limitations and the requisites for successful operation.
4. "For the success of a system of budgetary control it is essential that there should be a sound organisation for budget preparation, budget maintenance, and budget administration." Discuss.
5. What is Zero based Budgeting?
6. What is Performance Budgeting?
7. What is Flexible Budget? Explain
8. Write short notes on the following:
  - a. Capital Expenditure budget
  - b. Zero based budget
  - c. Performance budget
9. Explain the latest developments in the field of budgeting and budgetary control.

## 5.5 EXERCISES

1. A company manufactures two products A and B. The sales manager forecasts the sales in units as follows:

	Jan.	Feb.	March	April	May	June	July
Product A	28	28	24	20	16	16	18
Product B	10	12	16	20	24	24	20

It is assumed that there will be no work-in-progress at the end of any month and finished units equal to half the sales for the following month will be kept in stock. Prepare a production budget for each month.

**[Ans.: Jan. 1,100; Feb. 1,400; Mar. 1,800; April 2,200; May 2,400; June 2,200]**

2. The sales director of a manufacturing company reports that next year he expects to sell 54,000 units of a certain product. Production manager consults his store keeper and casts his figures as follows:

Two kinds of raw materials A and B are required for manufacturing of the product. Each unit of the product required 2 units of A and 3 units of B. The estimated opening balances at the commencement of the next year are:

Finished Product – 10,000 units; A – 12,000 units; B – 15,000 units.

The desirable closing balances at the end of the next year are:

Finished Product – 14,000 units; A – 13,000 units; B – 16,000 units.

Prepare the material budget for the next year.

**[Ans.: Materials to be purchased A – 1,17,000 units; B – 1,75,000 units]**

3. You are required to prepare a selling overhead budget from the estimates given below:

	Rs.
Advertisement	1,000
Salaries of the Sales Department	1,000
Expenses of the Sales Department (fixed)	750
Salesmen's Remuneration:	
Salaries and Dearness Allowance	3,000
Commission @ 1% on sales affected	
Carriage outwards: Estimated @ 5% on sales	
Agent's commission: 6¼ % on sales	

The sales during the period were estimated as follows:

Rs.80,000 including Agent's sales	Rs.8,000
Rs.90,000 including Agent's sales	Rs.10,000
Rs.1,00,000 including Agent's Sales	Rs.10,000

**[Ans.: Rs.7,450; Rs.7,775; Rs.7,875]**

4. From the following information, prepare cash budget for the month of January to April.

Expected Sales		Expected Purchase	
	Rs.		Rs.
January	60,000	January	48,000
February	40,000	February	80,000
March	45,000	March	81,000
April	40,000	April	90,000

Wages to be paid to workers Rs.5,000 each month. Balance at bank on 1<sup>st</sup> January Rs.8,000. It has been decided by the Management that:

- In case of deficit fund within the limit of Rs.10,000 arrangements can be made with bank.
- In case of deficit fund exceeding Rs.10,000 but within the limits of Rs.42,000 issue of debentures is to be preferred.
- In case of deficit fund exceeding Rs.42,000, issue of shares is preferred (considering the fact that it is within the limit of authorised capital)

**[Ans.: Cash Closing Balance : January Rs.15,000; February – Nil; March – Nil; April – Nil]**

Comment: It is presumed that Shares/Debentures are issued by the company precisely to meet the deficit arising in each month.

5. Prepare Cash budget of a company for April, May, June 2002 in a columnar form using the following information.

Month	Sales Rs.	Purchases Rs.	Wages Rs.	Exp. Rs.
January (Actual)	80,000	45,000	20,000	5,000
February (Actual)	80,000	40,000	18,000	6,000
March (Actual)	75,000	42,000	22,000	6,000
April Budget	90,000	50,000	24,000	6,000
May Budget	85,000	45,000	20,000	6,000
June Budget	80,000	35,000	18,000	5,000

You are further informed that:

- 10% of purchase and 20% of Sales are for cash.
- The average collection period of the Company is  $\frac{1}{2}$  month and credit purchases are paid off regularly after one month.
- Wages are paid half monthly and the rent of Rs.500 excluded in expense is paid monthly.
- Cash and Bank balance on April 1, was Rs.15,000 and the company wants to keep it on end of every month below this figure, the excess cash being put in fixed deposits.

**[Ans.: Cash Closing Balance: April Rs.21,700; May Rs.12,700; June Rs.13,200]**

6. The Delta Ltd., manufacturers two brands of pen one sold under the name of 'Bright' and one under the name of 'Hans'. The sales department of the company has three departments in different areas of country.

The sales budgets for the year ending 31<sup>st</sup> December, 2002 were:

Bright – Department I – 3,00,000; Department II – 5,62,500; Department III – 1,80,000; and  
Hans – Department I – 4,00,000; Department II – 6,00,000; and Department III – 20,000.  
Sales prices are Rs.3 and Rs.1.20 for Bright and Hans respectively, in all departments.

It is estimated that by forced sales promotion the sale of 'Hans' in Department I will increase by 1,75,000. It is also expected that by increasing Production and arranging extensive advertisement. Department III will be able to increase the sale of 'Hans' to 50,000.

It is recognised that the estimated sales by Department II represent an unsatisfactory target. It is agreed to increase both estimates by 20%.

Prepare a Sales Budget for the year to 31<sup>st</sup> December, 2002.

**[Ans.: Quantity : Bright 11,55,000; Hans 13,65,000; Amount : Bright Rs.34,65,000; Hans Rs.16,38,000]**

7. The following information has been made available from the accounting records of payment of Precision Tools Ltd., for the last six months of 2001 (and of only sales for January, 2002) in respect of fishplates X produced by it.

- i. The units to be sold in different months are:

July	2,200	November	5,000
August	2,200	December	4,600
September	3,400	January, 2002	4,000
October	3,800		

- ii. There will be no work-in-progress at the end of any month.  
iii. Finished units equal of half the sales for the next month will be in stock at the end of every month (including June, 2001)  
iv. Budgeted production and production costs for the year ending December, 2001 are as thus:

Production	44,000
Direct materials per unit	Rs.10.00
Direct wages per unit	Rs.4.00
Total factory overheads apportioned to product	Rs.88,000

It is required to prepare: Production budget for the last six months of 2001; and  
a. Production cost budget for the same period.

**[Ans.: Production required total for 6 months 22,100 units; Product cost budget total for 6 months Rs.3,53,600; Factory Overhead per unit Rs.2]**

8. Binaka Ltd., have prepared the budget for the production of a lakh units of the only commodity manufactured by them for a costing period as under:

	Rs.
Raw material	2.52 per unit
Direct labour	0.75 per unit
Direct expenses	0.10 per unit
Works overhead (60% fixed)	2.50 per unit
Administration overheads (80% fixed)	0.40 per unit
Selling overheads (50% fixed)	0.20 per unit

The actual production during the period was only 60,000 units. Calculate the revised budgeted cost per unit.

**[Ans.: Cost per unit Rs.7.75]**

9. The expenses budgeted for production of 10,000 units in a factory are furnished below:

	Per unit Rs.
Materials	70
Labour	25
Variable overheads	20
Fixed overheads (Rs.1,00,000)	10
Variable expenses (Direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administrative expenses (Rs.50,000)	5
Total cost of sales per unit (to make and sell)	155

Prepare a Budget for production of (a) 8,000 units and (b) 6,000 units.  
Assume that administration expenses are rigid for all levels of production.

**[Ans.: Total cost at 10,000 units Rs.15,50,000; at 8,000 units Rs.12,75,400; at 6,000 units Rs.10,00,800]**



10. A factory is currently working to 50% capacity and the product cost is Rs.180 per unit as follows:

Material	Rs.100
Labour	Rs.30
Factory overhead	Rs.30 (40% fixed)
Administration overhead	Rs.20 (50% fixed)

The product is sold at Rs.200 per unit and the factory produces 10,000 units at 50% capacity.

You are required to estimate profit if the factory works at capacity of 60%. At the working level of 60% the raw cost increases by 20% and the selling price falls by 20%.

**[Ans.: At 60% Total Cost: Rs.23,56,000; per unit Rs.196.33; Loss Rs.4,36,000; per unit Rs.(-) 36.33; Sales Rs.19,20,000; per unit Rs.160]**

11. The monthly budget for a producing unit for two levels were as follows:

Capacity	60%	100%
Units	300	500
Indirect wages	600	1,000
Consumable Stores	450	750
Depreciation	2,000	2,000
Insurance	1,000	1,000
Maintenance	800	1,000
Power and Fuel	1,450	1,750

Prepare a budget of 80% activity segregating fixed and variable cost in total and per unit. At 80% activity indirect wages will rise by 5%.

**[Ans.: At 60%: Total Cost Rs.6,300; per unit Rs.21; At 80%: Total Cost Rs.6,940; per unit Rs.17.35; At 100%: Total Cost Rs.7,500; per unit Rs.15]**

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## 5.7 REFERENCE BOOKS

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9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

**Chapter – 6****CONCEPT OF CAPITAL BUDGETING****Objectives :**

After reading this lesson we should able to :

- understand the concept of capital budgeting
- analyse the nature of capital budgeting decisions in an organizations
- know the importance of capital budgeting decisions
- analyse the process of the capital budgeting with reference to specific proposals.

**Structure :**

- 6.1 Concept of Capital Budgeting**
- 6.2 Nature of Capital Budgeting Decision**
- 6.3 Importance of capital Budgeting Decisions**
- 6.4 Capital Budgeting Process**
- 6.5 Evaluation of Proposals**
- 6.6 Self Assessment Questions**
- 6.7 Reference Books**

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**6.1 CONCEPT OF CAPITAL BUDGETING**

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Efficient allocation of capital is one of the most important functions of the financial management in modern times. This function involves the firms decision to commit its funds in long-term assets and other profitable activities. The decision to invest funds in the long term assets of a firm are quite significant and they will influence the firms wealth, determine the size, get the pace and direction of its growth and also affect the business risk.

The capital investment refers to the investment in various fixed assets whose returns would be available only after a year. The investment in fixed assets will be quite heavy and to be made immediately, but the returns will be available after a period of one year. The investment decision of a company are commonly called as the capital budgeting decisions or capital expenditure decisions.

**James C. Van Horne:** “Capital budgeting involves a current investment in which the benefits are expected to be received beyond one year in the future.” It suggests that the investment in any asset with a life of less than a year, falls into realm of working capital management, whereas any asset with a life or more than one year involves capital budgeting.

**Weston and Brigham:** “capital budgeting involves the entire process of planning expenditures whose returns are expected to extend beyond one year”.

**Charles T. Horngren:** “Capital Budgeting is the long-term planning for making and financing proposed capital outlays.”

**Robert N. Anthony:** “The Capital Budget is essentially a list of what management believes to be worthwhile projects for the acquisition of new capital assets together with the estimated cost of each project.”

Thus, Capital budgeting decision may be defined as the firm's decision to invest its current funds most efficiently in long-term projects, in anticipation of an expected flow of future funds over a series of years.

It involves the process of generation of investment proposals, estimation of cash flows for the proposals, evaluation of cash flows, selection of projects based upon an acceptance criterion and finally continuous revaluation of investment projects after their acceptance.

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## 6.2 NATURE OF CAPITAL BUDGETING DECISIONS

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Generally, the company's capital budgeting decisions include additions, disposition, modification and replacement of fixed assets. The capital budgeting decisions include the following proposals:

1. **Replacement:** Replacement of fixed assets on account of the existing assets, either being worn out or become out-dated.
2. **Expansion:** The company may have to expand its production capacities on account of high demand for its products or inadequate production capacity. This will need additional capital investment.
3. **Diversification:** A company may intend to reduce its risk by operating in several markets. In such case, capital investment may become necessary for purchase of new machinery and facilitates to handle the new products.
4. **Research & Development:** Large sums of money may have to be spent on research and development, in case of those industries where technology is rapidly changing. In such cases, large sums of money are needed for these proposals. So these are also included in the proposals of capital budgeting.
5. **Miscellaneous Proposals:** A company may have to invest money in projects which do not directly help in achieving profit-oriented goals. For example, installation of pollution control equipment, may be necessary on account of legal requirements. Hence, funds will be required for such proposals also.

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## 6.3 IMPORTANCE OF CAPITAL BUDGETING DECISIONS

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Capital budgeting decisions are among the most crucial and critical business decisions. A number of factors are responsible for capital budgeting decisions. Care must be taken while making capital budgeting decisions influence all the departments of a company such as production, marketing, personnel etc. The other reasons for keeping more attention include the following.

- 1. Investment of Huge Funds:** Capital budgeting decisions require large capital outlays. Hence, the company should carefully plan its investment programme so that it may get the funds at the right time and they must be put to most profitable use. An opportune investment decision can give rise for spectacular result. On the other hand, an ill-advised and incorrect decision can jeopardise the profitable position and can also be the cause for closure of the company.
- 2. Long-Term Implications:** The effect of a capital budgeting decision will be felt by the company over a long period and therefore they have decisive influence on the rate and direction of the growth of the company, For example, if a company purchases a new machine by paying heavy amount and the project comes out to be unprofitable, the company will have to bear the burden of fixed cost upto a stage, where the company decides to write off the machine completely. Apart from this, if the results are extended for a long period of time, it may result in losing the flexibility of the decision maker, because it involves lot of uncertainty about the future of the investment. Further, it may be influenced by several future unforeseen events.
- 3. Irreversible Decisions:** Capital budgeting decisions are irreversible in majority of the cases. It is due to the fact that, it is very difficult to find a market for the capital assets. The only alternative is to treat the entire value of the asset as a scrap. This will result in heavy loss.
- 4. Capital Budgeting Decisions are most difficult to take:** Capital budgeting decisions involve assessment of future events which are most uncertain. It will be very difficult to project sales revenues, costs and benefits accurately in quantitative terms because of economic, political, social and technological factors. Further, the erroneous forecast of asset needs can result in serious consequences for a company.
- 5. Raising of Funds:** Another reason for the importance of capital budgeting is that always asset acquisition involves substantial amount of funds on the part of the company. Before a firm spends large amount of funds, it must plan them to raise systematically because funds are not always available with the company. The company contemplating a major capital expenditure programme, may need to arrange its financing requirements several years in advance, to be sure of having the availability of funds for expansion.

**6. Ability to Compete:** Finally, it has been said that many firms fail, not because they have too much capital equipment but because they have too little ability to complete. The conservative approach of having a small amount of capital equipment may be appropriate. At times, such approach may also be fatal if the other competitors install modern and automated equipment that permit them to produce a better product and sell it a lower price. Hence, the investment in capital assets must help the company to face and meet the competition from the other companies in the same industry.

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## 6.4 CAPITAL BUDGETING PROCESS

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The capital budgeting process involves generation of investment proposals, estimation of cash flows for the proposals, evaluation of cash flows, selection of projects based on acceptance criterion, and finally the continual revaluation of investment after their acceptance. The steps involved in capital budgeting process are as follows:

1. project generation
2. project evaluation
3. project selection
4. project execution

### 6.4.1 Project Generation:

In the project generation, the company has to identify the proposals to be undertaken depending upon its future plans of activity. After identification of the proposals, they can be grouped according to the following categories:

- i. Replacement of Equipment:** In this case, the existing out-dated equipment and machinery may be replaced by purchasing new and modern equipment.
- ii. Expansion:** The company can go for increasing additional capacity in the existing product line by purchasing additional equipment.
- iii. Diversification:** The company can diversify its product lines by way of producing various products and entering into different markets. For this purpose, it has to acquire the fixed assets to enable producing new products.
- iv. Research and Development:** Where the company can go for installation of research and development wing by incurring heavy expenditure, with a view to innovate new methods of production, new products etc.

### 6.4.2 Project Evaluation:

The process of project evaluation involves two steps:

- a) **Estimation of benefits and costs:** These must be measured in terms of cash flows. Benefits to be received are measured in terms of cash inflows, and costs to be incurred are measured in terms of cash outflows.
- b) Selection of an appropriate criterion to judge the desirability of the project.

### 6.4.3 Project Selection:

There is no standard administrative procedure for approving the investment decisions. The screening and selection procedure would differ from firm to firm. Due to lot of importance of capital budgeting decision, the final approval of the project may generally rest on the top management of the company. However, the proposals are scrutinised at multiple levels. Sometimes top management may delegate authority to approve certain types of investment proposals. The top management may do so by limiting the amount of cash outlay, prescribing the selection criteria and holding the lower management levels accountable for the results.

### 6.4.4 Project Execution:

In the project execution the top management or the Project Execution Committee is responsible for effective utilisation of funds allocated for the projects. It must see that the funds are spent in accordance with the appropriation made in the capital budgeting plan. The funds for the purpose of the project execution must be spent only after obtaining the approval of the Finance Controller. Further, to have an effective control, it is necessary to prepare monthly budget reports to show clearly the total amount appropriated, amount spent and the amount unspent.

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## 6.5 EVALUATION OF INVESTMENT PROPOSALS

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Evaluation on Investment opportunities implies comparison of the net investment outlay of the project with the net cash earnings from the project. Further anticipated streams of cash benefits available during lifetime of the project have to be converted into their present value so as to make them comparable with net investment outlay being incurred presently. Thus, the following constitutes components of an investment analysis.

1. Estimating Net Investment outlay
2. Estimating streams of net cash benefits after taxes
3. Evaluation of cash flows in terms of their time value.

### **6.5.1 Net Cash outflows or Net Capital Investment:**

The total net capital investment of total net cash outflows refer to incremental or marginal investment in a capital expenditure project at a point of time or over a period of time. It represents the net amount of capital expenditure in executing a capital project. The net capital investment outlay of a capital project includes the cost of purchasing land, building and plant. It also includes an increase in the level of working capital required to carry out the investment proposals. If a project results in the replacement of an existing capital asset, its current book value is a sunk cost.\* However, its salvage value is deducted from the capital outlay of the new project in order to arrive at the net investment outlay.

Since payment of income tax results in cash expenditure, tax on profit on sale of an existing asset in case of a replacement decision is added to the capital outlay of the new project. Investment allowance, if any, is deducted from the capital outlay for arriving at the net investment outlay.

### **6.5.2 Net operating Cash inflows:**

Operating cash inflows are the estimates of future streams of cash inflows resulting from the implementation of a capital project. These estimates are based on a number of estimates. The forecasts relate to production, plant performance, market share, sales revenues, profit margin, tax laws, state of the economy, etc. Cash inflows at different points of time have to be estimated on the basis of various forecasts. Though based on systematic forecasts and past experience of the firm and industry, projection of future cash inflows based on these estimates are not absolute. Net cash inflows are estimates of cash revenues minus cash expenditures.

Since depreciation is a book adjustment and does not involve any cash outflows, it is not deducted from cash inflows for estimating the net cash inflows. But tax-benefit result from depreciation appropriation is included in cash inflows. The scrap value of an asset at the end of its operational life is another component of cash inflow. Removal expenses and capital gains taxes, if any, are deducted from the salvage value of the asset. Thus, net cash inflows are equal to cash revenues minus cash expenses plus tax benefit from depreciation appropriation plus salvage value of asset, net of removal (expenses and capital gains tax plus value of current assets released).

### **6.5.3 Evaluation of Cash Flows in Terms of their Time Value:**

After determining the investment outlay of the project and economic gains which will be derived from the project, finance manager's next task is to reduce them in present value. Present value of the investment outlay need not be calculated because it has to be incurred in the current year. It is not in respect of cash earnings which will be available in future over

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\* Sunk cost means the costs which cannot be recovered back.



lifetime of the project that question of finding out their present value arises. An understanding of the concept of present value is, therefore, imminent.

### **Present Value:**

The concept of present value provides the underlying relationship between values of series of payments and revenues at different points of time. It is widely recognised that money has time value. A rupee to be received a year from now is not worth as much today as a rupee to be received now. At least three factors contribute to the time value of money.

1. This is just like a bird in hand worth more than twice in a bush. It means uncertainty increases with the futurity of an event so that promise of one rupee in tenth year is usually worth less than a similarly promise in one year.
2. Inflation reduces the purchasing power of the rupee over time, so if inflation is expected to continue, future rupees will have a depreciated value compared to current ones.
3. There are opportunity costs associated with any expenditure, which again makes future rupees worthless than current ones. Opportunity costs arise because a rupee today can be profitably invested and as a result will be worth more than a rupee in the future. Opportunity costs are not losses in the absolute sense but they are relative to what could have been, had the decision maker made the best use of available resources.

Since money has a time value, the finance manager needs a method of determining whether a cash outlay made now in an investment project can be justified in terms of expected receipts from the project in future years. That is, he must have a means of expressing future receipts in present rupee terms so that the future receipts can be compared on an equivalent basis with whatever investment is required in the project under consideration. Infact, the theory of interest provides the manager with the means of making such a comparison.

#### **6.5.4 Distinction between Cash Flow Ability and Profitability**

One of the most important tasks in capital budgeting is estimating future cash flows for a project. The final results we obtain are only as good as the accuracy of our estimates. Since cash, not income, is central to all decisions of the firm, we express whatever benefits we expect from a project, in terms of cash flows rather than income. A distinction should be made between cash flows and profits. Changes in profits do not necessarily mean corresponding changes in cash flows. It is possible for a firm to experience shortage of cash at a time when its profits are increasing and vice versa. Receipt of cash is an objective and cash flow is a clearly defined concept and it avoids the complications of measuring accounting profits.

### 6.5.5 Importance of Cash Flow Ability in Selection of a Project

A cash flow stream is a series of cash receipts and expenditure over the life of the investment project. The estimates of amount and timing of cash flows-inflows and outflows, resulting from an investment, should be carefully made while selecting a project. The information on cash flows is required for investment analysis. In investment analysis, it is the inflow and outflow of cash which is important. The concept of cash flow is important because receipt of cash is an objective and clearly defined concept. The firm invests cash now in a hope of receiving cash returns in a greater amount in the future. It is cash which can be invested, reinvested or distributed to shareholders by the firm in the form of dividends. Thus, for the very purposes of evaluating investment proposals, the very crucial information to be collected is the estimates of cash flows.

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## 6.6 SELF ASSESSMENT QUESTIONS

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1. Define the concept of capital budgeting and explain its significance.
2. Examine the nature of capital budgeting decision. Give suitable examples.
3. What do you mean by capital budgeting process? State the various steps in this process.
4. What is the distinction between cash flow ability and profitability?
5. Why is cash flow ability important in the selection of a project?
6. Define capital budgeting.

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**Chapter – 7****METHODS OF CAPITAL BUDGETING****Objectives :**

After studying this unit we should be able to :

- know the methods of capital budgeting
- Explain various methods of capital budgeting including traditional and non-traditional methods of capital budgeting.
- find out the problems relating to capital rationing

**Structure :**

- 7.1 Methods of Capital Budgeting**
- 7.2 Traditional Methods**
- 7.3 Time Adjusted or Discounted Cash flow method**
- 7.4 Capital Rationing**
- 7.5 Conclusion**
- 7.6 Self Assessment Questions**
- 7.7 Exercises**
- 7.8 Reference Books**

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**7.1. METHODS OF CAPITAL BUDGETING**

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The capital budgeting appraisal methods or techniques of evaluation of investment proposals will help the company to decide upon the desirability of an investment proposal depending upon their relative income generating capacity and rank them in order of their desirability. These methods provide the company a set of norms on the basis of which, either it has to accept or reject the investment proposal. Therefore, a sound appraisal method should enable the company to measure the real worth of the investment proposal. The appraisal methods should possess several good characteristics.

**7.1.1 Characteristics of a Sound Appraisal Method**

1. It should help the company to rank the investment proposals in order of their desirability.
2. It should provide a technique for distinguishing between an acceptable and non-acceptable project.
3. It should provide criteria to solve the problem of choosing among alternative projects.
4. It should recognise the importance of time value of money i.e., bigger benefits are preferable to smaller ones and the early benefits are preferable to later benefits.

5. It should provide the criteria for the selection applicability to any conceivable investment proposals.
6. It should take into account the life pattern of cash flows.  
The criteria for the appraisal of investment proposals are grouped into two types, viz.,

### 1. Traditional methods

- i) Pay Back Period Method,
- ii) Accounting Rate of Return or Average Rate of Return (ARR).

### 2. Time-adjusted or discounted cash flow method

- i) Net Present Value (NPV)
- ii) Internal Rate of Return (IRR)
- iii) Profitability Index (PI)
- iv) Discounted payback method

Let us now discuss methods are discussed below in detail:

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## 7.2 TRADITIONAL METHODS

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These methods are based on the principles to determine the desirability of an investment project on the basis of its useful life and expected returns. These methods depend upon the accounting information available from the books of accounts of the company. These will not take into account the concept of 'time value of money', which is a significant factor to determine the desirability of a project in terms of present value.

### 7.2.1 Pay-back Period Method:

It is the most popular and widely recognised traditional method of evaluating the investment proposals. It can be defined as the "the number of years required to recover the original cash outlay invested in a project". According to Weston and Brigham, "the pay back period is the number of years it takes for the firm to recover its original investment by net returns before depreciation, but after taxes." On the other hand, James C. Vanhorne has defined the pay back period as the number of years required to recover initial cash investment. It is the ratio of the initial fixed investment over the annual cash inflow for the recovery period." It can be calculated with the help of the following formula:

$$\text{Pay back period} = \frac{\text{Cash outlay}}{\text{Annual cash inflows}}$$

The pay back period can be used as an accept or reject criterion as well as a method of ranking projects. The pay back period is the number of years to recover the investment made in a project. If the pay back period calculated for a project is less than the maximum pay back period set up by the company, it can be accepted. As a ranking method it gives highest rank to a project which has lowest pay back period, and lowest rank to a project with highest pay back

period. Whenever a company faces the problem of choosing among two or more mutually exclusive projects, it can select a project on the basis of pay back period, which has shorter pay back period than the other project.

**Merits:** The following are the merits of the pay back period method.

- i. **Easy Calculation:** It is one of the easiest methods of evaluating the investment projects. It is simple to understand and to compute.
- ii. **Less Cost:** It does not involve any cost for computation of the period of pay back.
- iii. **Knowledge of Pay-Back Period:** The knowledge of pay back period is useful in decision-making, the shorter the period better the project.
- iv. **Protection from loss due to obsolescence:** This method is very suitable to such industries where mechanical and technical changes are routine matter and hence, shorter pay back period view avoid such losses.
- v. **Easy availability of information:** It can be computed on the basis of accounting information available from the books.
- vi. **More useful to small sector:** It is one of the widely used methods in small scale industry sector.

**Demerits:** However, the pay back period has certain demerits:

1. **Failure in taking cash flows after payback period:** This method fails to take into account the cash flows received by the company after the pay back period;
2. **Failure in considering time value of money:** It does not take into account the importance of time value of money;
3. **Non-consideration of interest factor:** It does not take into account the interest factor involved in an investment outlay;
4. **Maximisation of Market value not possible:** It is not consistent with the objective of maximising the market value of the company's share;
5. **Failure in taking magnitude and timing of cash inflows:** It fails to consider the pattern of cash inflows i.e., the magnitude and timing of cash inflows.

**Illu.1: A Project costs Rs.10,00,000. Its annual income is Rs.1,60,000 after depreciation @ 20% p.a. but before tax which is 50%. Calculate pay back period. Also calculate pay back period when the cash inflow is Rs.2,00,000 in the first year Rs.2,50,000 in second year; Rs.2,50,000 in third year, Rs.3,00,000 in fourth year.**

**Solution (a) :**

	Rs.
Project before tax	1,60,000
Less: 50% tax	80,000
Profit after tax	80,000
Add: Depreciation 20% Rs.10,00,000	2,00,000
	2,80,000

$$\begin{aligned} \text{Annual cash inflow pay back period} &= \frac{\text{Cash Investment}}{\text{Annual Cash inflows}} \\ &= \frac{10,00,000}{2,80,000} = 3.57 \text{ years.} \end{aligned}$$

**(b) When cash is not uniform:**

Year	Annual cash inflow (Rs.)	Cumulative Cash inflow (Rs.)
1	2,00,000	2,00,000
2	2,50,000	4,50,000
3	2,50,000	7,00,000
4	3,00,000	10,00,000

Pay back period = 4 years.

**Illu.2: Sai Trading Co., Ltd., propose to increase the production of the company. They are willing to purchase a new machine. There are three types of in the market. The following are the details regarding them.**

	Alpha Rs.	Beta Rs.	Gama Rs.
Cost of Machine	17,500	12,500	9,000
Estimated savings in scrap	400	750	250
Wages per operator	250	300	250
Cost of indirect materials	--	400	--
Expected savings in indirect material	100	--	250
Additional cost of maintenance	750	550	500
Operations required (number)	11	20	9
Estimated life of machine	10 years	6 years	5 years
Taxation at 50% of the profit			

You are required to advise the management which type of the machine should be purchased.

**Solution:**

**Profitability Statement**

	Alpha Rs.	Beta Rs.	Gama Rs.
Machine cost	17,500	12,500	9,000
Life of the machine	10 years	6 years	5 years
Savings (per year) in cos:			
Wages	2,750	6,000	2,250
Scrap	400	750	250
Indirect materials	100	--	250
Total (A)	3,250	6,750	2,750

	Alpha Rs.	Beta Rs.	Gama Rs.
<b>Additional Expenditure:</b>			
Indirect material	--	400	--
Supervision	--	800	--
Maintenance	750	550	500
Total (B)	750	1,750	500
Marging Profit (A-B)	2,500	5,000	2,250
Net savings after tax of 50%	1,250	2,500	1,125
Pay back period	14 years	5 years	8 years
Pay back profitability	Nil	2,500	Nil

The company is advised to purchase Machine Type Beta since it ranks first both in payback as well as payback profitability criteria. In the case of Type Alpha and Type Gama the life of each machine is shorter than the payback period.

**Illu.3: Durga Ltd., is producing articles mostly by manual labour and is considering to replace it by a new machine. There are two alternative models 'M' and 'N' of the new machine. Prepare a statement of profitability showing the pay-back period from the following information:**

	Machine M Rs.	Machine N Rs.
<b>Estimated life of the machine</b>	<b>4 years</b>	<b>5 years</b>
<b>Cost of the machine</b>	<b>9,000</b>	<b>18,000</b>
<b>Estimated savings in scrap</b>	<b>500</b>	<b>800</b>
<b>Estimated savings in direct wages</b>	<b>6,000</b>	<b>8,000</b>
<b>Additional cost of maintenance</b>	<b>800</b>	<b>1,000</b>
<b>Additional cost of supervision</b>	<b>1,200</b>	<b>1,800</b>
<b>(Ignore taxation)</b>		

**Solution:**

**Statement showing Annual Cash Inflows**

	Machine M Rs.	Machine N Rs.
Estimated savings in scrap	500	800
Estimated savings in direct wages	6,000	8,000
Total savings (A)	6,500	8,800
Additional cost of maintenance	800	1,000
Additional cost of supervision	1,200	1,800
Total additional costs (B)	2,000	2,800
Net Cash inflow (A-B)	4,500	6,000

$$\text{Pay back period} = \frac{\text{Original Investment}}{\text{Annual average cash inflows}}$$

$$\text{Machine M} = \frac{9,000}{4,500} = 2 \text{ years}$$

$$\text{Machine N} = \frac{18,000}{6,000} = 3 \text{ years}$$

**Machine 'M' has a shorter pay-back, hence it should be preferred to Machine N.**

**Illu.4: An engineering company is considering the purchases of a new machine for its immediate expansion programme. There are three possible machines suitable for the purpose. Their details are as follows:**

	Machines		
	1 Rs.	2 Rs.	3 Rs.
Capital cost	3,00,000	3,00,000	3,00,000
Sales (at standard prices)	5,00,000	4,00,000	4,50,000
Net cost of production:			
Direct material	40,000	50,000	48,000
Direct Labour	50,000	30,000	36,000
Factory overheads	60,000	50,000	58,000
Cost of production	1,50,000	1,30,000	1,42,000
Administrative costs	20,000	10,000	15,000
Selling and distribution costs	10,000	10,000	10,000
<b>Total cost</b>	<b>1,80,000</b>	<b>1,50,000</b>	<b>1,67,000</b>

The economic life of machine no.1 is 2 years, while it is 3 years each for the other two. The scrap values are Rs.40,000, Rs.25,000 and Rs.30,000 respectively.

Sales are expected to be at the rates shown for each year during the full economic life of the machines. The costs relate to annual expenditure resulting from each machine.

Tax to be paid is expected at 50% of the net earnings of each year. It may be assumed that all payables and receivables will be settled promptly, strictly on cash basis with no outstanding from one accounting year to another. Interest on capital has to be paid at 8% per annum.

You are requested to show which machine would be the most profitable investment on the principle of "pay-back method."



**Solution:****Statement showing the net cash flow of three machines.**

	Machine-1 Rs.	Machine-II Rs.	Machine-III Rs.
Capital cost	3,00,000	3,00,000	3,00,000
<b>Sales (i)</b>	5,00,000	4,00,000	4,50,000
Cost of production	1,50,000	1,30,000	1,42,000
Administration cost	20,000	10,000	15,000
Selling and Distribution cost	10,000	10,000	10,000
Total cost (ii)	1,80,000	1,50,000	1,67,000
Profit before depreciation and interest (i)-(ii)=(iii)	3,20,000	2,50,000	2,83,000
Depreciation: Capital cost less scrap value Divided by economic life =	1,30,000	91,667	90,000
Add: back interest on borrowing	24,000	24,000	24,000
Depreciation and Interest(iv)	1,54,000	1,15,667	1,14,000
Profit before tax (iii)-(iv)	1,66,000	1,34,333	1,69,000
Less taxation (50%)	83,000	67,167	84,500
Profit after tax	83,000	67,166	84,500
Add: Depreciation	1,30,000	91,667	90,000
Net Cash flow	2,13,000	1,58,833	1,74,500
Pay-back period	1.41 yrs	1.89 yrs	1.72 yrs

**Selection:** Machine No.I is most profitable

**Working Notes:**

- i) It has been presumed that interest on borrowings will have to be paid throughout the economic life of the asset.
- ii) Factory overheads do not include depreciation
- iii) No borrowings will be required for working capital.

**7.2.2 Accounting or Average Rate of Return (ARR) Method:**

It is an accounting method, which uses the accounting information revealed by the financial statements to measure the profitability of an investment proposal. It can be determined by dividing the average income after taxes by the average investment, i.e., the average book value for depreciation. According to Solomon, accounting rate of return on an investment can be calculated as the ratio of accounting net income to the initial investment.

$$\text{Average Rate of Return (A.R.R.)} = \frac{\text{Average net income}}{\text{Average investment}}$$

On the basis of this method, the company can select all those projects whose ARR is higher than the minimum rate established by the company. It can reject the projects which an ARR lower than the expected rate of return. This method can also help the management to rank the proposals on the basis of ARR. A highest rank will be given to a project with highest ARR, whereas a lowest rank to a project with lowest ARR.

**Merits:** The following are the merits of this method:

1. It is very simple to understand and calculate;
2. It can be readily computed with the help of the available accounting data
3. It uses the entire stream of earnings to calculate the ARR.

**Demerits:** This method has the following demerits:

1. It is not based on cash flows generated by a project;
2. This method does not consider the objective of wealth maximisation;
3. It ignores the length of the projects useful life;
4. It does not take into account the fact that the profits can be re-invested; and
5. It ignores the time value of money.

**Illu.5: Determine the Average Rate of Return from the following data of two Machine A and B.**

	Machine A Rs.	Machine B Rs.
<b>Original cost</b>	<b>56,125</b>	<b>56,125</b>
<b>Additional Investment in Net working capital</b>	<b>5,000</b>	<b>6,000</b>
<b>Estimated Salvage Value</b>	<b>3,000</b>	<b>3,000</b>

**Annual Estimated Income after Depreciation and Taxes:**

	Rs.	Rs.
<b>1<sup>st</sup> Year</b>	<b>3,375</b>	<b>11,375</b>
<b>2<sup>nd</sup> Year</b>	<b>5,375</b>	<b>9,375</b>
<b>3<sup>rd</sup> Year</b>	<b>7,375</b>	<b>7,375</b>
<b>4<sup>th</sup> Year</b>	<b>9,375</b>	<b>5,375</b>
<b>5<sup>th</sup> Year</b>	<b>11,375</b>	<b>3,375</b>
	<b>36,875</b>	<b>36,875</b>
<b>Estimated Life in years</b>	<b>5</b>	<b>5</b>
<b>Average Income Tax Rate</b>	<b>55%</b>	<b>55%</b>

**Depreciation has been charged on Straight Line Method.**

**Solution:**

$$\text{Machine A} = \frac{\text{Rs.}56,125 - \text{Rs.}3,000}{2} + \text{Rs.}5,000 + \text{Rs.}3,000 = \text{Rs.}34,562.50$$

$$\text{Machine B} = \frac{\text{Rs.}56,125 - \text{Rs.}3,000}{2} + \text{Rs.}6,000 + \text{Rs.}3,000 = \text{Rs.}35,562.50$$

$$\text{ARR for Machine A} = \frac{\text{Rs.}7,375}{\text{Rs.}34,562.50} \times 100 = 21.34\%$$

$$\text{ARR for Machine B} = \frac{\text{Rs.}7,375}{\text{Rs.}35,562.50} \times 100 = 20.74\%$$

Hence Machine A is preferable.

**Illu.6: M/s Bharat Industries Limited purchased a machine five years ago. A proposal is under consideration to replace it by a new machine. The life of the machine is estimated to be 10 years. The existing machine can be sold at its written down value. As cost accountant of the company, you are required to submit your recommendations based on the following information:**

	Existing Machine Rs.	New Machine Rs.
Initial cost	25,000.00	50,000.00
Machine hours per annum	2,000.00	2,000.00
Wages per running hour	1.25	1.25
Power per hour	0.50	2.00
Indirect materials per annum	3,000.00	5,000.00
Other expenses per annum	12,000.00	15,000.00
Cost of materials per unit	1.00	1.00
Number of units produced per hour	12.00	18.00
Selling price per unit	2.00	2.00

Interest to be paid at 10% on fresh capital invested.

**Solution:**

	Existing Machine Rs.	New Machine Rs.
Production (units)	24,000.00	24,000.00
Selling price per unit (Rs.)	2.00	2.00
Sales (Rs.)	48,000.00	72,000.00
Cost of Sales: (Rs.)		
Materials	24,000.00	36,000.00
Wages	2,500.00	2,500.00
Power	1,000.00	4,000.00
Indirect materials	3,000.00	5,000.00

	Existing Machine Rs.	New Machine Rs.
Other expenses	12,000.00	15,000.00
Depreciation	2,500.00	5,000.00
Interest	---	3,750.00
	45,000.00	71,250.00
Total profit	3,000.00	750.00
Cost per unit	1.87	1.98
Profit per unit	0.13	0.02

**Decision:** The above analysis shows that it is better to continue with the existing machine than replacing it by a new machine.

On the basis of accounting rate of return also, it is better to continue with the existing machine, because of the ARR is higher in the case of old machine as per details shown below:

		Rs.
Profit on installation of new machine before charging interest	Rs.750+3,750 =	4,500
Incremental profit	Rs.4,500-3,000 =	1,500
Incremental investment	Rs.37,500	
Rate of return	$1,500/37,500 \times$	4%

**Working Notes:** Interest has been calculated as follows:

	Rs.
Investment in the new machine	50,000
Less: Sale value of the old machine (Rs.25,000 – Dep. Rs.12,500 on fixed instalment basis)	12,500
Additional investment required	37,500
Interest @ 10% p.a. on Rs.37,500	3,750

In case the rate of return is calculated on average investment (i.e.  $\frac{1}{2}$  of Rs.37,500) it will be 8%. This is not even sufficient to pay interest at 10% on additional investment required. Thus, it is advisable to continue with the existing machine.

**Illu.7: The Directors of New Reliance Limited are contemplating the purchase of a new machine to replace a machine which has been in operation in the factory for the last 5 years.**

Ignoring interest but considering tax at 50% of net earnings, suggest which of the two alternative should be preferred.

The following are the details.

	Old machine	New machine
Purchase price (Rs.)	40,000.00	60,000.00
Estimated life of machine	10 years	10 years
Machine running hours per annum	2,000.00	2,000.00
Units per hour	24.00	36.00
Wages per running hour (Rs.)	3.00	5.25
Power per annum (Rs.)	2,000.00	4,500.00
Consumables (Rs.)	6,000	7,500
All other charges per annum (Rs.)	8,000.00	9,000.00
Material cost per unit (Rs.)	0.50	0.50
Selling price per unit	1.25	1.25

You may assume that the above information regarding sales cost of sales will hold good through out the economic life of each of the machine. Depreciation has to be charged according to straight-line method.

**Solution:**

**Profitability Statement**

	Rs.	Old machine Rs.	Rs.	New machine Rs.
Cost of the machine (Rs.)		40,000		60,000
Life of machine (years)		10		10
Output(units)		48,000		72,000
Sales (Rs.)		60,000		90,000
Less: Cost of sales: (Rs.)				
Direct material	24,000		36,000	
Wages	6,000		10,500	
Power	2,000		4,500	
Consumable stores	6,000		7,500	
Other charges	8,000		9,000	
Depreciation	4,000		6,000	
		50,000		73,500
Profit before tax		10,000		16,500
Less: Tax at 50%		5,000		8,250
Profit after tax		5,000		8,250

Calculation of Accounting Rate of Return:

	Old Machine	New Machine
i. $\frac{\text{Average Net Earnings}}{\text{Original investment}} \times 100$	$\frac{5,000}{40,000} \times 100 = 12.5\%$	$\frac{8,250}{60,000} \times 100 = 13.75\%$
ii. $\frac{\text{Average Net Earnings}}{\text{Average investment}} \times 100$	$\frac{5,000}{20,000} \times 100 = 25\%$	$\frac{8,250}{30,000} \times 100 = 27.50\%$
iii. $\frac{\text{Incremental Earnings}}{\text{Incremental investment}} \times 100$	$\frac{3,250}{60,000 - 20,000} \times 100$	$\frac{3,250}{40,000} \times 100 = 8\%$ (approx.)

Thus replacement of the old machine by a new machine (ignoring interest) is profitable.

**Note:** It is assumed that the old asset will be sold at book value i.e.Rs.20,000.

**Illu.8: Balrampur Engineering Works manufactures of Part A which is used in Air Coolers which they sell. The quantity required is 7000 units per year. The direct cost of manufacturing this part is Rs.4 per unit. They have received a proposal from a Cuttack firm offering to meet the entire requirement @ Rs.5 per unit. If the Balrampur Works discontinue making this part, they can use their existing facilities for manufacturing a new product for sale which would involve the following:**

Investment in a new machine (Life of 40,000 hrs)	Rs.40,000
Material cost	Rs.3 per unit
Direct labour	Rs.2 per unit
Indirect expenses (other than depreciation) for 2,000 hours	Rs.12,000

Estimated volume of Sales 8,000 units at Rs.9 per unit.

State whether the proposal of the Cuttack firm should be accepted or not if:

- the current cut-off rate is 25%
- the current cut-off rate is 30%

**Solution:**

**Profitability of New Product**

	Rs.	Rs.
Sales (8,000 units × Rs.9)(Rs.)		72,000
Less: <b>Cost of Production:</b>		
Material cost (8,000 × Rs.3)	24,000	
Direct labour (8,000 × Rs.2)	16,000	
Indirect expenses	12,000	
Depreciation (8,000 × Rs.1)	8,000	60,000
		12,000
Less: Extra cost for Part-A payable to Cuttack firm		7,000
Profit		5,000

	Rs.	Rs.
Average investment in the New project (Rs.)		20,000
Rate of Return at 25% cut-off rate		5,000
Rate of Return at 30% cut-off rate		6,000

The proposal may be accepted at cut-off rate of 25%. However, it is not acceptable at cut-off rate of 30%.

## 7.3 DISCOUNTED CASH FLOW METHODS

The discounted cash flow methods provide a more objective basis for evaluating and selecting an investment project. These methods consider the magnitude and timing of cash flows in each period of a project's life. Discounted cash flow methods enable us to isolate the difference in the timing of cash flow of the project by discounting them to know the present value. The present value can be analysed to determine the desirability of the project. These techniques adjust the cash flows over the life of a project for the time value of money. The popular discounted cash flow techniques are:

- a) Net present value method
- b) Internal rate of return method, and
- c) Profitability index method

Each one of these methods are discussed below in greater detail:

### 7.3.1 Net Present Value (NPV) Method:

The net present value method is a classic economic method of evaluating the investment proposals. It is one of the methods of discounted cash flow. It recognises the important of time value of money. It correctly postulates that cash flows arising at different time period differ in value and the comparable only when their equivalent i.e., present values are found out.

It is a method of calculating the present value of cash flows (inflows and outflows) of an investment proposal using the cost of capital as an appropriate discounting rate. The net present value will be arrived at by subtracting the present value of cash outflows from the present value of cash inflows. According to Ezra Solomon, "it is a present value of future returns, discounted at the required rate of return, minus the present value of the cost of the investment". The steps to compute net present value are given below:

1. An appropriate rate of interest should be selected to discount cash flows. Generally, this will be the "cost of capital" of the company.
2. The present value of inflows and outflows of an investment proposal, has to be computed by discounting them with an appropriate cost of capital.

3. The net present value is the difference between the 'present value of cash inflows' and 'the present value of cash outflows'.

Thus, the net present value is the difference between the present value of the future cash inflows after tax and the present value of cash outlays. Symbolically the NPV can be expressed as follows:

$$\text{Net Present Value (NPV)} = \sum PV - \sum C$$

Where,

$\sum PV$  = Total of Present Values of Cash Inflows

$\sum C$  = Total of Present Values of Cash Outlays

The present values of investment outlays and cash inflows are to be calculated using Present Value tables given at the end of the chapter. The decision criteria for accepting or rejecting a project a given under:

**NPV > Zero**                      Accept the Proposal.

**NPV < Zero**                      Reject the Proposal.

In other words, if the NPV is positive, (i.e., the present value of cash inflows is more than the present value of cash outflows or investment outlays, the project should be accepted, otherwise rejected. The accept/reject criterion under the NPV method can also be put as under:

**PV > C**                      Accept the proposal

**PV < C**                      Reject the proposal

Where,

PV = Total present values of cash inflows

C = Total present value of cash outlays.

Zero NPV implies a situation where the firm can only recover the original investment.

Thus, under NPV technique, only that project will be selected whose net present value is positive or above zero. If a project's NPV is less than "zero", it gives negative NPV, hence, it must be rejected. The ranking of the proposals can be made by way of assigning ranks on the magnitude of positive net present value.

**Merits:** The following are the merits of the net present value (NPV) method:

1. **Recognition to the Time Value of Money:** This method explicitly recognises the time value of money, which is inevitable for making meaningful financial decisions.
2. **Consideration to Total Cash Inflows:** The NPV method considers the total cash inflows of investment opportunities over the entire life-time of the projects unlike the payback period method.



3. **Best Decisions Criteria for Mutually Exclusive Projects:** This method is particularly useful for the selection of mutually exclusive projects. It serves as the best decision criteria for mutually exclusive choice problems.
4. **Changing Discount Rate:** Since discounting rate changes due to time variations in cash inflows a changing discount rate can be used for the NPV calculations by altering the denominator.
5. **Maximization of the Shareholders Wealth:** Finally, the NPV method is instrumental in achieving the objective of the maximization of the shareholders wealth. This method is logically consistent with the company's objective of maximizing shareholders' wealth in terms of maximizing market price of shares, and theoretically correct for the selection of investment proposals.

**Demerits:** The following are the demerits of the net present value method:

1. It is difficult to understand and use
2. The NPV is calculated by using the cost of capital as a discount rate. But the concept of cost of capital itself is difficult to understand and determine.
3. It does not give solutions when the comparable projects are involved in different amounts of investment.
4. It does not give correct answer to a question when alternative projects or limited funds are available, with unequal lives.

**Illu.9:** The Alpha Co. Ltd., is considering the purchase of a new machine. Two alternative machines (A and B) have been suggested, each living an initial cost of Rs.4,00,000 and requiring Rs.20,000 as additional working capital at the end of 1<sup>st</sup> year. Earnings after taxation are expected to be as follows:

Year	Cash Inflows	
	Machine A Rs.	Machine B Rs.
1	40,000	1,20,000
2	1,20,000	1,60,000
3	1,60,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	80,000

The company has a target of return on capital of 10% and on this basis, you are required to compare the profitability of the machines and state which alternative you consider as financially preferable.

**Note:** The following table gives the present value of Rs.1 due in 'n' number of years:

Years	Present Value at 10%
1	0.91
2	0.83
3	0.75
4	0.68
5	0.62

**Solution: Statement showing the profitability of two machines.**

Year	Discount Factor	Machine A		Machine B	
		Cash inflow Rs.	Present value Rs.	Cash inflow Rs.	Present value Rs.
1.	0.91	40,000	36,400	1,20,000	1,09,200
2.	0.83	1,20,000	99,600	1,60,000	1,32,800
3.	0.75	1,60,000	1,20,000	2,00,000	1,50,000
4.	0.68	2,40,000	1,63,200	1,20,000	81,600
5.	0.62	1,60,000	99,200	80,000	49,600
				Rs.	Rs.
Total present value of inflows of cash			5,18,400		5,23,200
Total present value of outflows of cash (Rs.4,00,000+20,000× .91)			4,18,200		4,18,200
<b>Net present value</b>			1,00,200		1,05,000

**Recommendations:** Machine B is preferable to Machine A. Though total cash inflow of Machine A is more than that of Machine B by Rs.40,000, the net present value of the cash flows of Machine B is more than that of Machine A. Moreover, in case of Machine B, cash inflow in the earlier years is comparatively higher than that in case of Machine A.

**Illu.10:** A computer is available at a cash purchase price of Rs.4,40,000. If taken on hire, the charges would be Rs.15,400 per month for a minimum period of 36 months, and thereafter the rate would be reduced to Rs.7,500 per month. The rentals fall due for payment at the end of each month.

A company, planning to acquire the above computer, wants advice whether it would be more economical to purchase the machine or take it on hire, What would be your advice if the cost of capital is to be taken as 10% per annum? The present value of Re.1 and Rs.1.5 paid monthly at the end of n years, both at 10% are as follows:

After year (n)	Present value of Rs.1.5 paid monthly	Present value
1	0.950	0.909
2	0.864	0.826
3	0.785	0.751
4	0.714	0.683
5	0.649	0.621
6	0.591	0.564

**Solution:**

(a) In case the computer is purchased:

**Statement of Present Value of cash outflows**

Year	Cash flows (Rs.)	Discount factor	Present value of cash outflows Rs.	Present value of cumulative cash outflows (Rs.)
0	4,40,000	1.000	4,40,000	4,40,000
1	44,000	0.909	39,996	4,79,996
2	44,000	0.826	36,344	5,16,340
3	44,000	0.751	33,044	5,49,384
4	44,000	0.683	30,052	5,79,436
5	44,000	0.621	27,324	6,06,760
6	44,000	0.564	24,816	6,31,576
Net Present values of Of cash outflows			6,31,576	

Rs.4,40,000 are used for purchasing the computer. The amount invested somewhere else should have been given a minimum return of 10%. Hence, every year Rs.44,000 is being lost which has been taken as cash outflow.

b) In case the computer is hired:

**Statement of Present Value of cash outflows**

Year	Cash flows (Rs.)	Discount factor	Present value of cash outflows Rs.	Present value of cumulative cash outflows (Rs.)
1	1,84,800	0.950	1,75,560	1,75,560
2	1,84,800	0.864	1,59,667	3,35,227
3	1,84,800	0.785	1,45,068	4,80,295
4	90,000	0.714	64,260	5,44,555
5	90,000	0.649	58,410	6,02,965
6	90,000	0.591	53,190	6,56,155
Net Present values of Of cash outflows			6,56,155	

The present value of cash outflows (ignoring taxation) in case of purchase of computer is lower by Rs.24,579 as compared to hiring of the computer. Moreover, the cumulative cash outflows in case of purchase of computer is constantly decreasing. Hence, the purchase of computer may prove to be further profitable if the computer does not become obsolete after six years and continues to be serviceable. Even if it become obsolete, it will have some disposable value. **Hence, the company may be advised to purchase the computer instead of hiring.**

**Illu.11: Maheshwari Brothers purchased a machine 5 years ago at a cost of Rs.75,000. The machine had an expected life of 15 years at the time of purchase and a zero estimated salvage value at the end of 15 years. It is being depreciated on a straight line basis and has a book value of Rs.50,000 at present. The purchase manager reports that he can buy a new machine for Rs.1,00,000. The existing sales are Rs.1,00,000 and are expected to go up to Rs.1,10,000 on account of purchase of the new machine. Further, it will reduce the operating cost from Rs.70,000 to Rs.50,000. The old machine's current market value is Rs.10,000. Taxes are at present levied at the rate of 50% and the firm's cost of capital is 10%. Calculate the net cash outlay of the project and net cash inflows.**

**Solution:**

**(i) Net cash outlay of the new project**

	Rs.	Rs.
Invoice price of new machine		1,00,000
Less: Tax savings*	20,000	
Salvage value of old machine	10,000	30,000
		<b>70,000</b>

\*Taxable income of the firm will be reduced by the amount of loss on sale of machinery amounting to Rs.40,000. The tax rate is 50% and hence, there will be a tax saving of Rs.20,000.

**(ii) Estimated net cash in flows**

	Without new machine Rs.	With new machine Rs.
Sales...(i)	<b><u>1,00,000</u></b>	<b><u>1,10,000</u></b>
Less: Operating costs	70,000	50,000
Depreciation(D)	5,000	10,000
...(ii)	<b><u>75,000</u></b>	<b><u>60,000</u></b>
Taxable income..(i)-(ii)	25,000	50,000
Less: Income tax	12,500	25,000
Profit after tax (P)	<b><u>12,500</u></b>	<b><u>25,000</u></b>
Cash inflow (P)+(D)	17,500	35,000

Thus, in case the new machine is purchased, there will be an incremental cash inflow of Rs.17,500.

### 7.3.2 Internal Rate of Return (IRR) Method:

Internal rate of return (IRR) is also known as Time adjusted return or Discounted rate of return.

This method is based on the principle of present value. This method considers the relative importance of magnitude and timing of cash flows. The use of this method for appraising the investment projects was for the first time used by Joel Dean. According to Grunewald and Nemmers, the internal rate of return (IRR) can be defined as “the rate of interest that equates the present value of future periodic net cash flows, with the present value of the capital investment expenditure required to undertake a project.” The net cash flow may be defined as the difference between the anticipated cash income of the firm during the year, if the project is approved and the anticipated cash income, if the project is rejected.

Weston and Brigham defined the internal rate as “the interest rate that equates the present value of the expected future receipts to the cost of the investment outlay.”

Internal rate of return can thus be defined as that rate of return which would equate the present value of the investment outlay to the present value of net cash benefits.

The IRR is the rate of discount which would reduce the sum of the present value of net cash flows over the project life to zero. If this rate is greater than the cost, it means that the funds committed will earn more than their cost. When IRR of a project equals the cost of capital, the management would be indifferent to the project as it would not be expected to change the value of the firm.

The following equation is used to calculate the internal rate of return.

#### Formula:

$$C = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + \frac{A_n}{(1+r)^n}$$

Where,

C = Initial Capital outlay

A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub> etc. = Expected future cash inflows at the end of year 1,2,3 and so on.

r = rate of interest

n = number of years of project

In order to find out the exact IRR between two near rates, the following formula is to be used.

$$L = \frac{P_1 - C}{P_1 - P_2} \times D$$

Where,

L = Lower rate of interest

$P_1$  = P.V at lower rate of interest

$P_2$  = P.V at higher rate of interest

C = Cash outlay

D = Difference in rate of interest

### Computation of IRR

The Internal Rate of Return is to be determined by trial and error method. The following steps can be used for its computation.

1. Compute the present value of the cash flows from an investment, by using an arbitrarily selected interest rate.
2. Then compare the present value so obtained with investment cost.
3. If the present value is higher than the cost, then the present value of inflows is to be determined by using higher rate.
4. This procedure is to be continued until the present value of the flows from the investment are approximately equal to its cost.
5. The interest rate that brings about this equality is the 'internal rate of return'.

If the internal rate of return exceeds the required of return, then the project is accepted. If the project's IRR is lower than the required rate of return, it will be rejected. In the case of ranking the proposal, the technique of IRR is significantly used. The projects with highest rate of return will be ranked as first, compared to the lowest rate of return projects.

**Merits:** The following are the merits of the IRR method:

1. **Consideration of Time Value of Money:** It considers the time value of money.
2. **Consideration of Total Cash Flows:** It takes into account the cash flows over the entire useful life of the asset.
3. **Easier appeal to the users:** It has a psychological appeal to the users, because when the highest rate of return projects are selected, it satisfies the investors in terms of the rate of return on capital. It always suggests to accept the projects with maximum rate of return.
4. **Maximisation market share possible:** It is in conformity with the firm's objective of maximising owner's welfare.
5. **Provision for risk and Uncertainty:** This method automatically gives more weight to money values which are nearer to the present period than those which are distant from it. Conversely, in case of other methods like 'Payback Period' and 'Accounting Rate of Return', all money units are given the same weight which is unrealistic. Thus, the IRR is more

realistic method of project revaluation. This method improves the quality of estimates reducing the uncertainty to minimum.

- 6. Elimination of Pre-determined Discount rate:** Unlike the NPV method, the IRR method eliminates the use of the concept of required rate of return which is usually a pre-determined rate of cost of capital for discounting the cash flow streams. The IRR method itself provides a rate of return which is more realistic and consistent with the cost of capital. The IRR is therefore, a more reliable measure of the profitability of investment proposals under consideration.

**Demerits:** The following are the demerits of this method:

1. It is very difficult to understand and use
2. It involves a very complicated computational work
3. It may not give unique answer in all situations.
4. The assumption of re-investment of cash flows may not be possible in practice.
5. In evaluating the mutually exclusive proposals, this method fails to select the most profitable project which is consistent the objective of maximisation of shareholders' wealth.
6. The results of this method may be inconsistent compared to NPV method, if the projects differ in their (a) expected lives (b) investment or (c) timing of cash inflow.

**Illu.12: A company has to select one of the following two projects:**

	Project-A	Project-B
<b>Cost (Rs.)</b>	<b>11,000</b>	<b>10,000</b>
<b>Cash inflows (Years) Rs.:</b>		
<b>1</b>	<b>6,000</b>	<b>1,000</b>
<b>2</b>	<b>2,000</b>	<b>1,000</b>
<b>3</b>	<b>1,000</b>	<b>2,000</b>
<b>4</b>	<b>5,000</b>	<b>10,000</b>

**Using the Internal Rate of Return Method suggest which project is preferable.**

**Solution:** The cash inflow is not uniform and hence the internal rate of return will have to be calculated by the trial and error method. In order to have an approximate idea about such rate, it will be better to find out the 'Factor'. The factor reflects the same relationship of investment and 'cash inflows' as in the case of pay back calculations:

Thus-

$$F = \frac{I}{C}$$

Where,

F = Factor to be located;

I = Original Investment;

C = Average cash inflow per year

The 'factor' in case of project – A would be:

$$F = \frac{11,000}{3,500} = 3.14$$

The 'factor' in case of project – B would be:

$$F = \frac{10,000}{3,500} = 2.86$$

The factor thus calculated will be located in P.V.Table-II on the line representing number of years corresponding to estimated useful life of the asset. This would give the expected rate of return to be applied for discounting the cash inflows for the internal rate of return.

In case of project-A, the rate comes to 10% while in cases of project-B it comes to 15%.

### Project – A

Year	Cash inflows Rs.	Discounting factor at 10% (Table-I)	Present value Rs.
1	6,000	0.909	5,454
2	2,000	0.826	1,652
3	1,000	0.751	751
4	5,000	0.683	3,415
Total present value			11,272

The present value at 10% comes to Rs.11,272. The initial investment is Rs.11,000. Internal rate of return may be taken approximately at 10%.

In case more exactness is required, another trial rate which is slightly higher than 10% (since at this rate the present value is more than initial investment) may be taken. Taking a rate of 12%, the following results would emerge;

Year	Cash inflows Rs.	Discounting factor at 12%	Present value Rs.
1	6,000	0.893	5,358
2	2,000	0.797	1,594
3	1,000	0.712	712
4	5,000	0.636	3,180
Total present value			10,844

The internal rate of return is thus more than 10% but less than 12%. The exact rate may be calculated using the following formula.

$$L + \frac{P_1 - C}{P_1 - P_2} \times D$$



Where,

L = Lower rate of interest

$P_1$  = P.V. at lower rate of interest

$P_2$  = P.V. at higher rate of interest

C = Cash outlay.

D = Difference in rate of interest

$$= 10 + \frac{11,272 - 11,000}{11,272 - 10,844} \times 2\%$$

$$= 10 + \frac{272}{428} \times 2\% = 11.3\%$$

**Alternatively:**

The exact internal rate of return can also be calculated as follows:

At 10% the present value is + 272

At 12% the present value is – 156

The internal rate would therefore be between 10% and 12% calculated as follows:

$$= 10\% + \frac{272}{272 + 156} \times 2 = 10 + 1.3 = 11.3\%$$

### Project – B

Year	Cash inflows Rs.	Discounting factor at 15%	Present value Rs.
1	1,000	0.870	870
2	1,000	0.756	756
3	2,000	0.658	1,316
4	10,000	0.572	5,720
Total present value			8,662

Since present value at 15% comes only to Rs.8,662 a lower rate of discount should be taken. Taking a rate of 10%, the following will be the result.

Year	Cash inflows Rs.	Discounting factor at 10%	Present value Rs.
1	1,000	0.909	909
2	1,000	0.826	826
3	2,000	0.751	1,502
4	10,000	0.683	6,830
Total present value			10,067

The present value at 10% comes to Rs.10,067 which is more or less equal to the initial investment. Hence, the internal rate of return may be taken as 10%.

In order to have more exactness, the internal rate of return can be interpolated as done in case of project-A.

At 10% the present value is +67

At 15% the present value is -1,338

$$= 10\% + \frac{67}{67 - 1,338} \times 5$$

$$= 10\% + \frac{67}{1,405} \times 5 = 10\% + 0.24 = 10.24 \text{ or } 10.24\%$$

Thus, internal rate of return in case of project-A is higher as compared to project-B. Hence, project-A is preferable.

**Illu.13: A firm whose cost of capital is 10% is considering two mutually exclusive project X and Y, the details which are:**

	Project X Rs.	Project Y Rs.
Investment	70,000	70,000
Cash flow Year 1	10,000	50,000
Cash flow Year 2	20,000	40,000
Cash flow Year 3	30,000	20,000
Cash flow Year 4	45,000	10,000
Cash flow Year 5	60,000	10,000
Total Cash flows	1,65,000	1,30,000

Compute the net present value at 10% profitability index and internal rate of Return for two projects.

#### Discount Factors

Year	10%	15%	20%	25%	30%	35%	40%
1	.909	.870	.833	.800	.769	.741	.714
2	.826	.756	.694	.640	.592	.549	.510
3	.751	.658	.579	.512	.455	.406	.364
4	.683	.572	.482	.410	.350	.310	.260
5	.621	.497	.402	.328	.226	.223	.186

#### Solution:

- i. Net Present Value of the two mutually exclusive projects, cost of capital of the firm being 10 per cent.

Year	Cash Flows		P.V. Factors at 10%	Discounted cash Flows	
	Project X Rs.	Project Y Rs.		Project X Rs.	Project Y Rs.
0	(-) 70,000	(-) 70,000	1.000	(-) 70,000	(-) 70,000
1	10,000	50,000	.909	9,090	45,450
2	20,000	40,000	.826	16,520	33,040
3	30,000	20,000	.751	22,530	15,020
4	45,000	10,000	.683	30,735	6,830
5	60,000	10,000	.621	37,260	6,210
Net Present Value				46,355	36,550

**(ii) Profitability Indices:**

$$\text{Project X: } \frac{\text{Discounted Cash inflow}}{\text{Discount Cash outflow}} = \frac{1,16,135}{70,000} = 1.659$$

$$\text{Project Y: } \frac{\text{Discounted Cash inflow}}{\text{Discount Cash outflow}} = \frac{1,06,550}{70,000} = 1.522$$

**(iii) Internal Rate of Return for the two projects:****Project X:**

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	10,000	.800	8,000	.769	7,690
2	20,000	.640	12,800	.302	11,840
3	30,000	.512	15,360	.455	13,650
4	45,000	.410	18,450	.350	15,750
5	60,000	.328	19,680	.269	16,140
			4,290		(-) 4,930

$$\begin{aligned} \text{IRR} &= 25\% + \frac{4,290}{9,220} \times 5 \\ &= 25 + 2.326 = 27.326\% \end{aligned}$$

**Project Y:**

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
0	(-) 70,000	1.000	(-) 70,000	1,000	(-) 70,000
1	50,000	.741	37,050	.714	35,600

Year	Cash flows Rs.	P.V. Factor at 25%	Discounted Cash Flows Rs.	P.V. Factor at 30%	Discounted Cash Flows Rs.
2	40,000	.549	21,960	.510	20,400
3	20,000	.406	8,120	.364	7,280
4	10,000	.301	3,010	.260	2,600
5	10,000	.223	2,230	.186	1,860
			2,370		(-) 2,260

$$\text{IRR} = 35\% + \frac{2,370}{4,630} \times 5 = 37.56\%$$

### 7.3.3 Profitability Index (PI):

This method is also known as 'Benefit Cost Ratio'. According to Van Horne, the profitability index of a project is the ratio of the present value of future net cash flows to the present value of initial cash outflows.

$$\text{Profitability Index} = \frac{\text{Present value of cash inflows}}{\text{Present value of initial cash outflows}}$$

On the basis of this criteria, the projects can be accepted when the profitability index is equal to or greater than '1'(one).

**Merits:** The merits of this method are as given under:

1. It takes into account the time value of money
2. It requires less computational work than IRR method
3. It helps to accept/reject investment proposals on the basis of value of the index.
4. It is useful to rank the proposals on the basis of the highest/lowest value of the index.
5. It takes into consideration the entire stream of cash flows generated during the useful life of the asset.

**Demerits:** However, this technique suffers from some of the following demerits:

1. It is some what difficult to understand
2. Some people may feel no limitation for index numbers due to several limitations involved in their computations
3. It is very difficult to understand the analytical part of the decision on the basis of profitability index.

**Illu.14:** NIIT Ltd. is contemplating to purchase a machine. Two machine A and B are available each costing Rs.5,00,000. In comparing the profitability of the machines a discounted rate of 10% is to be used. Earnings after taxation are expected as follows:

**Cash Flow**

Year	Rupees	
	Machine "A"	Machine "B"
I	1,50,000	50,000
II	2,00,000	1,50,000
III	2,50,000	2,00,000
IV	1,50,000	3,00,000
V	1,00,000	2,00,000

Indicate which of the machine would be profitable using the following methods of ranking investments proposals.

- i) Pay back method;
- ii) Net Present value method;
- iii) Post pay back profitability;
- iv) Return on investment method.

The discount factor at 10% is:

1 <sup>st</sup> Year	0.9091
2 <sup>nd</sup> Year	0.8264
3 <sup>rd</sup> Year	0.7513
4 <sup>th</sup> Year	0.6830
5 <sup>th</sup> Year	0.6209

**Solution: (i) Payback Method:**

	Machine A Rs.
I Year	1,50,000
II Year	2,00,000
III Year (balance)	1,50,000

Total : 5,00,000 i.e., 2 years +  $\frac{1,50,000}{2,50,000} = 2\frac{3}{5}$  years Pay back period.

	Machine B
I Year	50,000
II Year	1,50,000
III Year	2,00,000
IV Year (balance)	1,00,000
Total:	5, 00,000

i.e., 3 Years +  $\frac{1,00,000}{3,00,000} = 3\frac{1}{3}$  years Pay back period.

Machine "A" would be preferable under Pay back Method.

**iii) Net Present Value Method (NPV)**

Year	Machine – 'A'			Machine – 'B'		
	Cash Flow Rs.	Discount Factor at 10%	Present Value Rs.	Cash Flow Rs.	Discount Factor at 10%	Present Value Rs.
I	1,50,000	0.9091	1,36,365	50,000	0.9091	45,455
II	2,00,000	0.8264	1,65,280	1,50,000	0.8264	1,23,960
III	2,50,000	0.7513	1,87,825	2,00,000	0.7513	1,50,260
IV	1,50,000	0.6830	1,02,450	3,00,000	0.6830	2,04,900
V	1,00,000	0.6209	62,090	2,00,000	0.6209	1,24,180
Total			6,54,010			6,48,755
Less: Investment			5,00,000			5,00,000
N.P.V.			1,54,010			1,48,755

Under Net Present Value Method, Machine 'A' would be preferable as it will have higher positive Net Present Value.

**iv) Post Pay Back Profitability:**

	Machine – 'A'	Machine – 'B'
Total cash flow	8,50,000	9,00,000
Less: Investment	5,00,000	5,00,000
Post Pay Back Profits	3,50,000	4,00,000

Machine 'B' would be preferable.

**iv) Return on Investment Method (R.O.I)**

Particulars	Machines	
	'A'	'B'
Total Cash Flow in 5 years-	8,50,000	9,00,000
	$= \frac{8,50,000}{5}$	$= \frac{8,50,000}{5}$
	= 1,70,000	= 1,80,000
Return on Investment	$= \frac{1,70,000}{5,00,000} \times 100$	$= \frac{1,80,000}{5,00,000} \times 100$
	= 34%	= 36%

Machine 'B' would be preferable under R.O.I. Method

Selection of Machine under Different Methods of Evaluation:

Method	Preference for Machine
i) Pay back method	'A'
ii) N.P.V. Method	'A'
iii) Post Pay back Profitability	'B'
iv) R.O.I. Method	'B'

### 7.3.4 Discounted Payback Method:

It measures the time required for discounted cash flow to cover initial investment. Unlike the payback period, discounted payback period considers time value of money. The discount rate is the firm's cost of capital.

**Illu.15: Initial Investment is Rs.7,00,000 and the cash flows are 1 year Rs.1,60,000; 2<sup>nd</sup> year Rs.2,60,000; 3<sup>rd</sup> year Rs.3,00,000; 4<sup>th</sup> year Rs.3,50,000; 5<sup>th</sup> year Rs.4,00,000. Compute Discounted payback assuming cost of capital at 15%.**

**Solution:**

Year	Cash Flow	P.V.@ 15%	Cumulative PV
1.	1,60,000	1,39,200	1,39,200
2.	2,60,000	1,96,560	3,35,760
3.	3,00,000	1,97,400	5,33,160
4.	3,50,000	2,00,200	7,33,360
5.	4,00,000	1,98,800	9,32,160

Discounted Pay back = 4 year (Approximately)

**Illu.16: Using the information given below, compute the pay-back under (a) Traditional Pay-back method and (b) Discounted Pay-back method and comment on the results.**

	Rs.
<b>Initial outlay</b>	<b>80,000</b>
<b>Estimated life</b>	<b>5 years</b>
<b>Profit after tax:</b>	
<b>End of year 1</b>	<b>6,000</b>
<b>2</b>	<b>14,000</b>
<b>3</b>	<b>24,000</b>
<b>4</b>	<b>16,000</b>
<b>5</b>	<b>Nil</b>

Depreciation has been calculated under straight line method. The cost of capital may be taken at 20% p.a. and P.V. of Rs.1 at 20% p.a. is given below:

Year	1	2	3	4	5
P.V.factor	.83	.69	.58	.48	.40

**Solution:**

#### Traditional Pay-back Method

Year	Profit after tax (Rs.)	Depreciation (Rs.)	Cash inflows (Rs.)	Cumulative Cash inflows (Rs.)
1.	6,000	16,000	22,000	22,000
2.	14,000	16,000	30,000	52,000
3.	24,000	16,000	40,000	92,000
4.	16,000	16,000	32,000	1,24,000
5.	Nil	16,000	16,000	1,40,000

Cumulative cash inflows upto 2 years Rs.52,000: Balancing investment to be recovered is 28,000 (i.e.Rs.80,000-52,000)

Pay-back period = Period for which part of the investment is recovered

Balance of Investment to be recovered

+  $\frac{\text{Cash inflow in the subsequent year of the period in which part of the investment is recovered}}{\text{Cash inflow in the subsequent year of the period in which part of the investment is recovered}}$

$$\text{Pay - back period} = 2 + \frac{28,000}{40,000} \text{ yrs} = 2.7 \text{ years.}$$

#### Discounted Pay-back Method

Year	Cash inflows (Rs.)	Discount Factor	Discounted cash inflows (Rs.)	Cumulative discounted cash inflows (Rs.)
1.	22,000	.83	18,260	18,260
2.	30,000	.69	20,700	38,960
3.	40,000	.58	23,200	62,160
4.	32,000	.48	15,360	77,520
5.	16,000	.40	6,400	83,920

$$\text{Discounted Pay - back period} = 4 + \frac{3,920}{6,400} \text{ yrs} = 4.61 \text{ years.}$$



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## 7.4 . CAPITAL RATIONING

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Capital rationing refers to the situation where budgetary or fund constraints are imposed on the firm and the firm may not be in a position to invest its available scarce resources in all the acceptable projects. According to Weston and Brigham, "capital rationing is a situation where a constraint is placed on the total size of funds invested during a particular period." Under the situation of capital rationing, it is not possible on the part of the company to select all the available investment proposals due to financial constraints. Hence, the company has to rank the proposals applying the techniques of appraisals and finally select the best proposal within the available funds

### 7.4.1 Causes for Capital Rationing

The reasons for imposing restrictions on the finances of the company and evidence of capital rationing situation are as follows:

1. non-availability of funds;
2. it is difficult to raise funds through external sources;
3. some firms may impose limitations on capital expenditure due to lack of managerial resources;
4. some firms may resort to capital rationing due to the reason that its cost of capital may rise by way of raising additional funds;
5. some company's may not be interested in further expansion, but they may be interested to stabilise the present position.

### 7.4.2 Project Selection under Capital Rationing:

Selection of projects under capital rationing is made by:

1. ranking the projects according to Internal Rate of Return (IRR) or Profitability Index.
2. Selecting the projects in descending order of the ranks, until the budgeted funds are exhausted
3. not selecting the investment project with negative Net Present Value (NPV) or Internal Rate or Return (IRR) below the cost of capital.

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## 7.5. CONCLUSION

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Capital budgeting involves the firm's decisions to invest its current funds most efficiently in long-term projects, in anticipation of expected flow of future funds over a series of years.

The capital budgeting decisions include replacement, expansion, diversification research and development and miscellaneous proposals. Capital budgeting decisions are important because they involve investment of heavy funds with long term implications. These decisions are most difficult to take.

The capital budgeting process involve generation of investment proposals, estimation and evaluation of cash flows, selection of projects based on acceptance criterion and finally continuous evaluation of investments.

A sound appraisal method should enable the company to measure the real worth of the investment proposal. There are two traditional methods and three discounted cashflow methods for this purpose. They are the pay back method and the accounting rate of return in the first group and the net present value method, internal rate of return method and profitability index method in the second group.

Capital rationing is a situation where a constraint is placed on the total size of funds invested during a particular period. Some reasons for capital rationing include be self imposed and some are external reasons.

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## 7.6 SELF ASSESSMENT QUESTIONS

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### Short Questions:

1. Why are traditional methods of capital budgeting which are still popular?
2. What is time value of money?
3. What is Net Present Value Method?
4. What is capital rationing?

### Essay questions:

1. Why are Pay Back and ARR methods still popular? Explain their relative merits and demerits.
2. What do you mean by Discounted Cash Flow techniques? Explain NPV and Profitability Index methods to fulfill the requirements of time value of money.
3. Define Internal Rate of Return, How are project selection decisions taken under this method?
4. Define capital rationing and explain the causes, How are the project selection decisions made under capital rationing?

## 7.7 EXERCISES

1. Following are the details of three project A,B and C.

	A	B	C
Cost (Rs.)	50,000	70,000	70,000
Life	10 Years	12 Years	14 Years
Estimated scrap (Rs.)	5,000	10,000	7,000
Annual Profit less Taxation (Rs.)	5,000	6,000	5,500

Calculate the pay back period.

**[Ans.: A – 5.26 years, B – 6.36 years; C – 7 years]**

2. A choice is to be made between two competing proposals which require an equal investment of Rs.50,000 and are expected in generating net cash flows as under:

Year	Project I Rs.	Project II Rs.
1	25,000	10,000
2	15,000	12,000
3	10,000	18,000
4	Nil	15,000
5	12,000	8,000
6	6,000	4,000

Select the project under payable method.

**[Ans.: Project I 3 years; Project II 3.4 years]**

3. The directors of Alpha Ltd., are considering the purchase of a new Machine. Two Machines costing Rs.60,000 each are available. Each Machine has an expected life of 5 years. Net profit before tax during the expected life of each Machine are given as follows:

Year	Machine X Rs.	Machine Y Rs.
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000
	85,000	90,000

Following the method of Return on Investment ascertain which of the alternatives will be more profitable. The Average rate of tax may be taken as 50%.

**[Ans.: Average Profit (after tax) : Machine X Rs.8,500; Machine Y Rs.9,000; Average Investment : Machine X Rs.30,000; Machine Y Rs.30,000; Average Rate of Return : Machine X : 28.33%; Machine Y 30%; Thus Machine Y is more profitable as against Machine X]**

4. Mehta Co. Ltd., is considered the purchase of a new machine. Two Machine X and Y are available each costing Rs.1,00,000. Earnings after taxation are as follows:

Year	Machine X Rs.	Machine Y Rs.
1	30,000	10,000
2	40,000	30,000
3	50,000	40,000
4	30,000	60,000
5	20,000	40,000
	1,70,000	1,80,000

Work of the ARR for each machine.

**[Ans.: Average Cash inflows: Machine X = Rs.34,000; Machine Y Rs.36,000; Average Investment : Machine X Rs.50,000; Machine Y Rs.50,000; Annual Depreciation : Machine X Rs.20,000; Machine Y Rs.20,000; ARR for Machine X = 28%; ARR for Machine Y = 32%]**

5. Sundaram Ltd. is planning to increase its present capacity and is considering the purchase of a new machine. Machine A and B are available at a price of Rs.80,000 and Rs.90,000 respectively. The company can buy either of the two machines. Profit before depreciation but after taxation is estimated as follows:

Year	Cash inflows	
	Machine A Rs.	Machine B Rs.
1	25,000	26,000
2	30,000	34,000
3	40,000	28,000
4	28,000	40,000
5	12,000	25,000
6	--	17,000

There is no salvage value.

Which out of the two machines should be company buy? Decide on the basis of (i) payback period and (ii) average rate of return.

**[Ans.: (i) Payback period : Machine A – 2.63 years, Machine B – 3.4 years; (ii) ARR : Machine A – 21.5, Machine B – 29.6; Machine A is preferable]**

6. Calculate the 'pay back period', 'average rate of return' and 'net present value' for a project which requires an initial outlay of Rs.10,000 and generates year ending cash flows of Rs.6,000; Rs.2,000; Rs.5,000; and Rs.5,000 from the end of the first year to the end of fifth year. The required rate of return is 10 per cent and pays tax at 50 per cent rate. The project has a life of five years and depreciated on straight line basis.

Year	Discounting factor at 10%
1	.909
2	.826
3	.751
4	.683
5	.621

**[Ans.: Pay back period  $3\frac{3}{7}$  years; Average rate of return 22%; Net present value Rs.1,768]**

7. A Company is considering the possibility of manufacturing a particular component which at present is being bought from outside. The manufacture of the component would call for an investment of Rs.7,50,000 in a new machine besides an additional investment of Rs.50,000 in working capital. The life of the machine would be 10 years with a salvage value of Rs.50,000. The estimated savings (before tax) would be Rs.1,80,000 p.a. The income tax rate is 50%. The company's required rate of return is 10%. Depreciation is considered on straight line system. Should the company make this investment?

Note: The present value of Re.1 at 10% discount rate is as follows:

Year	1	2	3	4	5	6	7	8	9	10
P.V.	.91	.83	.75	.68	.62	.56	.51	.47	.42	.39

The present value (at 10% discount rate) of an annuity of Re.1 payable each year for different years is as follows:

Year	1	2	3	4	5	6	7	8	9	10
P.V.	0.91	1.74	2.49	3.17	3.79	4.35	4.87	5.33	5.76	6.14

Ignore impact of income-tax for the system of depreciation followed:

**[Ans.: NPV is Negative by Rs.1,43,180 and hence the new machine should not be purchased]**

8. A company has to select one of the two alternative projects, the particulars in respect of which are given below:

	Project A Rs.	Project B Rs.
Initial outlay	1,20,000	1,10,000
Net Cash Flow		
End of the Year 1	70,000	20,000
2	50,000	40,000
3	30,000	50,000
4	20,000	40,000
5	10,000	20,000
6	Nil	10,000

The company can arrange fund at 15%. Compute the Net Present Value and Internal Rate of Return of each project and comment on the result.

Present value of Re.1 payable or receivable at the end of each period is as under:

Year	1	2	3	4	5	6
15%	.8696	.7561	.6575	.5718	.4972	.4323
16%	.8621	.7432	.6407	.5523	.4761	.4104
17%	.8547	.7305	.6244	.5337	.4561	.3898
18%	.8475	.7182	.6086	.5158	.4371	.3704
19%	.8403	.7062	.5934	.4987	.4191	.3521
20%	.8333	.6944	.5787	.4823	.4019	.3349
21%	.8265	.6830	.5645	.4665	.3855	.3186
22%	.8197	.6719	.5507	.4514	.3700	.3033
23%	.8130	.6610	.5374	.4369	.3552	.2888

**[Ans.: Machine A should be selected as its NPV and IRR are higher]**

9. Mohan & Co. is considering the purchase of a machine. Two machines X and Y each costing Rs.50,000 are available. Earnings after taxation are expected to be as under:

Year	Machine X Rs.	Machine Y Rs.	Discount factor at 10%
1 <sup>st</sup>	15,000	5,000	.9091
2 <sup>nd</sup>	20,000	15,000	.8264
3 <sup>rd</sup>	25,000	20,000	.7513
4 <sup>th</sup>	15,000	30,000	.6830
5 <sup>th</sup>	10,000	20,000	.6209

Estimate the two alternatives according to :

- i) Payback method:
- ii) Return on investment method:
- iii) Net present value method a discount rate of 10% is to be used.

**[Ans.: (i) Pay back period : Machine X  $1\frac{5}{6}$  years, Machine Y  $2\frac{1}{3}$  years; (ii) ROI : Machine X – 14%; Machine Y – 16%; (iii) NPV : Machine X – Rs.52,309; Machine Y – Rs.52,783]**

10. Calculate the 'pay back period', 'average rate of return' and 'net present value' for a project which requires an initial out lay of Rs.10,000 and generates year ending cash flows of Rs.6,000; Rs3,000; Rs.2,000; Rs.5,000 and Rs.5,000 from the end of the first year to the end of fifth year. The required rate of return is 10 percent and pays tax at 50 per cent rate. The project has a life of five years and depreciated on straight line basis.

Year	Discounting factor at 10%
1	.909
2	.826
3	.751
4	.683
5	.621

**[Ans.: Pay back period – 3.43 years; ARR – 22%; NPV – Rs.1,768]**

11. An Engineering Company is considering the purchase of a machine. There are two possible machines which will produce the additional output. Details of these machines are given below:

	Machine X Rs.	Machine Y Rs.
Capital cost	30,000	30,000
Sales (at standard prices)	50,000	40,000
Costs:		
Labour	5,000	3,000

	Machine X Rs.	Machine Y Rs.
Materials	4,000	5,000
Factory overhead	6,000	5,000
Administrative costs	2,000	1,000
Selling costs	1,000	1,000
Expecting life in years	2	3

Show the most profitable investment on the facts given above, by the following methods:

- Payback period
- Return on investment
- Present value return on investment (at 10% discount)

Discounting factor at 10%:

- 1 year – 0.909
- 2 years – 0.826
- 3 years – 0.751

**[Ans.: (a) Payback period – Machine X : 0.94 years, Machine Y : 1.2 years; (b) Return on Investment – Machine X : 213%; Machine Y : 167%; (c) Present Value return : Machine X – 1.85; Machine Y – 2.07; Machine X is preferable under payback and return on investment method. Machine Y is preferable under present value return on investment method.]**

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## 7.8 REFERENCE BOOKS

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**Chapter – 8****WORKING CAPITAL MANAGEMENT****Objectives :**

After studying this unit you should be able to :

- define the meaning of working capital
- understand the importance of working capital
- find out the determinants of working capital
- analyse the walker's principles on the financing of working capital

**Structure :**

- 8.1 Introduction**
- 8.2 Working Capital Management**
- 8.3 Importance of Working Capital**
- 8.4 Determinants of Working Capital**
- 8.5 Walker's Principles**
- 8.6 Financing of Working Capital**
- 8.7 Self Assessment Questions**
- 8.8 Reference Books**

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**8.1 INTRODUCTION**

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Though working capital is of vital significance to an undertaking in several ways, the management of which did not receive adequate attention until recently. The literature of Finance concentrated more on the infrequent episodic events like mergers and liquidation neglecting completely the management of working capital. Even now, the management of fixed assets is getting a precedence over the working capital.

It has been observed by Schall and Haley that "managing current assets requires more attention than managing plant and equipment expenditure. Mismanagement of current assets can be costly. Too large an investment in current assets means tying up capital that can be used productively elsewhere. On the other hand, too little investment can also be expensive." For example, insufficient inventory may result in loss of sales as the goods that a customer wants to buy may not be available. The Finance Manager will be forced to spend a large percentage of his time in managing current assets. It is because these assets vary quickly and a lack of attention paid to them may result in appreciably lower profits for the firm.

### 8.1.1 Importance of Working Capital:

In fact, working capital forms a major chunk of the total capital employed in many a business enterprise. In case of industries like Tobacco and Trading, it forms more than 70 per cent of the total capital employed. Besides, it is this area of financial management that consumes much of the time of a finance manager. It plays a greater role in earning maximum return on the investment. That is to say, a firm's profitability may be increased as more working capital is added to the fixed capital when the firm does not exceed cent per cent of the capacity.

In managing this asset, the finance manager of a company is constantly engaged in endeavouring to maintain a sound working capital position. He is often times confronted with excess and shortages of working capital. While an excessive working capital leads to unremunerative use of scarce funds; inadequate working capital interrupts the smooth flow of business activity and impairs profitability. History is replete with instances where paucity of working capital has posed to be the major contributing factor for business failures. Nothing can be more frustrating for the operating managers of an enterprise than being compelled to function in a continuing atmosphere of lack of availability of funds to meet their important and urgent operating expenses.

Not only the inadequacy of working capital poses a threat to the finance manager, but also its abundance. Availability of more than required amount of funds causes an unchecked accumulation of inventories. Further, there may be a tendency to grant more and more credit without properly looking into the credentials of the customers. Moreover, idle cash earns nothing and it is unwise to keep large quantities of cash with the firm. Thus, the need to have adequate working capital in a firm need not be overemphasized.

### 8.1.2 Working Capital Definitions:

The following are the some of the definitions given for working capital by experts in the area of finance.

**J.S. Mill:** "The sum of the current assets is the working capital of a business."

**Bonneville and Dewey:** "Any acquisition of funds which increases the current assets, increased working capital, for they are one and the same."

**C.W. Gerstenberg:** "Working capital has ordinarily been defined as the excess of current assets over current liabilities."

### 8.1.3 Concept of Working Capital:

Thus, like most other financial terms, the concept 'Working Capital' is used in different connotations by different experts. On the basis of above definitions we can understand that there are two different concepts of working capital, viz., gross concept and net concept.

1. **Gross Working Capital:** The 'Gross Working Capital' also known as 'Current Capital' or 'Circulating Capital' is represented by the sum total of all current assets of the enterprise. Current assets are the assets which are meant to be converted into cash within a year or an operating cycle. Stock of raw materials, stock of semi-finished goods, stock of finished goods, trade debtors, bills receivable, prepaid expenses, cash at bank and cash in hand are examples of current assets.
2. **Net Working Capital:** On the other hand, the term net working capital refers to the difference between current assets and current liabilities. For example, the total current assets and current liabilities of a firm amount to Rs.6,50,000 and Rs.4,00,000 respectively. Then, the gross working capital of the firm is Rs.6,50,000. The net working capital of the firm is Rs.2,50,000 (Rs.6,50,000 – 4,00,000). It means a some of Rs.2,50,000 long term funds of the firm were used for financing the working capital needs of the firm. Thus, net working capital is that part of the working capital which is financed by long-term funds.

Both the net and the gross concepts of working capital have their own uses. The choice of a particular concept obviously depends upon the purpose in view. If the objective is to measure the size and extent to which current assets are being used to optimise productivity of the concern, the gross concept is more useful. If, on the other hand, the objective lies in evaluating the liquidity position of an undertaking, the concept of net working capital becomes pertinent and preferable.

### 8.1.4 Structure of Working Capital:

For a proper appreciation of the problems of working capital management, a closer look at the individual items of working capital is essential. The components of current assets and current liabilities, which are constituents of working capital are shown in the following Exhibit 1.

**Exhibit – 1 : Constituent Parts of Working Capital**

<b>Current Liabilities</b>	<b>Current Assets</b>
<b>Bank Borrowings:</b> Cash Credit and over drafts Trade Creditors Including Sundry Creditors or Creditors for purchases	<b>Inventories:</b> Raw materials, components etc. Work in Progress Finished goods, Stores and Spares

<b>Current Liabilities</b>	<b>Current Assets</b>
<b>Other Current Liabilities</b> Advances from customers, Accrued expenses viz., Salaries, wages, other trade dues	<b>Sundry Debtors and trade debtors</b> Cash in hand, Cash at Bank
<b>Statutory liabilities:</b> like electricity charges, municipal rent and rates, unpaid dividends, income-tax outstanding dues. Others like provisions for taxes and other current provisions.	<b>Other Current Assets</b> Advances to Suppliers, loans and advances and other debtors balances. Pre-paid expenses Short-term Investments in Government, and trade deposits of one year or less, advances payment of income-tax and sales tax.

### 8.1.5 Current Assets:

The finance literature describes the current assets as those assets which can be converted into cash within an accounting year or within the operating cycle whichever is greater. Sometimes these assets may not get converted into cash strictly within this stipulated period, but are still included in the category of current assets. The current assets include basically inventories of all categories, trade debtors, advances, investments in marketable securities, cash in hand and bank and other current assets including prepaid expenses and advance payment of tax.

### 8.1.6 Current Liabilities:

Current liabilities are those that are payable within the next accounting year or operating cycle. Normally all those liabilities that are required to be paid within a period of one year are regarded as current liabilities. They include sundry creditors, bank borrowings, advances received from customers, security and other deposits, provisions for taxation, dividends, bonus, etc., and other liabilities including interest accrued on loans. Like the current assets, current liabilities also may not strictly satisfy the time criterion, but the dues are still included in the category of current liabilities.

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## 8.2. WORKING CAPITAL MANAGEMENT

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Working capital management is concerned with all decisions and acts that influence the size and effectiveness of working capital. According to Gitman, "the goal of working capital management is to manage each of the firm's current assets and current liabilities in such a way that an acceptable level of net working capital is maintained." It is concerned with the determination of appropriate levels of current assets and their efficient use, as well as the choice of the financing mix for raising the current resources.

### 8.2.1 Adequacy of Working Capital:

Adequacy of working capital implies that it should neither be excessive nor inadequate of the firm's requirements. Excessive working capital means that the firm has funds which earn no profit for the firm. Inadequate working capital means the company does not have sufficient funds for carrying out its operations, which ultimately result in production interruptions and decreasing the profitability.

Working Capital should be adequate for smooth running of the operations and uninterrupted flow of production. It will maintain credit-worthiness in the market and meet all the current obligations including the payment of dividends to shareholders. It enables the firm to avail cash discounts by making prompt payments.

**Inadequate Working Capital:** Both the inadequate and excessive working capital are dangerous. If the working capital is inadequate, the production will suffer. Credit worthiness in the market will be affected because of lack of liquidity. Low liquidity and low production may lead to low profitability which in turn affects the liquidity.

### 8.2.2 Dangers of Inadequate Working Capital:

The following are the dangers of inadequate working capital.

- 1. Loss of Goodwill and Creditworthiness:** The firm loses its creditworthiness and goodwill as it fails to honour its current liabilities. Consequently, the firm finds it difficult to procure the requisite funds for its business operations on easy terms, which ultimately results in reduced profitability as well as production interruptions.
- 2. Firm cannot Avail the Favourable Opportunities:** The firm with inadequate working capital fails to undertake the profitable projects, which not only prevent the firm from availing the benefits of favourable opportunities, but also stagnate its growth.
- 3. Adverse Effect on Credit Opportunities:** The firm also fails to avail the attractive credit opportunities due to inadequacy of working capital.
- 4. Operational Inefficiency:** Inadequacy of working capital leads to operating inefficiencies as day-to-day commitments can not be met.
- 5. Low Rate of Return on Fixed Assets:** Inadequacy or shortage of working capital also results in lowering down the rate of return on fixed assets because fixed assets. It is can not be efficiently utilised or maintained due to inadequacy of working capital.
- 6. Increase in Business Risks:** Inadequate working capital increases the risk of the firm. In the absence of ample working capital, the firm cannot discharge its current liabilities

and is liable of being declared as insolvent. Inadequate working capital, therefore, poses a serious threat to the survival of the firm.

- 7. Adverse Effect on the Morale of Business Executive:** Inadequacy of working capital also adversely affects the morale of the firm's executives. They have to face many unhappy situations due to delay in payments.

**Excessive Working Capital:** If the working capital is excessive, excessive inventory is the main target. It results in the operational inefficiency leading to low profitability. Ralph Kennedy and Mc Muller observed that the availability of excessive working capital may lead to carelessness about costs and, therefore, to inefficiency of operations.

### 8.2.3 Dangers of Excessive Working Capital:

As mentioned above, it is not only inadequacy of working capital which is dangerous but also excessive working capital leads to many problems. These are given below:

- 1. Low Rate of Return on Capital:** Excessive working capital implies the presence of idle funds which earn no profit for the firm. The firm with excessive working capital may not be able to earn a proper rate of return on its total investments, whereas profits are distributed on the whole of its capital. This would ultimately result in bringing down the rate or return to the shareholders.
- 2. Decline in Capital and Efficiency:** Due to low rate of return and low dividend to shareholders, companies often adopt some objectionable devices to inflate profits to maintain or increase the rate of dividend. Sometimes, unearned dividends are paid out of the company's capital to keep up the show of prosperity by window dressing of accounts. In order to make up the deficiency of reduced earnings, certain provisions, such as a provision for depreciation, repairs and renewals are not made. This leads to decline in operating efficiency and fall in profits.
- 3. Loss of Goodwill and Confidence:** Excessive working capital leads to lower rate of return on the company's total investments. Shareholders also get lower dividend. Lower rate of dividend reduces the market value of the company's shares. The shareholders lose confidence in the company. The goodwill or credit of the company suffers a serious setback leading to loss of confidence.
- 4. Misapplication of Funds:** Companies with excessive working capital may not utilise the resources prudently. In case of excessive working capital, it becomes difficult to control the purchases of many things which are not required in the business. Often excessive inventories and fixed assets are purchased by the company, which do not add to the profitability of the company but adds to its maintenance costs and losses due to theft, waste and mishandling.

5. **Evils of Over-Capitalisation:** Excessive working capital is often responsible for overcapitalisation in the company. Over-capitalisation is not only disastrous to the smooth survival of the company but also affects the interests of those associated with the company.
6. **Inefficient Management:** Existence of excessive working capital is an indication of inefficient management of the company. It shows that the management is not interested in expanding the business, otherwise the excessive working capital might have been utilised in expanding the business.

#### **8.2.4 Optimum Level of Working Capital:**

Thus, every Finance manager has to work out the optimum level of working capital in order to avoid the dangers of inadequate and excessive working capital. Thus, both the situations of inadequate and redundant working capital are dangerous.

#### **8.2.5 Objectives of Working Capital:**

The two important objectives of working capital are 'profitability and liquidity'. Financial management cannot afford to stick to only one of these objectives. There should be a proper balance between the two so that one objective does not suffer at the expense of the other. Effective policies are needed to achieve these two objectives.

#### **8.2.6 Aspects of Working Capital:**

The aspects of management of working capital are:

1. determining the requirements of working capital;
2. financing the requirements; and
3. efficient utilisation of working capital.

#### **8.2.7 Determination of the Requirements of Working Capital:**

Efficient management of working capital involves careful determination of working capital requirements and formulation of plans for meeting them. A large number of factors influence the working capital needs of firms. The most important of these are: (1) the nature and size of business, (2) manufacturing cycle, (3) business fluctuations, (4) production policy, (5) credit policy, (6) credit availability, (7) growth and expansion activities, (8) profit margin and profit appropriation, (9) price level changes, (10) operating efficiency. It is in consonance with these factors, that the working capital requirements are planned.

### **8.2.8 Financing of Working Capital:**

A working capital forecast is prepared to determine the amount of working capital required to finance particular level of business operations. The exercise involves complicated calculations embracing every aspect of business activity. The items usually taken into consideration while preparing a working capital forecast are: costs to be incurred on material; wages and overhead expenses.

The budgetary approach to determine the working capital requirements involves preparation of cash budget which is an integral part of the overall budgetary process in any firm. The information required for each of the items in the cash budget has to be assembled from various functional budgets and supporting schedules. Cash budget may be prepared for any frequency (quarterly, monthly, fortnightly, weekly or even daily) depending upon the efficiency of the information system used in the firm and the relevance of the frequency.

### **8.2.9 Efficient utilisation of working capital:**

All the components of working capital viz., cash, debtors, inventory and inventories, are to be managed efficiently. There should not be excess or shortage of investment in any of these components.

### **8.2.10 Organisational set-up:**

Normally a separate organisational set-up for management of working capital in business enterprises may not exist. It is generally vested with the top Financial Executive who looks after all the aspects of financial management of the enterprise. He is styled variously as Director Finance / Financial Adviser / Adviser, Finance / Finance Adviser and Chief Accounts Officer as the case may be. He is concerned with the funds forecasting, laying down suitable policies and procedures; monitoring the levels of cash, receivables and inventory; deciding about the financial mix for working capital; expenditure control by fixing limits to expenditure; working capital control, review and replanning; formulation of guidelines for working capital expenditures; and obtaining bank finance and other funds to meet the working capital requirements. Fixation of limits of expenditure and authorisation of such expenditure is essential, in order to recurrent problems involving and adhoc discrimination between the departments.

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## **8.3. IMPORTANCE OF WORKING CAPITAL MANAGEMENT**

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The management of working capital is one of the key areas of financial decision making. It is significant because the management must see that an excessive investment in current assets should be minimised as it leads to low profitability. At the same time it should protect the company from the problems of stock-outs and risk. The management of fixed assets will be impossible without maintaining proper level of current assets. Current assets will also determine



the liquidity position of the company. The importance of working capital can be understood from the following points.

- 1. Time devoted to working capital decisions:** The financial manager will devote their largest time for working capital financing, control of current assets, management of liquidity etc. In view of this, it can be said that effective working capital decisions are also significant for successful management of the company's affairs.
- 2. Investment in current assets:** Characteristically, current assets present more than 60 per cent of the total assets of many firms, because they represent a large investment in the various components of current assets. Further, the investment trends tend to be relatively volatile. Hence, the financial manager has to show special attention for them.
- 3. Importance to small firms:** The management of working capital is particularly important to small firms, because for a small firm it may be possible to minimise its investment in fixed assets but it cannot avoid an investment in cash, receivables and inventories. Therefore, current assets are particularly significant for the financial managers of small firms. Small companies have relatively limited access to long-term capital market. Therefore, they have to depend heavily on trade credit and short-term loans from banks, both of which affect the net working capital.
- 4. Relationship between sales growth and current assets:** The relationship between growth in sales and increase in current asset investment are very close and direct. An increase in sales will accompany a similar rate of immediate increase in additional inventories and cash balance. All such needs must be financed.

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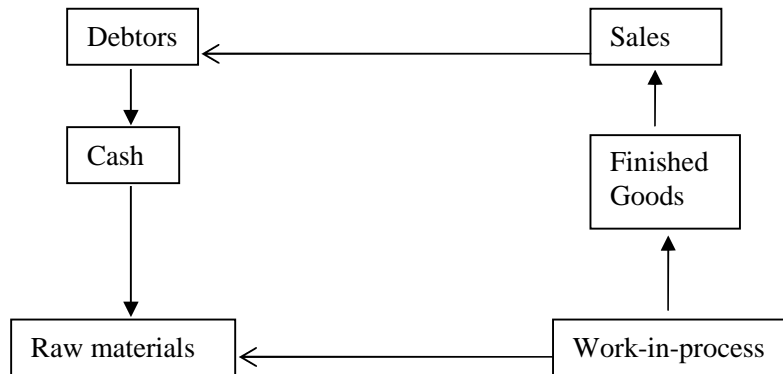
## 8.4. DETERMINANTS OF WORKING CAPITAL

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There are no set rules or formula to determine the working capital requirements of a firm. A large number of factors influence the size of investment in working capital. These include:

- 1. Nature of the business:** The working capital requirement of a firm are basically influenced by the nature of its business. Firms engaged in trading and financing activities make very heavy investment in current assets as compared to the investment in fixed assets, whereas in the case of rail and road transport and other public utility services steel, Aluminum, Automobile Industries, working capital forms a relatively low proportion of total assets.
- 2. Operating cycle:** The operating cycle implies the stages or processes through which the raw materials are processed to get the final product. If the process is lengthy and takes long time to get the finished products, the requirements of working capital will be much larger than that of a unit which has a relatively low operating cycle. The shortest manufacturing process will minimise the investment in the form of work-in-progress.

### Operating cycle of a manufacturing firm



3. **Seasonal elements:** The requirements of working capital to a company are influenced by the demand for the product. If the firm's product is seasonal demand-oriented, not only the amount of working capital fluctuates from one season to the other, but also the composition of working capital changes over the time. During the season, cash and bank balances are converted into inventory. The working capital level will increase and cash balances may reduce.
4. **Growth and expansion of business:** The working capital requirements of the firm will increase as it grows in terms of sales or fixed assets. Current assets are closely related with that of sales. The requirements of working capital for a growing firm will be more. A growing company has to maintain proper balance between fixed and current assets in order to sustain its growing production and sales. This will in turn increase the investment in current assets to support the increased scale of operations.
5. **Firm's credit policy:** The credit policy of the firm affects working capital by influencing the debtor balances. The credit terms of a company may also depend upon the industry credit norms. If a company follows a liberal credit policy, without following the norms of credit, it will result in more credit sales, increased book debts and increased investment in working capital.
6. **Turnover of current assets:** Turnover of current assets refers to the speed at which the components of current assets can be converted into cash. The greater the turnover is, greater will be the cashflow and lesser will be the level of working capital. If the turnover is low, the company can witness heavy piling up of various components of current assets and increased level of working capital.
7. **Availability of credit:** The level of working capital of a company also depends upon the credit facility available to it. The firm will need less working capital, if liberal credit terms are available. The availability of credit facility from commercial banks also influences

working capital needs of the firm. Generally, if a firm gets credit facility easily, on favourable conditions, it can operate with less working capital than a firm without such facility.

- 8. Dividend policy:** Dividends are paid to shareholders of the company out of the profits. The payment of dividends results in cash outflow. Further, a desire to maintain an established dividend policy may affect the company by reducing the cash balances. It will cause changes in the level of working capital. Often, changes in working capital also bring an adjustment in the dividend policy. Shortage of working capital therefore, acts as a powerful reason for reducing or skipping a cash dividend.
- 9. Taxation:** Taxation is a short-term liability payable in cash. Advance payment of tax may have to be paid on the basis of anticipated profits. Tax is the first appropriation out of profits. Higher the tax, greater is the strain on the working capital of the company.
- 10. Government Regulations and Restrictions:** Regulations and restrictions by the Government and Reserve Bank of India through such controls, as credit control, import regulations, influence the working capital of companies. For instance, the Tandon Committee has prescribed norms for holding inventory and debtors which the company is not expected to exceed.

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## 8.5 WALKER'S PRINCIPLES

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With regard to management of working capital, four propositions have been laid down by E.W.Walker and these propositions were further elucidated by James C.Van Horne. These propositions are also termed as the principles involving risk that serve as the basis of working capital theory.

### 8.5.1 Principle 1: Investment – Risk and Return:

“If working capital is varied relative to fixed asset investment (also sales), the amount of risk that a firm assumes is also varied and the opportunity for gain or loss is increased.” This principle assumes that a definite relation exists between the degree of risk that a firm assumes and the rate of return i.e., the more the risk assume, the greater is the opportunity for gain or loss. The opportunity for gain is increased by choosing an appropriate asset liability structure. The firm's return on investment will be greater when there is a low proportion of current assets to total assets and a high proportion of current liabilities to total liabilities.

**Profitability Vs. Liquidity:** This strategy no doubt will result in low level of working capital and greater profitability. But the firm assumes the risk of technical insolvency, i.e., the inability to meet its cash obligations. Therefore, the risk involved with various levels of current assets and current liabilities must be evaluated in relation to the profitability associated with those levels. Risk, profitability trade off, is considered by the management again in determining the

appropriate level of liquidity to be maintained for the firm. Such trade off is brought about by holding the fixed assets constant and varying the amount of current assets.

**Conservative Vs. Aggressive Policy:** The above analysis leads to two policies, viz., conservative policy and aggressive policy. In the case of conservative policy, the ratio of current assets to fixed assets is greatest at every level of output, the firm's liquidity is greatest, and the risk of technical insolvency is lowest. But the profitability of the firm will be lower on account of increased costs of maintaining high liquidity. In the case of aggressive policy, profitability will be higher but the firm has lowest liquidity and correspondingly the greatest risk. Therefore, it should be the goal of management to select the level of current assets that optimises the firm's rate of return.

### 8.5.2 Principle 2: Contribution to Networth:

"Capital should be invested in each component of working capital as long as the equity position of the firm increases." This principle is based on the concept that each rupee invested in fixed or working capital should contribute to the net worth of the firm.

### 8.5.3 Principle 3: Financing of working Capital:

"The type of capital used to finance working capital directly affects the amount of risk of the firm assumes as well as the opportunity for gain or loss and cost of capital. There are two approaches to financing which a firm can adopt, viz., the hedging approach and margin of safety approach.

- i. **Hedging Approach:** Hedging approach is a financial plan which involves the matching of assets with the expected life of the source of funds raised to finance assets. If the firm follows this policy, long-term funds are used to finance fixed assets and the permanent portion of current assets, while short-term funds are used to finance the temporary or variable portion of current assets. Under the hedging approach, the firm's seasonal fund requirements are financed on short-term basis and repaid during seasonal troughs as and when surplus cash is generated. Thus borrowings are resorted to only when they are needed. Under this policy, while profitability will be higher, the risk in terms of funds availability will be greater.
- ii. **Margin of Safety Approach:** The margin of safety approach involves financing a portion of the firm's expected seasonal fund requirements on long-term basis. If the expected net cash flows are realised, the debt is repaid during seasonal troughs when funds are not needed. The firm thus reduces the risk of fund availability by employing long-term funds to finance a portion of its seasonal requirements; but the profitability is also reduced on account of higher costs associated with the existence of idle funds (long-term) in times of seasonal troughs. Therefore, in order to maximise the overall rate of return on investment, firms have to employ an optimal mix of financing policies.

**8.5.4 Principle 4: Flow of Funds:**

“The greater the disparity between the maturities of a firm’s short-term debt instruments and its flow of internally generated funds, it is not possible to closely synchronise the schedule of expected net cash flows and payments on debt (called margin of safety) will depend upon the risk preferences of management. The shorter the maturity schedule of debt in relation to expected net cash flows, the less the risk of inability to pay the debt.” However, financing is likely to be costlier under longer maturity schedule thus cutting into profits. Profits can be maximised by making every effort to tie debt maturities with the cash inflows of internally generated funds, since in such a case, there will be no need to hold low yielding liquid assets, nor to have more long-term financing than is absolutely necessary.

**8.5.5 Maximisation of shareholders Wealth:**

On the whole, management has to determine the liquidity of the firm on the basis of the information about risk and opportunity costs of holding liquidity. The degree of liquidity desirable is a function of the probability of insolvency at various levels of liquidity, the opportunity cost of maintaining those level, and the cost of bankruptcy. The behaviour of the management should be influenced not only by the risk and the opportunity costs associated with various levels of liquidity, but also by the cost of bankruptcy. The management must behave in a manner consistent with maximisation of shareholder’s wealth (value of the firm to the owners).

**8.5.6 Techniques of Working Capital Management:**

There are several techniques of control as regards working capital management. Some of the important techniques are ratio analysis, systems approach as applied in the case of material management, PERT as applied in the case of operating cycle analysis, mathematical models as applied in determining economic order quantities; safety stocks and order points; discriminate analysis and decision tree approaches as applied in credit granting and collection decisions; discriminate analysis and simulation; and linear programming techniques as applied in cash management decisions; cash flow and funds flow analysis.

Concerned as it is with the determination of appropriate levels of current assets and their efficient use, as well as the choice of the financing mix for raising current resources, working capital management deals with decisions, acts and procedures relating to the use and the method of financing each current assets and determining its optimal level. The important components of working capital management, therefore, are inventory management, receivables management and cash management.

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## 8.6 FINANCING OF WORKING CAPITAL

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The sources of finance for working capital can be classified as under:

- i) **Short-term sources.**
  - a. Sundry creditors.
  - b. Bank overdraft.
  - c. Advance payments received.
- ii) **Long-term sources:**
  - a. Redeemable debentures.
  - b. Redeemable preference Shares.
  - c. Deposits.
- iii) **Permanent sources**
  - a. Share capital.
  - b. Irredeemable debentures
  - c. Plough back of profits.

### 8.6.1 Permanent and Variable Working capital:

In the similar way, the working capital requirements (current assets) of the concern can be divided into two portions – (i) permanent portion and (ii) variable portion.

- i. **Permanent Working Capital:** The total fund requirements (both on fixed capital and working capital) increases with increased production over a period of time. A portion of the working capital remains the same throughout. In other words, there is a limit below which the current assets do not fall. This portion is the permanent working capital. This minimum level or lowest level of current assets that a company should hold. It is known as the 'hard core' or 'fixed' working capital. The Dehejia Committee and the Tandon Committee have referred to the permanent working capital as the 'core current assets'.
- ii. **Fluctuating Working Capital:** There is a variable portion of current assets, over and above the permanent assets. It varies with production plans, seasonality etc. This portion, also known as the 'fluctuating' or 'temporary' working capital. It can be estimated in advance. The general principle is that the fixed asset and the permanent portion of the working capital should be financed by capital and reserves, long term debt and permanent portion of the current liabilities. The variable portion of working capital can be financed by short-term funds.
- iii. **Financing of Working Capital:** The Tandon Committee recommended that the core portion of current assets should be financed by the company out of equity or by raising long term debt. But till recently, companies continued to rely on commercial banks as

the major suppliers of working capital. However, due to tightening of bank credit and encouragement given to companies to tap capital market, companies have taken to issuing debentures for financing permanent working capital. Judicious mix of short-term and long-term finances for working capital requirements has several advantages. If variable working capital is financed on a short-term basis, the company pays interest on funds only during the period of time they are needed. This reduces the interest cost. By utilising the long-term funds for permanent working capital the company ensures stability. The loan need not be repaid at frequent intervals. The repayment over a period can be planned depending on the surplus generated. The liquidity of the concern is increased.

### 8.6.2 Tandon Committee and Permissible Bank Borrowings:

The Reserve Bank of India appointed a study Group (1975) under the Chairmanship of Sri P.L. Tandon to determine the maximum permissible bank borrowings. The study group has visualised that banker's role is to supplement the borrower's resources to carry an acceptable level of current assets. Bank is not expected to meet all working capital requirements of borrowers. Banker is required to finance only a part of the working capital gap.

**Working capital gap:** It is defined as the total current assets minus current liabilities other than the bank borrowings.

**Methods of Lending:** The committee has advocated three methods of sanctioning the permissible level of bank finance.

- 1. First Method of Lending:** Under the first method, the borrower contributes 25% of the working capital gap and banks finance the rest. This result in the current ratio of 1.17:1 (minimum)
- 2. Second Method of Lending:** Under the second method, borrower contributes (25% of the total current assets, the remaining working capital gap (i.e., total working capital gap minus borrower's contribution) is to be financed by banks. This will result in current ratio of 1.13:1 (must be)
- 3. Third Method of Lending:** Under the third method, borrower should contribute cent per cent of core assets, and 25% of the balance of current assets. The remaining working capital gap can be bridged by the bank borrowings and there will be an improvement of current ratio, further.

The term 'core assets' refer to the critical minimum level of raw material, stock-in-process, and finished goods, required to ensure continuity of production. This third method would mean further reduction in the bank credit and strengthening of the current ratio of the borrowing firm.

At present the second method is being followed by banks in financing the working capital needs of firms.

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## 8.7 SELF ASSESSMENT QUESTIONS

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1. Define Working Capital. What are various concepts of working capital?
2. What are current assets? What are current liabilities?
3. What is Adequacy of working capital? State the dangers of inadequate working capital.
4. Explain the problems of excessive working capital.
5. Explain the importance of working capital.
6. Discuss the concept of working capital? State the dangers of inadequate working capital exclusive? Explain.
7. Enumerate the cardinal principles of working capital management. Discuss the significance of these principles in management of working capital.
8. Discuss the risk-return trade off in current assets financing.
9. Explain the merits of a matching plan in relation of financing extensively using (a) long-term financing (b) short-term financing.

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**Chapter – 9****ESTIMATION OF WORKING CAPITAL****Objectives :**

After reading this unit you should be able to

- estimate the needs of the working capital of an organization
- go through different methods of forecasting working capital

**Structure :**

- 9.1 Estimation of Working Capital Requirements**
- 9.2 Methods of Working Capital Forecasting**
- 9.3 Self Assessment Questions**
- 9.4 Exercises**
- 9.5 Reference Books**

**9.1 ESTIMATION OF WORKING CAPITAL REQUIREMENTS**

The success of a business depends to a great extent on a correct assessment of its financial needs. Such an estimate is made not only by a new venture but also by an existing one. While planning fund requirements of a firm, an entrepreneur has to identify, in the first instance, the purpose for which capital would be needed. Following are the main purposes for which funds must be provided.

- To finance the acquisition of fixed assets viz., land, buildings, plant and machinery etc.
- To supply current assets viz., inventories, receivables and cash.
- To cover the cost of intangible assets.

After estimating fixed capital requirements of the firm the finance manager has to assess the amount of capital that would be needed to ensure smooth functioning of the enterprise. A manufacturing concern requires funds to pile up adequate amount of raw materials in stock, to ensure uninterrupted production activity. Likewise, sufficient stock of finished goods has also to be maintained in the anticipation of future demand.

Further, goods sold on credit do not return cash immediately. Firm will have, therefore to arrange funds to finance accounts receivable for the period until they are collected. Cash is also required for the payment of ordinary operations of the enterprise viz., wages, factory overhead before a product can be sold and receipts are collected. Ample cash is required to take advantage of cash discounts. Adequate cash is also essential from the point of view of maintaining good credit relations. Since uncertainty is always a characteristic of business, some

excess of cash should be maintained as insurance against unexpected adversities. Thus, the finance manager has to arrange capital for the following types of assets to ensure day-to-day operation of the firm.

- i. For building up inventories
- ii. For financing receivables.
- iii. For covering day-to-day operating expenses and contingencies.

### **9.1.1 Items to be included in the calculation of Working capital:**

Therefore, proper estimation of the working capital requirements is a must for running the business efficiently and profitably. The following items are usually included in the calculation of working capital required at a particular level of business operation.

1. Total costs incurred on materials, wages and overheads.
2. Time lag during which raw materials are to remain in stock before they are issued for productive purposes.
3. Duration of the production cycle so that longer the duration of the cycle, larger will be the working capital required.
4. Length of the sales cycle indicating the duration of time during which finished products have to stay in the warehouse before sale. For certain business concerns having seasonal sales of goods, stocks have to be maintained throughout the rest of the year and the working capital requirement will be very heavy.
5. Period of credit allowed to debtors, If longer periods of credit are allowed to the customers by a company without the same being extended to it by its suppliers, a larger working capital will be needed.
6. The period of credit extended by creditors. When a longer period of credit is extended by suppliers of a company that that extended by it to its customers, working capital requirements will be considerably reduced.
7. Time lag involved in the payment of wages and other overheads.

The quantum of working capital required will be determined by taking all the above factors into account and by adding finally a flat percentage to this amount by way of provision for meeting contingencies. This provision for meeting contingencies must be effected since the forecast of working capital is compiled on the basis of estimates only. This provision helps in cushioning all the uncertainties involved in making the estimates.

### **9.1.2 Estimation of Certain Items:**

An idea about how long working capital remains blocked with its various components might be available from annual reports. They can provide measure of time lag on an average. Although an accurate measure is not available, an average measure to working capital cycle can be derived from the volume of the time lags of its various components.

Two important types of information are necessary for the purpose. One relates to the information on annual cost of raw materials, finished goods, produced and sold which provides data on average daily purchases, production, etc. The other relates to how long on an average raw materials, work-in-progress, finished goods and debtors are held up. As we are aware working capital is blocked in (i) raw materials (ii) production process, (iii) finished goods and (iv) debtors. How long they are blocked may be estimated with the following ratios.

i. **For measuring time lag of raw materials** =  $\frac{\text{Average holding of raw materials}}{\text{Average daily purchases}} \times \text{days.}$

Average opening and closing stock should be considered here the numerator. Average daily purchases may be derived from annual purchases.

ii. **For measuring time lag in production process** =  $\frac{\text{Average holding of Work - in - Progress}}{\text{Average daily cost of goods produced/input to WIP}} \times \text{days.}$

iii. **Time lag of cost of goods sold** =  $\frac{\text{Average holding of finished goods}}{\text{Average daily cost of sales}} \times \text{days.}$

iv. **Credit allowed to debtors** =  $\frac{\text{Average trade debtors outstanding}}{\text{Daily credit sales}} \times \text{days.}$

v. **Credit from Suppliers** =  $\frac{\text{Average trade creditors outstanding}}{\text{Daily Credit purchases}} \times \text{days.}$

Information on annual purchase of raw materials, cost of goods procured, cost of goods sold, etc., required for the above ratio is not directly available from the annual accounts. They might be derived from the following proforma.

<b>I. Annual Materials used:</b>	<b>Rs.</b>	<b>III. Cost of goods produced:</b>	
Opening raw materials	x x x	Opening W.I.P.	x x x
<b>Add:</b> Purchases	x x x	<b>Add:</b> Cost of materials used	x x x
	x x x		x x x
<b>Less:</b> Closing raw materials	x x x	<b>Less:</b> Closing W.I.P.	x x x
Cost of materials used	x x x	Cost of goods produced	x x x
<b>II. Cost of goods sold:</b>			
Opening Finished goods	x x x		
<b>Add:</b> Cost of goods produced	x x x		
	x x x		
<b>Less:</b> Closing finished goods	x x x		
Cost of goods sold	x x x		

**Note:** WIP means Work-in-Progress

## 9.2 METHODS OF WORKING CAPITAL FORECASTING

There are two methods available for estimating the requirements of working capital. They are given below:

### 9.2.1 Method – 1

**By determining the amount of current assets and current liabilities:** This is also known as Balance Sheet Method. The assessment of working capital requirements can be made on the basis of the current assets required for the business and the credit facilities available for the acquisition of such current assets, i.e., current liabilities. Thereafter, the difference between the two is taken out. This difference will indicate the deficiency or surplus of cash.

**Illu.1: A and B, who want to buy a business seek your advice about the average working capital requirements in the first year's trading. The following estimates are available and you are asked to add 10% to allow for contingencies:**

	Per annum
<b>i. Average amount locked up in stocks:</b>	<b>Rs.</b>
Stock of finished products and work-in-progress	5,000
Stock of stores, material etc.	8,000
<b>ii. Average credit given:</b>	
Local sales – 2 weeks credit	78,000
Outside the state – 6 weeks credit	3,12,000
<b>iii. Time available for payment:</b>	
For purchases – 4 weeks	96,000
For wages – 2 weeks	2,60,000

Calculate the average amount of working capital required. Give details of your working.

**Solution:**

### Statement showing the amount of Working Capital Requirements

	Rs.	Rs.
<b>Current Assets:</b>		
Inventories:		
Stock of finished products and work-in-progress	5,000	
Stock of stores, material etc.	8,000	
		13,000

Accounts Receivable:	Rs.	Rs.
Local sales Rs.78,000 $\times \frac{2}{52}$	3,000	
Outside the state Rs.3,12,000 $\times \frac{6}{52}$	36,000	
		39,000
		52,000
<b>Less: Current Liabilities:</b>		
Accounts payable Rs.96,000 $\times \frac{4}{52}$	7,385	
Outstanding wages Rs.2,60,000 $\times \frac{2}{52}$	10,000	
		17,385
		34,615
<b>Add: 10% for contingencies</b>		3,462
<b>Working capital required</b>		38,077

**Illu.2: M/s Dabur & Co. is desirous to purchase a business and has consulted you, and one point on which you are asked to advise them is the average amount of working capital which will be required in the first year's working.**

**You are given the following estimates and are instructed to add 10% to your computed figure to allow for contingencies.**

		(Figures for the year)
i.	<b>Average amount locked up for the stocks:</b>	Rs.
	Stock of finished products	5,000
	Stock of stores, materials etc.	8,000
ii.	<b>Average credit given:</b>	
	Inland sales – 6 weeks credit	3,12,000
	Export sales – 1 ½ weeks credit	78,000
iii.	<b>Lag in payment of wages and other outgoings:</b>	
	Wages – 1 ½ weeks	2,60,000
	Stores, materials etc., 1 ½ months	48,000
	Rent, royalties, etc., - 6 months	10,000
	Clerical staff – ½ months	62,400
	Manager – ½ month	4,800
	Miscellaneous expenses – 1 ½ months	48,000
iv.	<b>Payment in advance:</b>	
	Sundry expenses (paid quarterly in advance)	8,000
v.	<b>Undrawn profits on the average throughout the year</b>	11,000

**Set up your calculations for the average amount of working capital required.**

**Solution:****Statement of Average Working Capital Requirements**

	Rs.	Rs.
<b>Current Assets:</b>		
Inventories:		
Stock of finished products	5,000	
Stock of stores, materials etc.	8,000	
		13,000
Book debts:		
Inland sales – 6 weeks sale of Rs.3,12,000 p.a.	36,000	
Export sales – 1 ½ weeks sale of Rs.78,000 p.a.	2,250	
		38,250
Advance payment of expenses		2,000
Investment in Current Assets		53,250
<b>Less: Current Liabilities:</b>		
Lags in payment of wages	7,500	
Stores, materials etc.	6,000	
Rent, royalties etc.	5,000	
Clerical staff	2,600	
Manager	200	
Miscellaneous	6,000	
		27,300
Net working capital		25,950
<b>Add:</b> 10% for contingencies		2,595
<b>Average working capital requirements</b>		<b>28,545</b>

**Notes:**

- i) Undrawn profit has not been taken into consideration since it is a source of fund which may or may not be used as working capital. It does not affect the total amount required as working capital. Further, the figures given in the question reveal a loss and net profit.

ii)		Rs.
a.	Books debts in respect of inland Sales	$3,12,000 \times \frac{6}{52}$ 36,000
b.	Wages outstanding:	$2,60,000 \times \frac{1\frac{1}{2}}{52}$ 7,500
c.	Stores etc.	$48,000 \times \frac{1\frac{1}{2}}{12}$ 6,000

**Illu.3: From the following information prepare a statement in columnar form showing the estimated working capital requirements.**

- i. in total; and
- ii. as regards each constituent part of working capital. Budgeted Sales Rs.2,60,000 per annum. Analysis of cost of each unit.

	Rs.
<b>Raw Materials</b>	<b>3</b>
<b>Labour</b>	<b>4</b>
<b>Overheads</b>	<b>2</b>
<b>Profit</b>	<b>1</b>
	<b>10</b>

It is estimated that:

- a. Pending use, raw materials are carried in stock for three weeks and finished goods for two weeks.
- b. Factory processing will take three weeks.
- c. Suppliers will give five weeks' credit and customers will require eight weeks' credit.

It may be assumed that production and overheads accrue evenly throughout the year.

**Solution:**

**Estimation of Working Capital Requirements**

	Rs.	Rs.
<b>Current Assets:</b>		
Inventories		
Stock of Raw materials $(26,000 \text{ units} \times \frac{3}{52} \times 3)$		4,500
Work-in-Progress		
Raw Materials $(26,000 \times \frac{3}{52} \times 3)$	4,500	
Labour $(26,000 \times \frac{3}{52} \times 3)$	4,500	
Overheads $(26,000 \times \frac{3}{52} \times 2)$	3,000	
		12,000
Stock of finished goods:		
Raw Materials $(26,000 \times \frac{2}{52} \times 3)$	3,000	
Labour $(26,000 \times \frac{2}{52} \times 4)$	4,000	
Overheads $(26,000 \times \frac{2}{52} \times 2)$	2,000	

	Rs.	Rs.
		9,000
Sundry Debtors ( $26,000 \times \frac{8}{52} \times 9$ )		36,000
		63,000
<b>Less: Current Liabilities:</b>		
Sundry Creditors ( $26,000 \times \frac{5}{52} \times 3$ )		7,500
<b>Working capital required</b>		<b>55,500</b>

Illu.4: XYZ Cements Ltd., sells its products on a gross profit 20% on sales. The following information is extracted from its annual accounts for the current year ended 31<sup>st</sup> December.

	Rs.
Sales at 3 months' credit	40,00,000
Raw material	12,00,000
Wages paid – average time lag 15 days	9,60,000
Manufacturing expenses paid – one month in arrears	12,00,000
Administrative expenses paid – one month in arrears	4,80,000
Sales promotion expenses – payable half yearly in advance	2,00,000

The company enjoys one month's credit from the suppliers of raw materials and maintains a 2 month's stock of raw materials and one-and half months' stock of finished goods. The cash balance is maintained at Rs.1,00,000 as a precautionary measure. Assuming a 10% margin, find out the working capital requirements of XYZ Cements Ltd.,

**Solution:**

**Statement Showing the determination of Working Capital:**

	Rs.	Rs.
<b>Current Assets:</b>	A	1,00,000
Cash Balance		
Inventories		
Raw Materials ( $\text{Rs.}12,00,000 \times \frac{2}{12}$ )	2,00,000	
Finished Goods ( $\frac{\text{Rs.}32,00,000 \times 15}{12}$ )	4,00,000	
		6,00,000
Debtors ( $\frac{\text{Rs.}32,00,000 \times 3}{12}$ )		8,00,000
Prepaid Expenses ( $\frac{\text{Rs.}2,00,000 \times 6}{12}$ )		1,00,000
		<b>16,00,000</b>



Current Liabilities	B	Rs.	Rs.
Creditors for goods ( $\frac{\text{Rs.}12,00,000 \times 1}{12}$ )			1,00,000
Wages ( $\frac{\text{Rs.}9,60,000 \times 1}{2 \times 12}$ )			40,000
Manufacturing expenses ( $\frac{\text{Rs.}12,00,000 \times 1}{12}$ )			1,00,000
Administrative expenses ( $\frac{\text{Rs.}4,80,000 \times 1}{12}$ )			40,000
Total			<u>2,80,000</u>
<b>C. Net Working Capital (A-B)</b>			13,20,000
10% Margin			<u>1,32,000</u>
			<u>14,52,000</u>
<b>Working Notes:</b>			
1. Sales			40,00,000
Less: Gross profit 20%			<u>8,00,000</u>
Cost of Production			<u>32,00,000</u>

**Illu.5: M/s Novartis Ltd., are engaged in large scale customer retailing. From the following information, you are required to forecast their working capital requirements.**

<b>Projected annual sales</b>	<b>Rs.65 lakhs</b>
<b>Percentage of net profit on cost of Sales</b>	<b>25%</b>
<b>Average credit allowed to debtors</b>	<b>10 weeks</b>
<b>Average credit allowed by creditors</b>	<b>4 weeks</b>
<b>Average stock carrying (in terms of sales requirements)</b>	<b>8 weeks</b>

**Add 10% to computed figures to allow for contingencies.**

**Solution:**

Projected Annual Sales	Rs.65 lakhs p.a.
Net Profit (20% on Sales)	Rs.13 lakhs p.a.
Cost of Sales (Rs.65 – 13)	Rs.52 lakhs p.a.
Cost of Sales per week	Rs.1.00 lakh

#### Statement of Working Capital Requirement

		(Rs.in lakhs)
		<b>Rs.</b>
<b>Current Assets:</b>		
Stock	Rs.1.00 × 8	8.00
Debtors – At cost equivalent	Rs.1.00 × 10 = 10	
Profit	Rs.13 × $\frac{10}{52}$ = Rs.2.50	12.50

<b>Less: Current Liabilities</b>		<b>Rs.</b>
Creditors	Rs.1.00 × 4	4.00
Working Capital computed		16.50
Add: 10% for contingencies		1.65
<b>Working capital required</b>		<b>18.15</b>

### 9.2.2 Method 2: CASH COST METHOD

It has already been stated that the working capital is the difference between current assets and the current liabilities. In order to estimate the requirements of working capital one has to forecast the amount of current assets, the cash costs involved are much less than the value of the current assets. For example, if the sundry debtors are estimated at Rs.10 lakhs and the cost of production of the goods with them is only Rs.7.5 lakhs, the amount of funds blocked with them is only Rs.7.5 lakhs and not Rs.1,00,000. Moreover, if the cost of production includes a sum of Rs.50,000 as depreciation the amount of actual funds blocked with the them is only Rs.7 lakhs. This is equally true of the cost of finished goods and work-in-progress which may include the amount of depreciation.

Working Capital forecast based on cash cost technique is likely to differ from the one determined on the balance sheet method. This is to be explained by the fact that the current assets shown in the balance sheet also indicate the amount which the firm is likely to realise sooner or later and this amount will be partly towards recovery of depreciation and the other non-cash charges and partly towards profit. When the cash is realised, it is for the firm to decide upon its utilisation. It may be used for acquiring fixed assets or for redeeming liabilities. It is not at all necessary that the whole of the cash should be kept as a liquid asset.

Many experts, therefore, calculate the working capital requirements by taking into account only the cash cost blocked in sundry debtors, stock of work-in progress and finished goods. According to this approach, the debtors are computed not as a percentage of sales but as a percentage of cash costs. Similarly the finished goods and work-in-progress are valued according to cash cost. Observe the following example.

**Illu.6: TVS Ltd. sells goods on a gross profit of 25%. Depreciation is taken into account as a part of cost of production. The following are the annual figures given to you.**

	<b>Rs.</b>
<b>Sales (two months credit)</b>	<b>18,00,000</b>
<b>Materials consumed (one month credit)</b>	<b>4,50,000</b>
<b>Wages paid (one month lag in payment)</b>	<b>3,60,000</b>
<b>Cash manufacturing expenses (one month lag in payment)</b>	<b>4,80,000</b>

	Rs.
<b>Administration expenses (one month lag in payment)</b>	<b>1,20,000</b>
<b>Sales promotion expenses (paid quarterly in advance)</b>	<b>60,000</b>
<b>Income tax payable in 4 instalments of which one is payable next year</b>	<b>1,50,000</b>

The company keeps one month stock each of raw materials and finished goods. It also keeps Rs.1,00,000 in cash. You are required to estimate the working capital requirements of the company assuming 15% safety margin.

**Solution:**

#### Statement of Working Capital requirements

	Rs.
<b>A. Current Assets:</b>	
Debtors (Cash cost of goods sold, i.e. $14,70,000 \times \frac{2}{12}$ )	2,45,000
Prepaid sales expenses	15,000
Inventories:	
Raw materials ( $\frac{\text{Rs.}4,50,000}{12}$ )	37,500
Finished goods ( $\frac{\text{Rs.}12,90,000}{12}$ )	1,07,500
Cash-in-hand	1,00,000
	<u>5,05,000</u>
<b>B. Current Liabilities:</b>	
Sundry creditors ( $\frac{4,50,000}{12}$ )	37,500
Outstanding manufacturing expenses $\frac{4,80,000}{12}$	40,000
Outstanding administration expenses $\frac{1,20,000}{12}$	10,000
Provision for taxation $\frac{1,50,000}{4}$	37,500
Outstanding wages $\frac{3,60,000}{12}$	30,000
	<u>1,55,000</u>
Working capital [(A) – (B)]	3,50,000
<b>Add: 15% for contingencies</b>	<u>52,500</u>
<b>Working capital required</b>	<u>4,02,500</u>

**Working Notes:**

		Rs.	Rs.
<b>1.</b>	<b>Total manufacturing expenses</b>		
	Sales		18,00,000
	<b>Less:</b> Gross profit 25% of sales		4,50,000
	Total manufacturing expenses		13,50,000
	<b>Less:</b> Cost of materials	4,50,000	
	Wages	3,60,000	
			8,10,000
	Manufacturing expenses/overhead		5,40,000
<b>2.</b>	<b>Depreciation:</b>		
	Total manufacturing expenses/overhead		5,40,000
	<b>Less:</b> Cash manufacturing expenses		4,80,000
	Depreciation		60,000
<b>3.</b>	<b>Total cash cost:</b>		
	Total manufacturing expenses		13,50,000
	<b>Less:</b> Depreciation		60,000
			12,90,000
	<b>Add:</b> Administration expenses		1,20,000
	Sales promotion expenses		60,000
	Total cash cost		14,70,000

**Illu.7: Prepare working capital forecast of Siemen's Company Ltd., from the following information:**

**Issued Share Capital Rs.4,00,000**

**6% Debentures Rs.1,50,000**

The fixed assets are valued at Rs.3 lakhs. Production during the previous year is 1 lakh units. The same level of activity is intended to be maintained during the current year.

The expected ratios of cost to selling price are:

Raw materials 50%

Direct wages 10%

Overheads 25%

The raw materials ordinarily remain in stores for 2 months before production. Every unit of production remains in process for 2 months. Finished goods remain in the warehouse for 4 months. Credit allowed by creditors is 3 months from the date of delivery of raw materials and credit given to debtors is 3 months from the date of despatch.

Selling price is Rs.6 per unit. Both production and sales are in a regular cycle.

**Solution:****Working Capital Forecast**

	Rs.
<b>Current Assets</b>	
Stocks:	
Raw materials	50,000
Work-in-process	67,500
Finished goods	1,70,000
Debtors	1,27,500
	4,15,000
<b>Less: Current Liabilities</b>	
Creditors	75,000
Working Capital required	3,40,000

**Working Notes:**

	Rs.
i. Sales	
Cost of sales	6,00,000
Raw materials	3,00,000
Direct wages	60,000
Overheads	1,50,000
ii. Stock of raw materials $\frac{\text{Rs.}3,00,000}{12} \times 2$	50,000
iii. Work-in-process:	
Raw materials $\text{Rs.}3,00,000 \times \frac{2}{12}$	50,000
Direct wages $\text{Rs.}60,000 \times \frac{2}{12} \times \frac{1}{12}$	5,000
Overheads $\text{Rs.}1,50,000 \times \frac{2}{12} \times \frac{1}{12}$	12,500
	67,500
iv. Stock of finished goods $5,10,000 \times \frac{4}{12}$	1,70,000
v. Debtors: $5,10,000 \times \frac{3}{12}$	1,27,500
vi. Creditors: $3,00,000 \times \frac{3}{12}$	75,000

**Illu.8: A proforma cost sheet of a company provides the following particulars:**

Element of cost:	Amount per Unit Rs.
Raw materials	80
Direct labour	30
Overheads	60
<b>Total cost</b>	<b>170</b>
Profit	30
<b>Selling price</b>	<b>200</b>

The following further particulars are available:

Raw materials are in stock on average one month. Materials are in process, on average, half a month. Finished goods are in stock on average one month.

Credit allowed by suppliers is one month. Credit allowed to debtors is two months. Time Lag in payment of wages is 1½ weeks. Lag in payment of overhead expenses is one month.

One-fourth of the output is sold against cash. Cash on hand and at bank is expected to be Rs.25,000.

You are required to prepare a statement showing the working capital needed to finance a level of activity of 1,04,000 units of production when current assets are to be taken at (a) cash costs only and (b) total value. Which method do you consider better?

You may assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

**Solution: a) When current assets are taken at cash costs only**

#### Statement of Working Capital Requirements

	Rs.	Rs.
<b>Current assets:</b>		
Cash at bank		25,000
Stock of raw materials for 8,000 Units @ Rs.80 per unit		6,40,000
Work in Progress:		
Material for 4,000 units @ Rs.80 per unit	3,20,000	
Labour and overheads equal to 4,000 units @ Rs.90 per unit	3,60,000	
		6,80,000
Finished goods, 8,000 units @ Rs.170 per unit		13,60,000
Sundry debtors: (at cost equivalent)		
Total sales in units (for 2 months)	16,000	
Less: Cash sales	4,000	
	12,000	
Credit sales 12,000 units @ Rs.170 per unit		20,40,000
<b>Total</b>		<b>47,45,000</b>

	Rs.	Rs.
<b>Less: Current Liabilities</b>		
Sundry creditors for 8,000 units @ Rs.80 per unit		6,40,000
Expenses outstanding:		
Wages on 3,000 units @ Rs.30 per unit	90,000	
Overheads on 8,000 units @ Rs.60 per unit	4,80,000	
		5,70,000
<b>Working capital required</b>		<b>35,35,000</b>

**Working Notes:**

- i. Sales per week will be 2,000 units i.e.,  $\frac{1,04,000}{52}$
- ii. The amount of depreciation included in overheads should be excluded for purposes of calculations made above. However, this could not be done in the absence of information on this point.

**b) When current assets are taken at total value**

	Rs.
<b>Statement of Working Capital Requirements</b>	
Working capital required as per statement (a) given above	35,35,000
<b>Add:</b> Profit on credit sales to debtors 12,000 units × Rs.30	3,60,000
	<b>38,95,000</b>

Therefore, Method – I for estimating working capital requirements is better compared to the cash costs method. One does not lay aside the amount of profit expected to be earned as working capital.

**Illu.9:** The management of Kinetic, desires to determine the quantum of working capital needed to finance programme formulated to be put into operation with effect from 1<sup>st</sup> April, 2000. The following percentages which various elements of cost bear to the selling price have been extracted from the proforma cost sheet.

**Materials 50%**  
**Labour 20%**  
**Overhead 10%**

Production in 2001 was 2,00,000 units and it is proposed to maintain the same during 2002.

Following further particulars are available.

1. Raw materials are expected to remain in stores for an average period of one month before issue to production.

2. Finished goods are to stay in the warehouse for two months on the average before being sold and sent to customer.
3. Each unit of production will be in process for one month on the average.
4. Credit allowed by suppliers from the date of delivery of materials is one month.
5. Debtors are allowed two months credit from the date of the sale of goods.
6. Selling price is Rs.9 per unit.
7. Sales and production follow a consistent pattern.

Prepare an estimate of working capital requirements.

**Solution:**

**Statement of Working Capital Requirements**

	Rs.	Rs.
<b>Current assets:</b>		
Stock of Raw Materials (1 month)		75,000
Stock of Finished goods (2 months)		
Materials (75,000 × 2)	1,50,000	
Labour (30,000 × 2)	60,000	
Overhead (15,000 × 2)	30,000	
		2,40,000
Work-in-progress (1 month)		
Materials	75,000	
Labour	30,000	
Overhead	15,000	
		1,20,000
Debtors (at cost Equivalent for 2 months)		
Materials (75,000 × 2)	1,50,000	
Labour (30,000 × 2)	60,000	
Overhead (15,000 × 2)	30,000	
		2,40,000
		6,75,000
<b>Less: Current Liabilities:</b>		
Creditors (one month)		75,000
<b>Working Capital required</b>		6,00,000

**Note:**

1. Calculation of amount locked up in materials, labour and overhead per month. Sales for one month =  $\text{Rs.}18,00,000 \times \frac{1}{12} = \text{Rs.}1,50,000$

**Illu.10: Ajanta Co. Ltd., Bangalore commenced its business in 2001 and has prepared the following projected Profit and Loss account.**



	Rs.	Rs.
<b>Sales</b>		<b>21,00,000</b>
<b>Cost of goods sold</b>		<b>15,30,000</b>
<b>Gross Profit</b>		<b>5,70,000</b>
<b>Administrative Expenses</b>	<b>1,40,000</b>	
<b>Selling Expenses</b>	<b>1,30,000</b>	
		<b>2,70,000</b>
<b>Profit Before Tax</b>		<b>3,00,000</b>
<b>Provision for taxation</b>		<b>1,00,000</b>
<b>Profit after tax</b>		<b>2,00,000</b>

The cost of goods sold has been arrived at as under:

<b>Materials used</b>	<b>8,40,000</b>
<b>Wages and Manufacturing Expenses</b>	<b>6,25,000</b>
<b>Depreciation</b>	<b>2,35,000</b>
	<b>17,00,000</b>
<b>Less on stock of finished goods (10% of goods produced not yet sold)</b>	<b>1,70,000</b>
	<b>15,30,000</b>

The figures given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in arrear; suppliers of material will extend 1 ½ months' credit; sales will be 20% for cash and the rest at two months' credit; 70% of the income tax will be paid in advance in quarterly instalments. The company wishes to keep Rs.80,000 in cash.

Prepare an estimate of the requirement of (i) working capital and (ii) Cash cost of working capital.

**Solution:**

**(i) Estimate of Working Capital Requirements**

	Rs.		Rs.	Rs.
<b>Current Liabilities</b>		<b>Current Assets</b>		
Sundry Creditors:		Finished Stock	84,000	
Raw Materials purchases	1,20,750	Wages	62,500	
Expenses and Wages	55,208	Depreciation	23,500	

	Rs.		Rs.	Rs.
Administrative and Selling Expenses	22,500	Work-in-Progress		1,70,000
Provision for taxation	30,000	Materials	1,26,000	
	2,28,458	Wages	37,500	
		Depreciation	14,100	1,77,600
Working capital required, (Current Assets – Current Liabilities) (Rs.8,68,000-2,28,458)	6,40,142	Raw material		1,61,000
		Sundry debtors		
		Materials	1,00,800	
		Wages	75,000	
		Depreciation	28,200	
		Admn. & Selling Expenses	36,000	
		Profit	40,000	
				2,80,000
		Cash in hand		80,000
	8,68,600			8,68,600

### (ii) Estimated Cash Cost of Working Capital

	Rs.
Working Capital as per statement given above	6,40,142
<b>Less:</b> Profit and Depreciation for which funds are not needed (See below)	1,05,800
Cash cost of working capital required	5,34,342

### Working Notes:

	Rs.
(i) Work-in-Progress:	
15% of material consumed for finished goods	1,26,000
15% of 40% of wages and expenses	37,500
15% of 40% of Depreciation	14,100
	1,77,600

- (ii) Raw materials will be  $\frac{1}{6}$  of total material consumed, i.e., Rs.8,40,000 for finished goods plus Rs.1,26,000 for work-in-progress.
- (iii) Sundry Debtors: 80% of two months' sales, i.e.,  $21,00,000 \times \frac{80}{100} \times \frac{2}{12}$  or Rs.2,80,000
- (iv) Individual items have been computed on that basis.

Creditors for raw material (Rs.8,40,000 + 1,26,000)  $\times \frac{1\frac{1}{2}}{12}$  or Rs.1,20,750

(v) Creditors for expenses: (Rs.6,25,000 + 37,500)  $\times \frac{1}{12}$  = Rs.55,208.

(vi) Creditors for administration and Selling expenses: Rs.2,70,000  $\times \frac{1}{2}$  = Rs.22,500.

(vii) Depreciation and profit included in the cost of current assets:

<b>Depreciation</b>	<b>Rs.</b>
Finished goods	23,500
Work-in-progress	14,100
Debtors	28,200
	65,800
Profit included in Debtors	40,000
Profit included in Debtors (including income-tax i.e., Rs.13,333)	1,05,800

### 9.3 SELF ASSESSMENT QUESTIONS

1. What factors should the finance manager take into consideration while estimating working capital needs of a firm?
2. Discuss the technique of forecasting working capital requirements of a firm.
3. How do you estimate the working capital under the cash cost method?

### 9.4 EXERCISES

1. From the following details, prepare an estimate of the requirement of working capital:

Production	60,000 units
Selling price per unit Rs.5	
Raw materials	60% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price
Materials in hand	2 months requirements
Production Time	1 month
Finished Goods in stores	3 months
Credit for Material	2 months
Credit allowed to customers	3 months
Average cash balance	Rs.20,000

Wages and overheads are paid at the beginning of the month following. In production all the required materials are charged in the initial stage and wages and overheads accrue evenly.

**[Ans.: Net Working capital requirement Rs.1,77,500]**

2. You are supplied with the following information in respect of XYZ Ltd. for ensuring year:

Production for the year	69,000 units
Finished goods in store	3 months
Raw material in store	2 months' consumption
Production process	1 month
Credit allowed by creditors	2 months
Credit given by Debtors	3 months
Selling price per unit	Rs.50
Raw material	50% of selling price
Direct wages	10% of selling price
Overheads	20% of selling price

There is a regular production and sales cycle and wages and overheads accrue evenly. Wages are paid in the next month of accrual. Material is introduced in the beginning of production cycle. You are required to find out its working capital requirement.

**[Ans.: Net Working Capital requirement Rs.17,53,750]**

3. From the following projections of XYZ & Company for the next year, you are required to work out the working capital required by the company.

	Rs.
Annual Sales	14,40,000
Cost of production including depreciation Rs.1,20,000	12,00,000
Raw material purchases	7,05,000
Monthly expenses	25,000

Anticipated opening stock of raw materials Rs.1,40,000

Anticipated closing stock of raw materials Rs.1,25,000

Inventory Norms	
Raw material	2 months
Work-in-Progress	15 days
Finished goods	1 month

The firm enjoys a credit of 15 days on its purchases, and allows one month's credit on its supplies. The company has received an advance of Rs.15,000 on sales orders. You may assume that production is carried on evenly throughout the year, and the minimum cash balance desired to be maintained is Rs.10,000.

**[Ans.: Net Working Capital Requirement Rs.3,35,625]**

4. The Board of directors of Nanak Engineering Company Private Limited requests you to prepare a statement showing the working capital requirements for a level of activity at 1,56,000 units of production.

The following information is available for your calculation.

	Per unit (Rs.)
Raw materials	90
Direct labour	40
Overheads	75
Total	205
Profit	60
Selling price per unit	265

- (i) Raw materials are in stock, on average, for one month.
- (ii) Materials are in process (50% complete) on average for 4 weeks.
- (iii) Finished goods are in stock, on average, for one month.
- (iv) Credit allowed by suppliers is one month.
- (v) Time lag in payment from debtors is 2 months.
- (vi) Average lag in payment of wages is 1½ weeks.
- (vii) Average lag in payment of overheads is one month.

20% of the output is sold against cash. Cash in hand and in bank is expected to be Rs.60,000. It is to be assumed that production is carried on evenly throughout the year, wages and overheads accrue similarly, and time period of 4 weeks is equivalent to a month.

**[Ans.: Net Working Capital Requirement Rs.71,51,500]**

5. AB Ltd. provides the following particulars relating to its working.

	Per unit
(i) Cost/Profit per unit	(Rs.)
Raw materials	84
Direct labour cost	36
Overheads (all variable)	36
Total cost	156
Profit	44
Selling Price	200
(ii) Average amount of back up stock	
Raw material	1 month
Work-in-progress (50% complete)	½ month
Finished goods	1 month
(iii) Credit allowed by suppliers	1 month
(iv) Credit allowed to customers	2 months
(v) Average time lag in the payments of:	
Wages	½ month
Overhead expenses	1½ months
(vi) Required cash in hand and at bank Rs.3,00,000	
(vii) 25% of the output is sold for cash	

For an expected sale of 1,00,000 units of AB Ltd., work out the working capital requirements assuming that production is carried on evenly throughout the year and wages and overheads accrue similarly.

**[Ans.: Net Working Capital Requirement Rs.32,75,000]**

6. Compute the estimated working capital requirement during the next year. (Assume 1 year = 360 days)

Average collection period = 60 days

Average payment period = 75 days

Inventory holding period = 90 days (calculated with reference to cost of goods sold)

Cash and bank balance = 2.5% of Sales.

Sales Rs.20,00,000, gross profit = 25%

Credit purchases –  $\frac{1}{3}$  of the cost of goods sold

The company expects 50% increase in sales during the next year.

**[Ans.: Net working capital requirement Rs.9,81,250]**

7. Bhanu Ltd. supplies you the following information from its annual budget.

- (i) Sales Rs.46.80 lakhs (78,000 units) 25% cash sales and balance in credit.
- (ii) Raw material cost = 60% of sales value
- (iii) Labour cost = Rs.6 per unit

- (iv) Variable overhead = Re.1 per unit  
 (v) Fixed overhead Rs.5 lakhs (including Rs.1,10,000 as depreciation)  
 (vi) Budgeted stock levels  
 Raw material = 3 weeks  
 Work in progress = 1 week (Material 100%, labour and overhead 50%)  
 Finished goods = 2 weeks  
 Debtors are allowed credit for 3 weeks  
 Creditors allow 4 weeks credit  
 Wages are paid bi-monthly i.e., by the 3<sup>rd</sup> week and by the 5<sup>th</sup> week for 1<sup>st</sup> and 2<sup>nd</sup> week and the 3<sup>rd</sup> and 4<sup>th</sup> weeks respectively.  
 Lag in payment of overhead = 2 weeks  
 Cash in hand required Rs.50,000  
 Allow 10% margin for contingencies.

Prepare the Working capital budget for a year for Bhanu Ltd., making the necessary assumptions you deem fit.

**[Ans.: Total working capital required Rs.4,21,300]**

8. You are a responsible officer in the Finance Department of Resco Ltd. The data given below are estimates relating to the year ending 31<sup>st</sup> March, 2007.

(i)	Opening balance	Rs.in lakhs
	Raw materials	410
	Work in progress	100
	Finished goods	450
	Receivables	600
	Payables	450
(ii)	Estimated closing balance	
	Raw materials	450
	Work in progress	120
	Finished goods	500
	Receivables	740
	Payable	420
(iii)	Raw materials purchased	1,600
(iv)	Manufacturing expenses	1,100
(v)	Selling, Administration and Financing costs	480
(vi)	Sales	4,000

You are required to compute the operating cycle period and prepare a statement showing the cash working capital of the company. Assume 360 days in the year.

**[Ans.: Cash working capital Rs.1,125 lakhs (approx); operating cycle period = 132 days]**

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**Chapter – 10****FUNDS FLOW ANALYSIS****Objectives :**

After going to this unit you should be able to

- understand the meaning of funds flow analysis
- find out the significance of funds flow statement
- go through the steps involved in the preparation of funds flow statement
- explain the schedule of changes in working capital

**Synopsis:**

- 10.1 Introduction**
- 10.2 Significance of Funds Flow Statement**
- 10.3 Financial Statements and Funds Flow Statements**
- 10.4 Preparation of Funds Flow Statement**
  - (i) Calculation of Funds from operations**
  - (ii) Schedule of Changes in Working Capital**
- 10.5 Self Assessment Questions**
- 10.6 Exercises**
- 10.7 Reference Books**

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**10.1 INTRODUCTION**

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Significant technique of financial analysis is 'Funds Flow Analysis'. It is designed to highlight changes in the financial condition of a business concern between two points of time which generally conform to beginning and ending financial statement dates. Funds Flow statement is also termed as a 'Statement of Sources and Applications of Funds', 'Statement of Changes in Working Capital', 'Statement of Changes in Financial Position,' 'Statement of Funds Supplied and Applied.' 'Statement of Funds Generated and Expended, 'Where Got and Where Gone Statement', Funds Statement.

Although financial statements supply useful information to the management and describe the nature of changes in ownership as a result of the period's productive and commercial activities, these statements fail to mirror the funds changes that have taken place over a given time span. They do not spell out the movement of funds. It is more important to describe the sources from which additional funds were derived and the uses to which these funds were put, because the ultimate success of a business enterprise depends on where got and where gone situations. The funds flow statement is, therefore, prepared to uncover the information which the financial statements fail to describe clearly.

### 10.1.1 Funds Flow Statement:

The following are the definitions of Funds Flow Statement.

**R.N. Anthony:** "The Funds Flow Statement describes the sources from which additional funds were derived and the uses to which these funds were put.

**R.A. Foulk:** "A Statement of Sources and Applications of Funds is a technical device designed to analyse the changes in the financial condition of a business between two dates."

**Bierman:** "It is a statement which highlights the underlying financial movements and explains the changes of working capital from one point of time to another."

Thus, funds flow statement is a report which summarises the events taking place between the two accounting periods. It spells out the sources from which funds were derived and the uses to which these funds were put. This statement is essentially derived from an analysis of the changes that have occurred in assets and liabilities items between two balance sheet dates. In this statement, only the net changes are shown so that the outcome of a transaction or of a series of transactions upon the financial condition of a business enterprise, is reflected more sharply.

### 10.1.2 Concept of Fund:

The term 'Funds' has a variety of meanings. Some people take funds synonymous to cash, and to them there is no difference between a Cash Flow Statement prepared on this basis and a Funds Flow Statement. While others include marketable securities and cash to constitute business funds. However, the most common definition of the term 'funds' is 'Working Capital' or 'Net Current Assets'. Thus the difference between Current Assets and Current Liabilities is called 'Funds'.

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## 10.2. SIGNIFICANCE OF FUNDS FLOW STATEMENT

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Funds Flow Statement is an important tool of financial analysis. The utility of the funds flow statement from the fact that it enables management, shareholders, investors, creditors and other interested in the enterprise to evaluate the uses of funds by the enterprise and to determine how these uses are financed.

### 10.2.1 Useful in Decision Making to the Management:

The Funds Flow Statement serves as valuable tool of financial analysis to the finance manager. It helps in understanding the financial stability and efficiency of financial policies of the management.

- i. Decisions relating to Financing:** With the help of the funds flow statement, the analyst can evaluate the financing pattern of the enterprise. An analysis of the major sources of funds in the past reveals what portion of the growth was financed internally and what portion externally. The statement is also meaningful in judging whether the company has grown at too fast a rate, credit has increased out of proportion to expansion in current assets and sales. If trade credit has increased at relatively higher rate, one would wish to evaluate the consequences of slowness in trade payments on the credit standing of the company and its ability of finance in future.
- ii. Decisions on Capitalisation:** The funds flow statement serves as handmaid to the finance manager in deciding the make-up of capitalization. Estimated uses of funds for new fixed assets, working capital, dividends and repayment of debt are made for each of several future years. Estimates are made of the funds to be provided by operations, and the balance must be obtained by borrowing or issuance of new securities. If the indicated amount of new funds required is greater than what the finance manager thinks possible to raise, then plans for new fixed asset acquisition and the dividend policies are re-examined so that the uses of funds can be brought into balance with the anticipated sources of financing them. In particular, funds statements are very useful in planning intermediate and long-term financing.
- iii. Reveals the reasons for financial difficulties:** The funds flow statement reveals clearly the causes for the financial difficulties of the company. The difficulties may be due to improper mix of short and long term sources, unnecessary accumulation of inventory of fixed assets etc. These can be found out by a careful study of the funds flow statement.
- iv. Other uses:** Funds Flow Statement is useful to the management in the following cases.
  - a. estimating the amount of funds needed for growth;
  - b. improving the rate of income on assets;
  - c. planning the temporary investment of idle funds;
  - d. securing additional working capital when needed;
  - e. securing economies in the centralised management of cash in organization whose management is decentralised;
  - f. planning the payment of dividend to shareholders and interest to creditors; and
  - g. easing the effects of insufficient cash balance.

#### 10.2.2 Useful as a control Device:

The funds flow statement also serves as a control device in that the statement compared with the budgeted figures will show to what extent the funds were put to use according to plan. This enables the finance manager to find out deviation from the planned course of action and take remedial steps to correct the deviations.

### 10.2.3 Useful to the external parties:

The outside parties can have a clear knowledge about the financial policies that the company has pursued. In the light of the information so supplied by the statement, the outsiders can decide whether or not to invest in the enterprise and on what terms funds have to be invested. The funds statement provides an insight into the financial operations of a business enterprise – an insight immensely valuable to the finance manager in analysing the past and future expansion plans of the enterprise and the impact of these plans on its liquidity. He can detect imbalances in the uses of funds and undertake remedial actions.

Thus, the funds statement draws the attention of the finance manager to problems which call for detailed analysis and immediate action. In view of these, funds flow statement is becoming more popular which management. Even some bank managers make it obligatory for the borrowers to furnish a funds statement along with their annual balance sheet. Now a days many Indian companies are publishing this statement in their annual reports although they are not obliged to do so under the Companies Act.

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## 10.3. FINANCIAL STATEMENTS AND FUNDS FLOW STATEMENT

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Financial Statement means the profit and loss account and the balance sheet. All the organizations more particularly, the company form of organisations is required to present the annual financial statements every year. The financial statements differ with the funds flow statement in many ways.

A Funds Flow Statement is a statement measuring the inflows and outflows of net working capital that result from any type of business activity between two dates. An Income Statement is a statement measuring the inflows and outflows of net assets of revenue nature that result from rendering goods or services to customers between two dates.

A Funds Flow Statement has become a useful tool in the hands of financial analyst. That is because the financial statements, i.e., Income Statement measures the flows restricted to transaction relating to rendering of goods and services to customers. It is not capable of any accurate information of the resources from operating unless the income data is converted into funds data. The Balance Sheet is merely a static statement of assets and liabilities as on a particular date. It does not depict the major financial transactions which have resulted in changes in Balance Sheet.

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## 10.4. PREPARATION OF FUNDS FLOW STATEMENT

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In order to prepare a Funds Statement, it is necessary to find out the “**sources**” and “**applications**” of funds.

**10.4.1 Sources of funds:**

1. **Funds from Operations:** Funds from operations is the only internal source of funds. Some adjustments are to be made in calculating funds from operations to the net profit given in the financial statement.

**Calculation of Funds from Operations:**

The following procedure is to be followed in the calculation of funds from operations.

1. **Start with the Net Profit given in the profit and loss account.**
2. **Add the following items to the Net Profit as they do not result in outflow of funds.**
  - i. Depreciation on fixed assets.
  - ii. Preliminary expenses or goodwill etc., written off.
  - iii. Contribution to debenture redemption fund, transfer to general reserve etc., if they have been deducted before arriving at the figure of net profit.
  - iv. Provision for taxation and proposed dividend. These may be taken as appropriations of profits or current liabilities for the purposes of Funds Flow Statement. Tax or dividends actually paid are taken as applications of funds. Similarly, interim dividend paid is shown as an application of funds. All these items will be added back to net profit if already deducted, to find funds from operations.
  - v. Loss on sale of fixed assets.
3. **Deduct the following items from Net Profit as they do not increase the funds.**
  - i. Profit on sale of fixed assets, since the full sale proceeds are taken as a separate source of funds and inclusion here will result in duplication.
  - ii. Profit on revaluation of fixed assets.
  - iii. Non-operating incomes such as dividend received or accrued rent. These items increase funds but they are non-operating incomes. They will be shown under separate heads as "sources of funds" in the Funds Flow Statement.

In case the Profit and Loss account shows 'Net Loss' this should be taken as an item which decreases the funds.

**Illu.1: Calculate funds from operation from the following profit and loss accounts for M/S Reliance & Co.**

Dr.	Profit and Loss Account		Cr.
	Rs.		Rs.
To Salaries	10,000	By Gross Profit	2,00,000
To Rent	3,000	By Profit on sale of Machine	5,000
To Commission	2,000	By Refund of Tax	3,000
To Discount Allowed	1,000	By Dividends received	2,000

	Rs.		Rs.
To Provision for Depreciation	14,000		
To Transfer to General Reserve	20,000		
To Provision for Tax	10,000		
To Loss on sale of Investments	5,000		
To Discount on issue of Debentures	2,000		
To Preliminary Expenses	3,000		
To Selling Expenses	20,000		
To Net Profit	1,20,000		
	<b>2,10,000</b>		<b>2,10,000</b>

**Solution:**

Funds from operations can be arrived at by starting with gross profit or net profit in a statement form. It can also be arrived at through accounting form. All the forms are given below:

**By taking Gross Profit as base**

Particulars	Rs.	Rs.
Gross Profit		2,00,000
<b>Less: Operating Expenses:</b>		
Salaries	10,000	
Rent	3,000	
Commission	2,000	
Discount allowed	1,000	
Preliminary Expenses	3,000	
Selling Expenses	20,000	39,000
Funds from operation (Source)		1,61,000

**By taking Net Profit as base:**

Particulars	Rs.	Rs.
Net Profit		1,20,000
<b>Add: Non-operating expenses and losses:</b>		
Provision for depreciation	14,000	
Transfers to General Reserve	20,000	
Provision for tax	10,000	
Loss on sale of investment	5,000	
Discount on issue of debentures	2,000	51,000
		1,71,000

<b>Less: Non-operating incomes and gains:</b>	Rs.	Rs.
Profit on sale of Machine	5,000	
Refund of tax	3,000	
Dividends received	2,000	10,000
<b>Funds from operation (Source)</b>		<b>1,61,000</b>

**Account Form:****Profit & Loss Adjustment a/c**

Particulars	Rs.	Particulars	Rs.
To Provision for depreciation	14,000	By Profit on sale of Machine	5,000
To Transfer to General Reserve	20,000	By Refund of tax	3,000
To Provision for tax	10,000	By Dividends received	2,000
To Loss on sale of Investments	5,000	By Funds from Operations (Source)	1,61,000
To Discount of issue of debentures	2,000	(Balancing figure)	
To Net Profit	1,20,000		
	<b>1,71,000</b>		<b>1,71,000</b>

**10.4.2 Applications of funds:**

The uses to which funds are put to are called 'applications of funds'. Following are some of the purposes for which funds may be used:

- i. **Purchase of fixed assets:** Purchase of fixed assets such as land, buildings, plant, machinery, long-term investments, etc., result in decrease of current assets without any decrease in current liabilities. Hence, there will be an outflow of funds. But in case shares or debentures are issued for acquisition of these fixed assets, there will be no outflow of funds.
- ii. **Payment of dividend:** Payment of dividends results in decrease of a fixed liability and therefore, it affects funds. Generally, recommendation of directors regarding declaration of dividend (i.e., proposed dividends) is simply taken as an appropriation of profits and not as an item affecting the working capital.
- iii. **Payment of fixed liabilities:** Payment or redemption of redeemable preference shares results in reduction of working capital and hence it is taken as an application of funds.
- iv. **Payment of tax liability:** Provision for taxation is generally taken as an appropriation of profits and not as an application of funds. But if the tax has been paid, it will be taken as an application of funds.

- v. **Increase in Working Capital:** Working capital is increased, if current assets increase and current liabilities decrease. Funds are required in both the cases i.e., in order to acquire more current assets or paying current liabilities and thus funds are said to have been applied or used.

#### 10.4.3 Statement of Changes in Working Capital:

The increase or decrease in working can be calculated by preparing the schedule of changes in working capital.

'Working capital represents the excess of current assets over current liabilities. Several items of all current assets and current liabilities are the components of working capital. In order to ascertain the working capital at the beginning and at the end of the period and to measure the increase or decrease therein it is necessary to prepare a Statement or Schedule of Changes in Working Capital'.

#### Statement of Changes in Working Capital

	Previous Year	Current Year	Effect on Working Capital	
			Increase	Decrease
	Rs.	Rs.	Rs.	Rs.
<b>Current Assets: (A)</b>				
Stock				
Debtors				
Cash				
Bank				
Bills Receivable				
Prepaid expenses				
Total (a)				
<b>Current Liabilities (B)</b>				
Creditors				
Bills payable				
Outstanding expenses				
Total (b)				
Working Capital: (A-B)				
Increase/Decrease in Working Capital				
Total				

While preparing a schedule of changes in working capital it should be noted that:



1.
  - a. an increase in current assets increases working capital;
  - b. a decrease in current assets decreases working capital;
  - c. an increase in current liabilities decreases working capital;
  - d. a decrease in current liabilities increases working capital;
  - e. an increase in current asset and increase in current liability does not affect working capital.
  - f. a decrease in current asset and decrease in current liability does not affect working capital.
  - g. Changes in fixed (non-current) assets and fixed (non-current) liabilities affects working capital.
  
2. The changes in all current assets and current liabilities are merged into one figure only – either an increase or decrease in working capital over the period for which funds statements has been prepared. If the working capital at the end of the period is more than the working capital at the beginning thereof, the difference is expressed as ‘increase in working capital’. On the other hand, if the working capital at the end of the period is less than at the commencement, the difference is called ‘decrease in working capital’.

**Current Assets:**

The expression ‘current assets’ denotes those assets which are continually on the move. Since they are constantly in motion, they are also known as the circulating capital of the business. These assets can or will be converted into cash during a complete operating cycle of the business. Current assets include:

- a. Stock-in-trade or inventories;
- b. Debtors;
- c. Payments in advance or prepaid expenses;
- d. Stores;
- e. Bills receivable;
- f. Cash at bank;
- g. Cash in hand;
- h. Work-in-progress, etc.

**Current Liabilities:**

Current liabilities’ are those liabilities which are to be paid in the near future, i.e., during a complete operating cycle of the business. Such liabilities include:

- a. Trade creditors.
- b. Accrued or outstanding expenses.
- c. Bills payable.
- d. Income-tax payable.
- e. Dividends declared;
- f. Bank overdraft.

**Note:** Some experts are of the opinion that as bank overdraft has a tendency to become more or less a permanent source of financing, and hence it need not be included among current liabilities.

**Illu.2:** Find out changes in working capital from the particulars of Amararaj Batteries Ltd., given below.

Capital and Liabilities	31-12-96	31-1-97	Assets	31-12-96	31-12-97
Share capital	3,00,000	3,75,000	Machinery	70,000	1,00,000
Trade Creditors	1,06,000	70,000	Stock	1,21,000	1,36,000
Profit & loss a/c	14,000	31,000	Debtors	1,81,000	1,70,000
			Cash	48,000	70,000
	4,20,000	4,76,000		4,20,000	4,76,000

**Solution:**

#### Schedule of changes in Working Capital

Particulars	1996 Rs.	1997 Rs.	Changes in the Working Capital	
			Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Cash	48,000	70,000	22,000	
Debtors	1,81,000	1,70,000		11,000
Stock	1,21,000	1,36,000	15,000	
Total Current Assets (A)	3,50,000	3,76,000		
<b>Current Liabilities:</b>				
Trade Creditors (B)	1,06,000	70,000	36,000	
Working Capital (A-B) (C)	2,44,000	3,06,000		
Net Increase in Working Capital (Application)				62,000
			73,000	73,000

## 10.5 SELF ASSESSMENT QUESTIONS

1. What is funds flow statement? Discuss the significance of funds flow statement as a tool of financial analysis.
2. Discuss in detail the methodology of preparing funds flow statement.
3. What is cash flow concept of the term 'funds'? How is funds flow statement prepared under this concept?
4. What do you understand by the working capital concept of the term 'funds'? How is funds flow statement drawn under this concept?

5. Examine the managerial uses of 'funds flow statement'?
6. What are the differences between Funds Flow Statement and Balance sheet?

## 10.6 EXERCISES

1. Calculate fund from operations from the information given below:

	Rs.
Net profit as per profit and loss a/c	8,00,000
Gain on sale of building	38,500
Goodwill written off	21,500
Loss on sale of Machine	13,500
Transfer to Reserve	1,15,500
Depreciation on fixed assets	1,25,000

**[Ans.: Funds from operations Rs.10,37,000]**

2. Calculate funds from operations from the following Profit and Loss a/c.

Dr.	P & L a/c		Cr.
	Rs.		Rs.
To Rent, Salaries paid	75,000	By Gross Profit	1,12,500
To Depreciation	17,500	By Gain on sale of land	15,000
To Loss on sale of Machine	1,000		
To Discount	50		
To Goodwill	5,000		
To Net Profit	28,950		
	1,27,500		1,27,500

**[Ans.: Funds from operations Rs.37,500]**

3. Calculate fund from operations from the following profit and loss account.

Profit and Loss account			
	Rs.		Rs.
To Expenses paid	3,00,000	By Gross Profit	4,50,000
To Depreciation	70,000	By Profit on sale of land	60,000
To Loss on sale of machine	4,000		
To Discount on shares	200		
To Goodwill	20,000		
To Net Profit	1,15,800		
	5,10,000		5,10,000

**[Ans.: Funds from operations Rs.1,49,800]**

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## Chapter – 11

# STATEMENT OF SOURCES AND APPLICATION OF FUNDS

**Objectives :**

After going to this unit you should be able to

- know various types of funds from operations
- find out the funds from long term loans
- explain funds from increase in share capital
- analyse the reasons for declining working capital

**Structure :****11.1 Statement of Sources and Application of Funds****11.2 Treatment of Adjustments****11.3 Self Assessment Questions****11.4 Exercises****11.5 Reference Books**

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**11.1 STATEMENT OF SOURCES AND APPLICATIONS OF FUNDS:**

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1. **Funds from Operations:** It is an internal sources of funds. Funds from operations is to be calculated as per the method stated above.
2. **Funds from long-term loans:** Long-term loans such as debentures, borrowings from financial institutions will increase the working capital and therefore, there will be inflow of funds. However, if the debentures have been issued in consideration of some fixed assets, there will be no inflow of funds.
3. **Sale of fixed assets:** Sale of land, buildings, long-term investments will result in generation of funds.
4. **Funds from increase in share capital:** Issue of shares for cash or for any other current asset or in discharge of a current liability is another source of funds. However, shares allotted in consideration of some fixed assets will not result in funds. However, it is recommended that such purchase of fixed assets as well as issue of securities to pay for them be revealed in Funds Flow Statement.

- 5. Decrease in Working Capital:** Decrease in working capital is the result of decrease in current asset or increase in current liabilities. In both the cases inflow of funds takes place. Suppose stock, a current asset reduces from Rs.15,000 to Rs.12,000 the decrease of Rs.3,000 is assumed to be due to the disposal of stock which undoubtedly brings funds into the business. In the same way increase in current liabilities means lesser payment, so retaining funds is also a source.

### Funds Flow Statement

	Rs.
<b>Sources of Funds:</b>	
Issue of shares	XXXXX
Issue of debentures	XXXXX
Long-term borrowings	XXXXX
Sale of Fixed assets	XXXXX
Operating profit	XXXXX
Decrease in Working capital*	XXXXX
<b>Total Sources</b>	XXXXX
<b>Applications of Funds:</b>	
Redemption of redeemable Preference shares	XXXXX
Redemption of debentures	XXXXX
Payment of other long-term loans	XXXXX
Purchase of fixed assets	XXXXX
Payment of dividends, taxes, etc.	XXXXX
Increase in working capital	XXXXX
<b>Total Uses</b>	XXXXX

\*Only one will be there.

The Funds Flow Statement can also be prepared in 'T' shape as shown below:

### Funds Flow Statement

Sources of Funds	Rs.	Applications of Funds	Rs.
Issue of Shares	xxx	Redemption of Redeemable Preference Shares	xxx
Issue of Debentures	xxx	Redemption of Debentures	xxx
Long-term Borrowings	xxx	Payment of other Long-term loans	xxx
Sale of Fixed Assets	xxx	Purchase of Fixed Assets	xxx
Operating Profit	xxx	Operating loss	xxx
Decrease in Working Capital*	xxx	Payment of Dividends taxes, etc.	xxx
		Increase in Working Capital*	xxx
	xxx		xxx

\*Only one will be there.

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## 11.2 TREATMENT OF ADJUSTMENTS

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Sometimes the factors affecting the funds from operations may not be given in the problems directly and there may be some hidden information. As such, some of the transactions have to be dug out using the additional information provided as adjustments to the balance sheet. These items include:

- a. Provision for tax;
- b. Proposed dividends;
- c. Sale or Purchase of fixed assets.

### 11.2.1 Provision for Tax:

It is a current liability. While preparing a Funds Flow Statement, there are two options available.

- (i) Provision for tax may be taken as a current liability. In such a case, when provision for tax is made the transaction involves profit and loss Appropriation Account which is a fixed liability and provision for tax account, which is a current liability. It will thus decrease the working capital. On payment of tax there will be no change in working capital because it will involve one current liability (i.e., Provision for Tax) and the other a current asset (i.e., Bank or Cash Balance).
- (ii) Provision for tax may be taken only as an appropriation of profit. It means that there will be no change in working capital position when provision for tax is made since it will involve two fixed liabilities, i.e., Profit and Loss Appropriation Account and Provision for Tax Account. However, when tax is paid, it will be taken as application of funds, because it will then involve 'provision for tax account' which has been taken as a fixed liability and 'bank account' which is a current asset.

### 11.2.2 Proposed dividends:

Whatever has been said about the "provision for tax" is also applicable to "proposed dividends". Proposed dividends can also be dealt with in two ways:

- (i) Proposed dividends may be taken as a current liability since declaration of dividends by the shareholders is simply a formality. Once the dividends are declared in the general meeting, they will have to be paid within 42 days of their declaration. In case proposed dividends are taken as a current liability, it will appear as one of the items decreasing working capital in the 'schedule of changes in working capital'. It will not be shown as an application of funds when dividend is paid later on.

- (ii) Proposed dividends may simply be taken as an appropriation of profits. In such a case proposed dividend for the current year will be added back to current year's profit in order to find out funds from operations if such amount of dividend has already been charged to profits. Payment of dividend will be shown as an "application of funds".

### 11.2.3 Sale or Purchase of fixed assets:

For arriving at the final figure we have to prepare the asset account, depreciation account assets sold or purchased account. This can be illustrated well with the following extracts of the balance sheet.

<b>Balance Sheet</b>			
Liabilities	Assets	31 <sup>st</sup> March 2001	31 <sup>st</sup> March 2002
	Plant & Machinery	2,00,000	2,50,000
	Less: Accumulated depreciation	40,000	60,000
	Net value	1,60,000	1,90,000

#### Adjustment:

During the year, a machinery costing Rs.50,000 over which depreciation accumulated to Rs.12,000 was sold for Rs.30,000. You are required to find out the value of machinery purchased and profit/loss on sale.

#### Solution:

In the absence of additional information, one would have come to the superfluous conclusion that additional machinery purchased during the year was Rs.50,000 and that the depreciation charged during the year was Rs.20,000. The real position can be ascertained if the following three accounts are prepared.

**(i) Asset account (Plant and Machinery Account):** This is maintained at the cost price. The account is debited with the cost of the machinery as at the beginning of the year (i.e., balance in the machinery account at the beginning) and with purchases during the year. It is credited with the cost price of the machinery sold and with cost of the machinery as at the close of the year (i.e., balance in the machinery account at the end). In the problems either the total value of purchases during the year may be missing or the cost of the machinery sold may be missing. The missing figure can be found out by feeding the account with the available information and balancing it.

**(ii) Depreciation account:** Depreciation is not a source of funds. Source of funds is constituted by those transactions, where one account belongs to current category and the other



belongs to non-current category. In case of depreciation both items belong to non-current category, as such it does not make any change in the funds and is not a source of funds. In support of the answer journal entry regarding depreciation is presented herewith.

Date	Particulars	L.F.	Debit	Credit
i.	Depreciation a/c Dr. To Fixed Assets a/c		xxx	xxx
ii.	Profit and Loss a/c Dr. To Depreciation a/c		xxx	xxx
	(OR) Profit and Loss a/c Dr. To Fixed Assets a/c		xxx	xxx

Profit and Loss a/c is a non-current liability and fixed assets are non-current assets. As both of them belong to non-current category, so depreciation is not a source of funds.

**(iii) Asset sold account:** The purpose of preparing this account is to ascertain the profit/loss made on sale of the asset. The account is debited with the cost of the assets sold (transferred from the Asset account). It is credited with the accumulated depreciation on the asset sold (transferred from depreciation account). It is also credited with the money received on sale on the machinery. The difference between the two sides would be profit (if credit balance) or loss (if debit balance).

#### Machinery Account

	Rs.		Rs.
To Opening Balance	2,00,000	By Machinery sold a/c	50,000
To Bank (Purchases)	1,00,000	By Closing Balance	2,50,000
	3,00,000		3,00,000

#### Depreciation Account

	Rs.		Rs.
To Machinery sold a/c	12,000	By Opening Balance	40,000
To Closing Balance	60,000	By P & L Account (provision)	32,000
	72,000		72,000

#### Machinery sold Account

	Rs.		Rs.
To Machinery a/c	50,000	By Depreciation	12,000
		By Bank (Sales)	30,000
		By P & L a/c (Loss)	8,000
	50,000		50,000

**Working Notes:**

- i. Depreciation charged during the year is Rs.32,000 (to be added back to profit to arrive at funds from operations)
- ii. Loss on sale machinery is Rs.8,000 (to be added back to profit to arrive at funds from operations).
- iii. Sale of machinery Rs.30,000 a source of funds.
- iv. Purchase of machinery Rs.1,00,000 use of funds.

**Illu.1: From the following balance sheets of Gudivada Ltd., you are required to prepare Funds (working capital) flow statement for the year ending 31<sup>st</sup> Dec. 2002:**

Liabilities	31.12.01	31.12.02	Assets	31.12.01	31.12.02
	Rs.	Rs.		Rs.	Rs.
Share capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Provision for bad debts	700	800	Stock	49,200	42,700
Creditors	10,360	11,840	Land	20,000	30,000
Profit & Loss A/c	10,040	10,560	Goodwill	10,000	5,000
	<b>1,03,100</b>	<b>1,03,200</b>		<b>1,03,100</b>	<b>1,03,200</b>

**Additional information:**

- (a) Dividends paid Rs.3,500
- (b) Land is purchased during the year Rs.10,000.

**Solution:****Schedule of changes in the Working Capital**

Particulars	2001 Rs.	2002 Rs.	Changes in the Working Capital	
			Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Cash	9,000	7,800		1,200
Debtors	14,900	17,700	2,800	
Stock	49,200	42,700		6,500
Total Current Assets (A)	73,100	68,200		
<b>Current Liabilities:</b>				
Trade Creditors	10,360	11,840		1,480
Reserve for doubtful debts	700	800		100
Total current liabilities (B)	11,060	12,640		
Working Capital (A-B)	62,040	55,560		
Net decrease in Working Capital (Source)			6,480	
			9,280	9,280

Dr.		<b>Land a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		20,000	By Balance b/d		20,000
To Bank (application)		10,000			
		30,000			30,000

Dr.		<b>Goodwill a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		10,000	By Profit & Loss adjustment a/c (Balancing Figure)		5,000
			By Balance c/d		5,000
		10,000			10,000

Dr.		<b>Share Capital a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		74,000	By Balance b/d		70,000
			By Bank (Source)		4,000
			(Balancing Figure)		
		74,000			74,000

Dr.		<b>Debentures a/c</b>		Cr.	
		Rs.			Rs.
To Bank (application) (Balancing Figure)		6,000	By Balance b/d		12,000
To Balance c/d		6,000			
		12,000			12,000

Dr.		<b>Profit &amp; Loss Adjustment a/c</b>		Cr.	
		Rs.			Rs.
To Goodwill		5,000	By Balance b/d		10,040
To Bank (application)		3,500	By Funds from Operation (Source)		9,020
To Balance c/d		10,560	(Balancing Figure)		
		19,060			19,060

**Funds flow statement for the year ended 31.12.2002**

Sources	Rs.	Applications	Rs.
Decrease in Working Capital	6,480	Purchase of land	10,000
Issue of share capital	4,000	Redemption of debentures	6,000
Funds from operation	9,020	Payment of Dividends	3,500
	19,500		19,500

**Illu.2: Prepare Funds Flow Statement from the following data:-  
Comparative Balance Sheets**

(Rs.in '000)		
Assets	2001	2002
Land	960	800
Plant	600	680
Patents	40	36
Closing stock	600	688
Debtors	400	740
Cash	1600	1776
	<b>4200</b>	<b>4720</b>
<b>Liabilities &amp; Capital</b>		
Share Capital	1400	1740
Reserves & Surplus	600	780
Debentures	880	880
Discount on Debentures	(80)	(72)
S. Creditors	1200	1280
Provision for Depre.	200	112
	<b>4200</b>	<b>4720</b>

**Other information:**

- (1) Net profit for the year Rs.4,00,000
- (2) Dividend paid Rs.80,000
- (3) Shares issued for cash Rs.2,00,000 and for Bonus Rs.1,40,000.
- (4) Depreciation charged for the year Rs.32,000.
- (5) A building was sold for Rs.56,000 its cost and book value being Rs.1,60,000 and Rs.40,000.

**Solution:**

**Schedule of changes in Working Capital**

(Rs.in '000)				
Particulars	2001 Rs.	2002 Rs.	Changes in the Working Capital	
			Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Stock	600	688	88	
Debtors	400	740	340	
Cash	1,600	1,776	176	
Total Current Assets (A)	2,600	3,204		
<b>Current Liabilities:</b>				
Creditors (B)	1,200	1,280		80
Working Capital (A-B)	1,400	1,924		
Net increase in Working Capital (application)			604	524
			604	604

Dr.		<b>Land a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	960	By Bank (Source)			56
To Profit & Loss adjustment a/c (56,000-40,000)	16	By Provision for depreciation (1,60,000-40,000)			120
		By Balance c/d			800
	976				976

Dr.		<b>Goodwill a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	600	By Balance c/d			680
To Bank (application) (Balancing Figure)	80				
	680				680

Dr.		<b>Patents a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	40	By Profit & Loss adj. a/c (Balancing Figure)			4
		By Balance c/d			36
	40				40

Dr.		<b>Share Capital a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Balance c/d	1,740	By Balance b/d			1,400
		By Bank (Source)			200
		By Profit & Loss adj. a/c (Stock dividend) (Bonus Shares)			140
	1,740				1,740

Dr.		<b>Discount on debentures a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	80	By Profit & Loss adj. a/c (Balancing Figure)			8
		By Balance c/d			72
	80				80

Dr.		<b>Provision for depreciation a/c</b>		Cr.	
	Rs.		Rs.		Rs.
To Land	120	By Balance b/d			200
To Balance c/d	112	By Profit & Loss adj. a/c (Balancing Figure)			32
	232				232

Dr.	<b>Reserves &amp; Surplus a/c (P.L.A. a/c)</b>		Cr.
	Rs.		Rs.
To Patents written off	4	By Balance b/d	600
To Share capital (div.)	140	By Profit on sale of buildings	16
To Discount on debentures	8	By funds from operation (Source)	
		(Balancing Figure)	428
To Provision for depreciation	32		
To Dividend (application)	80		
To Balance c/d	780		
	1,044		1,044

**Funds flow statement for the year ended 31.12.2002**

Sources	Rs.	Applications	Rs.
Sale of building	56	Increase in working capital	524
Issue of share capital	200	Purchase of plant	80
Funds from operation	428	Payment of Dividend	80
	684		684

**Illu.3: Statement of retained earnings is as follows:**

		Rs.
<b>Balance of retained earnings-January, 1996</b>		<b>4,17,280</b>
<b>Add: NP after tax for 1996</b>		<b>8,32,660</b>
<b>IT refund</b>		<b>28,430</b>
		<b>12,78,370</b>
<b>Less: Dividends</b>		<b>5,85,210</b>
<b>Write off investments</b>		<b>1,22,300</b>
<b>Loss on sale of plant</b>		<b>13,340</b>
		<b>7,20,850</b>
<b>Balance of retained earnings – Dec. 1996</b>		<b>5,57,520</b>

Depreciation charged for current year was Rs.79,520. Plant with a book value of Rs.43,210 was sold in February, 1996. Plant properties were increased during the year 1996 at a cost of Rs.2,31,900. This was financed by bonds. Preference shares were redeemed for Rs.76,400. Prepare Funds Flow Statement.

**Solution:**

Dr.	Memorandum Plant a/c		Cr.
	Rs.		Rs.
To Bonds	2,31,900	By Profit & Loss adjustment a/c (Loss on sale)	13,340
		By Profit & Loss adj. a/c (depreciation)	79,520
		By Bank (Source) (Sale) (43,210 – 13,340)	29,870
		By Balance c/d (Balancing Figure)	1,09,170
	2,31,900		2,31,900

Dr.	Bonds a/c		Cr.
	Rs.		Rs.
To Balance c/d	2,31,900	By Plant & Machinery	2,31,900
	2,31,900		2,31,900

Redemption of Preference share capital (application) Rs.76,400.

Dr.	Retained Earnings a/c		Cr.
	Rs.		Rs.
To Plant & Machinery (loss)	13,340	By Balance b/d	4,17,280
To Plant & Machinery (depreciation)	79,520	By Income tax refund (Source)	28,430
To Dividend (application)	5,85,210	By Funds from operation (Source)	9,12,180
		(Balancing Figure)	
To Investment written off	1,22,300		
To Balance c/d	5,57,520		
	13,57,890		13,57,890

**Funds flow statement for the year ended 31.12.96**

Sources	Rs.	Applications	Rs.
Sale of Plant & Machinery	29,870	Redemption of Pref. Share capital	76,400
Refund of income tax	28,430	Payment of dividend	5,85,210
Funds from operation	9,12,180	Increase in working capital (Balance in Figure)	3,08,870
	9,70,480		9,70,480

**Illu.3: Following are the summarised Balance Sheets of Vijaya Ltd., as on 31<sup>st</sup> December 2001 and 31<sup>st</sup> December 2002:**

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share capital	2,00,000	2,50,000	Land and Buildings	2,00,000	2,40,000
General Reserve	40,000	70,000	Machinery	1,80,000	1,30,000
Profit and Loss a/c	32,000	39,000	Stock	1,00,000	1,26,000
Bank loan (long-term)	1,60,000	40,000	Sundry Debtors	80,000	64,000
Sundry Creditors	1,50,000	1,30,000	Cash at Bank	52,000	9,000
Provision for Taxation	30,000	40,000			
	6,12,000	5,69,000		6,12,000	5,69,000

**Additional information is an under:**

- During the year ended 31<sup>st</sup> December 2002, Dividend of Rs.42,000 was paid.
- Assets of another company were purchased for a consideration of Rs.50,000 payable in the issue of shares. There were Land and Buildings of Rs.25,000 and Stock Rs.25,000.
- Depreciation written off on Machinery is Rs.12,000 and Land and Buildings is Rs.22,500. Loss on sale of Machinery amounting to Rs.12,000 was written off to General Reserve.
- Income tax paid during the year was Rs.35,000.
- New additions to Buildings were for Rs.37,500.

**You are required to prepare a statement showing sources and application of funds from the above mentioned date.**

**Solution:**

**Schedule of changes in Working Capital**

Particulars	2001 Rs.	2002 Rs.	Changes in the Working Capital	
			Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Stock	1,00,000	1,26,000	26,000	
Debtors	80,000	64,000		16,000
Cash at bank	52,000	9,000		43,000
Total Current Assets (A)	2,32,000	1,99,000		



<b>Current Liabilities:</b>	Rs.	Rs.	Rs.	Rs.
Creditors	1,50,000	1,30,000	20,000	
Provision for taxation	30,000	40,000		10,000
<b>Total Current Liabilities (B)</b>	<b>1,80,000</b>	<b>1,70,000</b>		
Working Capital (A-B)	52,000	29,000		
Decrease in Working Capital (Source)			23,000	
			<b>69,000</b>	<b>69,000</b>

Dr.		<b>Business Purchase a/c</b>		Cr.	
	Rs.				Rs.
To Share Capital	50,000	By Land & Buildings			25,000
		By Stock			25,000
	50,000				50,000

Dr.		<b>Machinery a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	1,80,000	By Profit & Loss adjustment a/c (depreciation)			12,000
		By General Reserve (Loss)			12,000
		By Bank (Source) (Balance in Figure)			26,000
		By Balance c/d			1,30,000
	1,80,000				1,80,000

Dr.		<b>Land &amp; Buildings a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	2,00,000	By Profit & Loss adjustment a/c (depreciation)			22,500
To Business Purchase	25,000	By Balance c/d			2,40,000
To Bank	37,500				2,62,500
	2,62,500				2,62,500

Dr.		<b>Share Capital a/c</b>		Cr.	
	Rs.				Rs.
To Balance c/d	2,50,000	By Balance b/d			2,00,000
		By Business Purchase			50,000
	2,50,000				2,50,000

Dr.		<b>General Reserve a/c</b>		Cr.	
		Rs.			Rs.
To Machinery	12,000	By Balance b/d			40,000
To Balance c/d	70,000	By Profit & Loss adjustment a/c (Balance in Figure)			42,000
	82,000				82,000

Dr.		<b>Bank Loan a/c</b>		Cr.	
		Rs.			Rs.
To Bank (application) (Balance in Figure)	1,20,000	By Balance b/d			1,60,000
To Balance c/d	40,000				
	1,60,000				1,60,000

Dr.		<b>Profit &amp; Loss Adjustment a/c</b>		Cr.	
		Rs.			Rs.
To Machinery (depreciation)	12,000	By Balance b/d			32,000
To Land & Buildings (depreciation)	22,500	By Funds from operation (source) (Balancing Figure)			1,25,000
To General Reserve	42,000				
To Dividend (application)	42,000				
To Balance c/d	39,000				
	1,57,000				1,57,000

**Funds flow statement for the year ended 31.12.2002**

Sources	Rs.	Applications	Rs.
Decrease in Working Capital	23,000	Purchase of Land & Buildings	37,500
Sale of Machinery	26,000	Repayment of bank loan	1,20,000
Funds from operation	1,25,500	Payment of dividend	42,000
Issue of Capital (Stock)	25,000		
	1,99,500		1,99,500

**Illu.4: The following are the summarised balance sheets of Akila Ltd. on 31<sup>st</sup> December, 2000 and 31<sup>st</sup> December, 2001:**

Liabilities	2000 Rs.	2001 Rs.
Share Capital	12,00,000	16,00,000
Debentures	4,00,000	6,00,000
Profit and Loss Account	2,50,000	5,00,000
Creditors	2,30,000	1,80,000

	Rs.	Rs.
<b>Provision for:</b>		
Bad and doubtful debts	12,000	6,000
Depreciation on land and buildings	40,000	48,000
Depreciation on plant and machinery	60,000	70,000
	<b>21,92,000</b>	<b>30,04,000</b>
<b>Assets</b>		
Plant and Machinery (at cost)	8,00,000	12,90,000
Land and Buildings (at cost)	6,00,000	8,00,000
Stock	6,00,000	7,00,000
Preliminary expenses	14,000	12,000
Bank	40,000	80,000
Debtors	1,38,000	1,22,000
	<b>21,92,000</b>	<b>30,04,000</b>

**Additional information:**

(a) During the year, a part of the machinery, costing Rs.1,40,000 (accumulated depreciation thereon Rs.4,000) was sold for Rs.12,000.

(b) Dividend for Rs.1,00,000 was paid during the year.

**Ascertain:**

(i) Change in working capital for 2001.

(ii) Funds Flow Statement for 2001.

**Solution:****Schedule of changes in Working Capital**

Particulars	2000 Rs.	2001 Rs.	Changes in the Working Capital	
			Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Stock	6,00,000	7,00,000	1,00,000	
Bank	40,000	80,000	40,000	
Debtors	1,38,000	1,22,000		16,000
Total Current Assets (A)	7,78,000	9,02,000		
<b>Current Liabilities:</b>				
Creditors	2,30,000	1,80,000	50,000	
Provision for doubtful debts	12,000	6,000	6,000	
Total Current Liabilities (B)	2,42,000	1,86,000		
Working Capital (A-B)	5,36,000	7,16,000		
Net Increase in Working Capital (Application)				1,80,000
			1,96,000	1,96,000

Dr.		<b>Plant &amp; Machinery a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	8,00,000	By Provision for depreciation			4,000
To Bank (application)	6,30,000	By Bank (Source)			12,000
(Balancing Figure)		By Profit & Loss adjustment a/c (loss)			1,24,000
		By Balance c/d			12,90,000
	14,30,000				14,30,000

Dr.		<b>Land &amp; Buildings a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	6,00,000	By Balance c/d			8,00,000
To Bank (application)	2,00,000				
(Balancing Figure)					
	8,00,000				8,00,000

Dr.		<b>Preliminary Expenses a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	14,000	By Profit & Loss adjustment a/c (Balance in Figure)			2,000
		By Balance c/d			12,000
	14,000				14,000

Dr.		<b>Share Capital a/c</b>		Cr.	
	Rs.				Rs.
To Balance c/d	16,00,000	By Balance b/d			12,00,000
		By Bank (Source)			4,00,000
		(Balance in Figure)			
	16,00,000				16,00,000

Dr.		<b>Debentures a/c</b>		Cr.	
	Rs.				Rs.
To Balance c/d	6,00,000	By Balance b/d			4,00,000
		By Bank (Source)			2,00,000
		(Balance in Figure)			
	6,00,000				6,00,000

Dr.		<b>Depreciation on Buildings a/c</b>		Cr.	
	Rs.				Rs.
To Balance c/d	48,000	By Balance b/d			40,000
		By Profit & Loss adjustment a/c (Current year provision) (Balance in Figure)			8,000
	48,000				48,000

Dr.		<b>Provision for depreciation on Plant &amp; Machinery a/c</b>		Cr.	
	Rs.				Rs.
To Plant & Machinery	4,000	By Balance b/d			60,000
To Balance c/d	70,000	By Profit & Loss adjustment a/c (Balance in Figure) (Current year Provision)			14,000
	74,000				74,000

Dr.		<b>Profit &amp; Loss Adjustment a/c</b>		Cr.	
	Rs.				Rs.
To Plant & Machinery	1,24,000	By Balance b/d			2,50,000
To Preliminary Expenses	2,000	By Funds from operation (source)			4,98,000
To Depreciation on Land & Buildings	8,000				
To Depreciation on Plant & Machinery	14,000				
To Dividend (application)	1,00,000				
To Balance c/d	5,00,000				
	7,48,000				7,48,000

**Funds flow statement for the year ended 31.12.2001**

Sources	Rs.	Applications	Rs.
Sale of Machinery	12,000	Increase in working capital	1,80,000
Issue of share capital	4,00,000	Purchase of machinery	6,30,000
Issue of debentures	2,00,000	Purchase of land & Buildings	2,00,000
Funds from operation	4,98,000	Payment of dividend	1,00,000
	11,10,000		11,10,000

### 11.3 SELF ASSESSMENT QUESTIONS

1. Explain the procedure of preparing a funds flow statement.
2. Revenue expenditure reduces working capital where as the charging of depreciation does not reduce, explain?
3. "Retained earnings and the allowance for depreciation are the two primary sources of funds" comment?
4. Suggest some items which may be added back to net profit to get the total funds provided by profitable operations for fund flow statement? Illustrate your answer.
5. How would you treat the following items for funds flow statement.
  - (a) Provision for tax
  - (b) Proposed dividend
  - (c) Interim dividend
  - (d) Investments.
6. Explain the terms Funds and Flow of fund. Examine the impact of the following transactions on flow of fund.
  - (a) Cash collected from debtors
  - (b) Purchase of buildings by issue of debentures
  - (c) Old furniture value which is Rs.4,500 discarded and written off to profit and loss account.

### 11.4 EXERCISES

1. The following are the Balance Sheets of Singh Company from which you are asked to prepare Funds Flow Statement:

Assets	31-12-2006 Rs.	31-12-2007 Rs.
Cash	35,000	75,000
Debtors	98,000	90,000
Stock	87,000	1,20,000
Investments	15,000	10,000
Land	20,000	30,000
	2,55,000	3,25,000
Liabilities		
Creditors	50,000	45,000
Bills payable	20,000	35,000
Promissory Notes	---	20,000
Share Capital	1,25,000	1,50,000
Retained Earnings	60,000	75,000
	2,55,000	3,25,000

**[Ans.: Increase in working capital Rs.55,000; Funds from operations Rs.15,000; Funds Flow Statement Rs.65,000]**

2. From the following Balance Sheet of a firm, prepare funds flow statement:

Liabilities	31-12-2006	31-12-2007	Assets	31-12-2006	31-12-2007
	Rs.	Rs.		Rs.	Rs.
Equity Share Capital	2,40,000	3,60,000	Buildings	1,66,200	3,39,600
Share premium	24,000	36,000	Machinery	1,06,800	1,53,900
General Reserve	18,000	27,000	Furniture	7,200	4,500
P & L a/c	58,500	62,400	Stock	66,300	78,000
8% Debentures	---	78,000	Debtors	1,09,500	1,17,300
Provision for taxes	29,400	32,700	Bank	14,400	12,000
Creditors	1,00,500	1,09,200			
	4,70,400	7,05,300		4,70,400	7,05,300

Provide depreciation on Machinery Rs.38,400; on Furniture Rs.1,200.

**[Ans.: Increase in Working Capital Rs.5,100; Funds from operations Rs.52,500; Funds flow Statement Rs.2,64,000]**

3. The following are the summarised balance sheet of Aravinda Stores on 31<sup>st</sup> December, 2006 and 31<sup>st</sup> December, 2007.

Liabilities	2006	2007	Assets	2006	2007
	Rs.	Rs.		Rs.	Rs.
Creditors	18,000	20,500	Cash	2,000	1,800
Bank Loan (long term)	15,000	22,500	Debtors	17,500	19,200
Capital	74,000	74,500	Stock	12,500	11,000
			Land	10,000	15,000
			Buildings	25,000	27,500
			Machinery	40,000	43,000
	1,07,000	1,17,500		1,07,000	1,17,500

During 2010, the proprietor withdrew for personal use Rs.13,000. Provision for depreciation on machinery stood at Rs.13,500 on 31<sup>st</sup> December, 2009 and at Rs.18,000 on 31<sup>st</sup> December, 2010. Prepare Funds Flow Statement.

**[Ans.: Decrease in working capital Rs.2,500; Funds from operations Rs.18,000; Funds Flow Statement Rs.28,000]**

4. Balance Sheet of Mrs.Ram and Shyam as on 1-1-2007 and 31-12-2007 were as follows.

Liabilities	1-1-2007 (Rs.)	31-12-2007 (Rs.)
Creditors	40,000	40,000
Mr.Ram's Loan	25,000	---
Loan from Bank	40,000	50,000
Capital	1,25,000	1,57,000
	<b>2,30,000</b>	<b>2,47,000</b>
Assets	1-1-2007 (Rs.)	31-12-2007 (Rs.)
Cash	10,000	7,000
Debtors	30,000	50,000
Stock	35,000	25,000
Machinery	80,000	55,000
Land	40,000	50,000
Buildings	35,000	60,000
	<b>2,30,000</b>	<b>2,47,000</b>

During the year a machine costing Rs.10,000 (accumulated depreciation Rs.3,000) was sold for Rs.5,000. The provision for depreciation against machinery as on 1-1-2010 Rs.25,000 and on 31-12-2010 Rs.40,000. Net Profit for they year 2010 amounted Rs.45,000.

You are required to prepare a funds flow statement.

**[Ans.: Net increase in working capital Rs.7,000; Funds from operations Rs.65,000; Funds flow statement Rs.80,000]**

5. From the following Balance Sheets of XL Ltd., prepare a statement of sources and application of funds.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	1,00,000	1,25,000	Land	1,00,000	95,000
General Reserve	25,000	30,000	Plant	75,000	84,500



Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Profit & Loss A/c	15,250	15,300	Stock	50,000	37,000
Bank loan	35,000	20,000	Debtors	40,000	32,100
Creditors	75,000	47,600	Cash	250	300
Provision for taxation	15,000	17,500	Goodwill	---	6,500
	2,65,250	2,55,400		2,65,250	2,55,400

## Additional Information:

- Dividend of Rs.11,500 was paid.
- Depreciation written off on plant Rs.9,000
- Income tax paid Rs.16,500

**[Ans.: Increase in working capital Rs.19,050; Funds from operation Rs.30,550; Funds Flow Statement Rs.55,550]**

6. From the following balance sheets of a company as on 31<sup>st</sup> December, 2005 and 2006, prepare
- Statement showing changes in the working capital; and
  - funds flow statement.

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share Capital	20,000	25,000	Land & Buildings	20,000	19,000
General reserve	5,000	6,000	Plant	15,000	17,400
Profit & Loss a/c	3,050	3,060	Stock	10,000	7,400
Loan from bank (short term)	7,000	---	Sundry debtors	8,000	6,420
Sundry creditors	15,000	13,520	Cash in hand	50	60
Provision for taxes	3,000	3,500	Cash at bank	---	800
	53,050	51,080		53,050	51,080

## Additional Information:

- Depreciation on plant written off in 2010 – Rs.1,400
- Dividends paid in 2010 – Rs.2,000
- Provision for taxes during this year – Rs.2,500

**[Ans.: Increase in working capital Rs.4,610; Funds from operations Rs.5,410; Funds Flow Statement Rs.10,410]**

7. The following are the summarised Balance Sheets of X Ltd., on 31<sup>st</sup> December, 2006 and 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	6,00,000	8,00,000	Plant & Machinery (at cost)	4,00,000	6,45,000
Debentures	2,00,000	3,00,000	Land & buildings (at cost)	3,00,000	4,00,000
Profit & Loss a/c	1,25,000	2,50,000	Stock	3,00,000	3,50,000
Creditors	1,15,000	90,000	Bank	20,000	40,000
Provision for bad and doubtful debts	6,000	3,000	Preliminary expenses	7,000	6,000
Provision for Depreciation On land & buildings	20,000	24,000	Debtors	69,000	61,000
On Plant and Machinery	30,000	35,000			
	10,96,000	15,02,000		10,96,000	15,02,000

**Additional Information:**

- a. During the year, a part of machinery costing Rs.70,000 (accumulated depreciation there on Rs.2,000) was sold for Rs.6,000
- b. Dividends of Rs.50,000 were paid during the year.

You are required to ascertain:

- i. Changes in working capital for 2010.
- ii. Funds flow statement.

**[Ans.: Increase in working capital Rs.90,000; Funds from operations Rs.2,49,000; Funds Flow Statement Rs.5,55,000]**

8. From the following balance sheets as on 31<sup>st</sup> March, 2006 and 2007, prepare funds flow statements of Arogya Ltd.

9.

	2006 Rs.	2007 Rs.		2006 Rs.	2007 Rs.
Share capital	55,000	87,000	Machinery (Cost)	42,000	60,000
Profit & Loss a/c	11,250	25,000	Stock	2,500	3,000
Debentures	12,500	18,000	Bank	2,220	3,330
Creditors	2,000	9,200	Debtors	2,000	1,000
Depreciation on Buildings	2,000	3,000	Investments	20,000	50,500
Machinery	3,000	4,000	Buildings	15,000	28,000
			Goodwill	2,030	370
	85,750	1,46,200		85,750	1,46,200

**Additional Information:**

- Dividend Rs.15,000 declared and paid during the year.
- A part of the machinery costing Rs.11,000 (depreciation provided on this was Rs.2,500) was sold for Rs.6,000

**[Ans.: Decrease in Working Capital Rs.6,950; Funds from operations Rs.37,410; Funds Flow Statement Rs.87,500]**

10. Following are the Balance Sheets of a company:

Liabilities	2005 Rs.	2006 Rs.	Assets	2006 Rs.	2007 Rs.
Equity Capital	50,000	53,000	Cash	20,000	25,000
Long-term debt	14,000	13,000	Accounts Receivable	24,000	27,000
Retained Earnings	28,000	37,000	Inventories	31,000	32,000
Accumulated Depreciation	21,000	25,000	Other Current Assets	8,000	7,000
Sundry Creditors	20,000	21,000	Fixed Assets	50,000	58,000
	1,33,000	1,49,000		1,33,000	1,49,000

**Additional Information:**

- Fixed assets costing Rs.12,000 were purchased during 2006 for cash.
- Fixed assets (original cost Rs.4,000, accumulated depreciation Rs.1,500) were sold at book value.
- Depreciation for the year 2006 amounted to Rs.5,500 which has been debited to Profit and Loss Account.
- During 2006, dividends paid Rs.3,000

**[Ans.: Increase in working capital Rs.7,000; Funds from operations Rs.17,500; Funds Flow Statement Rs.23,000]**

11. The following are the Balance Sheet of XY Ltd. Company for the years ended on 31-12-2006 and 2007.

**Balance Sheet**

Liabilities	2006 Rs.	2007 Rs.
Share Capital	4,50,000	4,50,000
General Reserve	3,00,000	3,10,000
Profit & Loss a/c	56,000	68,000
Creditors	1,68,000	1,34,000

Liabilities	2006 Rs.	2007 Rs.
Provision for taxation	75,000	10,000
Long term loan	---	2,70,000
	10,49,000	12,42,000
<b>Assets</b>		
Fixed Assets	4,00,000	3,20,000
Investments	50,000	60,000
Stock	2,40,000	2,10,000
Debtors	2,10,000	4,55,000
Bank	1,49,000	1,97,000
	10,49,000	12,42,000

**Additional Information:**

- Investments (Cost Rs.8,000) were sold in the year 2007 for Rs.8,500 and further investments were purchased during the year for Rs.18,000
- The net part for the year was Rs.62,000 after charging depreciation on fixed assets Rs.70,000 and provision for taxation Rs.10,000.
- During the year part of fixed assets costing Rs.10,000 was disposed for Rs.12,000 and the profit is included in the profit and loss account.
- Dividend paid in the year Rs.40,000.

From the above particulars prepare:

- Statement of Changes in Working Capital
- Funds Flow Statement.

**[Ans.: Increase in Working capital Rs.2,97,000; Funds from operations Rs.1,39,500; Funds Flow Statement Rs.4,30,000]**

Note: Provision for taxation is taken as appropriation of profit.

12. The following are the summarised Balance Sheet of Y Ltd. on 31<sup>st</sup> December, 2006 and 31<sup>st</sup> December, 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	3,00,000	4,00,000	Plant and		
Debentures	1,00,000	1,50,000	Machinery (Cost)	2,00,000	3,22,500
P & L a/c	62,500	1,25,000	Land and		
Creditors	57,500	45,000	Buildings (Cost)	1,50,000	2,00,000
Provision for			Stock	1,50,000	1,75,000
Doubtful debts	3,000	1,500	Preliminary	3,500	3,000
			expenses		

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Provision for Depreciation on Land & Buildings	10,000	12,000	Bank	10,000	20,000
Plant & Machinery	15,000	17,500	Debtors	34,500	30,500
	5,48,000	7,51,000		5,48,000	7,51,000

**Additional Information:**

- During the year, a part of the machinery costing Rs.35,000 (accumulated depreciation thereon Rs.1,000) was sold for Rs.3,000.
- Dividend of Rs.25,000 was paid during the year.

Prepare (i) Statement of changes in working capital and (ii) Funds flow statement

**[Ans.: Increase in Working Capital Rs.45,000; Funds from operations Rs.1,24,500; Funds Flow Statement Rs.2,77,500]**

13. From the following Balance Sheet of XYZ & Co. Ltd., as on 31<sup>st</sup> December, 2006 and 2007, you are required to prepare a funds flow statement.

	2006 Rs.	2007 Rs.		2006 Rs.	2007 Rs.
Share Capital	1,00,000	1,25,000	Land, Buildings	1,00,000	95,000
General reserve	25,000	30,000	Plant	75,000	84,500
Profit & Loss a/c	15,250	15,300	Stock	50,000	37,000
Bank Loan	35,000	---	Debtors	40,000	32,100
Creditors	75,000	67,600	Cash	250	300
Provision for taxation	15,000	17,500	Bank	---	4,000
			Goodwill	---	2,500
	2,65,250	2,55,400		2,65,250	2,55,400

The following information is also provided.

- Dividends paid during 2007 is Rs.11,500
- Depreciation written off plant Rs.7,000
- Income Tax provision made during the year Rs.16,500

**[Ans.: Increase in Working Capital Rs.23,050; Funds from operations Rs.26,050; Funds Flow Statement Rs.51,050]**

**Note:** Bank loan is treated as Short term liability.

14. From the following Balance Sheet of X Ltd. You are required to prepare:

- (a) A schedule of changes in working capital.  
 (b) A Funds Flow Statement

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share Capital	1,00,000	1,00,000	Goodwill	12,000	12,000
General Reserve	14,000	18,000	Buildings	40,000	36,000
Profit & Loss a/c	16,000	13,000	Plant	37,000	36,000
Sundry Creditors	8,000	5,400	Investments	10,000	11,000
Bills payable	1,200	800	Stock	30,000	23,400
Provision for taxation	16,000	18,000	Bills Receivable	2,000	3,200
Provision for doubtful debts	400	600	Debtors	18,000	19,000
			Cash at bank	6,600	15,200
	1,55,600	1,55,800		1,55,600	1,55,800

The following additional information has also given:

- (i) Depreciation charged on Plant was Rs.4,000 and on Building 4,000.  
 (ii) Provision for taxation of Rs.19,000 was made during the year 2002.  
 (iii) Interim dividend of Rs.8,000 was paid during the year 2002.

**[Ans.: Increase in Working Capital Rs.5,000; Funds from operations Rs.17,000;  
 Funds flow statement Rs.17,000]**

15. The following is the Balance Sheet of X Ltd., on 31<sup>st</sup> December 2006 & 2007.

Liabilities	2006 Rs.	2007 Rs.
Capital (Equity)	3,00,000	4,00,000
Cum. Preference Shares	1,50,000	1,00,000
General Reserve	40,000	70,000
Profit & Loss a/c	30,000	48,000
Proposed dividend	42,000	52,000
Sundry Creditors	55,000	83,000
Bills payable	20,000	16,000
Provision for taxation	40,000	50,000
	6,77,000	8,17,000
Assets		
Goodwill	1,15,000	90,000
Buildings	2,00,000	1,70,000
Machinery	80,000	2,00,000

Liabilities	2006 Rs.	2007 Rs.
Sundry debtors	1,60,000	2,00,000
Stock	77,000	1,09,000
Bills receivable	20,000	30,000
Cash in hand and at Bank	25,000	18,000
	6,77,000	8,17,000

Additional Information:

1. Depreciation written off on machinery and building in 2007 were Rs.10,000 and Rs.20,000 respectively.
2. During the year 2007, dividends Rs.20,000 were paid.
3. The income tax paid during the year was Rs.35,000. Prepare the fund flow statement.

**[Ans.: Increase in Working capital Rs.51,000; Funds flow operations Rs.2,18,000; Funds Flow Statement Rs.3,28,000]**

16. Following are the summarised Balance Sheets of a Limited Co. As at 31<sup>st</sup> March, 2006, and March 31, 2007:

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Sundry Creditors	39,010	41,135	Cash at Bank	3,000	2,700
Bills payable	37,780	11,525	Sundry Debtors	85,175	72,625
Bank Overdraft	60,000	Nil	Sundry Advances	2,315	735
Provision for Income tax	40,000	49,000	Stock	1,09,040	97,370
Reserves	44,000	50,000	Land & Buildings	1,48,000	1,54,250
Profit & Loss a/c	39,690	41,220	Plant & Machinery	1,12,950	1,16,200
Share Capital	2,00,000	2,60,000	Goodwill	Nil	9,000
	4,60,480	4,52,880		4,60,480	4,52,880

Additional Information:

- (a) An interim dividend of Rs.26,000 and a final dividends of Rs.54,000 were paid during 2006-07.
- (b) The assets of another company were purchased for Rs.60,000 payable in fully paid shares of the company. The assets purchased comprised of stock: Rs.22,000; and Machinery Rs.29,000.
- (c) Additional plant purchased worth Rs.6,000

- (d) Depreciation provided during the current year: Land and Buildings – Rs.3,750; Plant and Machinery – Rs.12,000
- (e) Income tax paid during the year Rs.30,000

You are required to prepare the Funds Flow Statement and a statement of change in working capital for the year ending on March 31, 2007.

**[Ans.: Increase in Working Capital Rs.49,030; Funds from operations Rs.1,03,280; Funds Flow Statement Rs.1,45,030]**

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## 11.5 REFERENCE BOOKS

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1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi
2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
7. Manmohan & Goyal, Management Accounting
8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting



**Chapter – 12****CASH FLOW ANALYSIS****Objectives :**

After going to this lesson you should be able to

- understand the meaning of cash flow analysis
- distinguish between funds flow and cash flow of an organization
- find out the uses of cash flow statement
- analyse the classification of cash flows
- go through the steps in the presentation of cash flow statement

**Structure :**

- 12.1 Introduction**
- 12.2 Distinction between Funds Flow and Cash Flow**
- 12.3 Uses of Cash Flow Statement**
- 12.4 Preparation of Cash Flow Statement**
- 12.5 Classification of Cash Flows**
- 12.6 Presentation of Cash Flow Statement**
- 12.7 Self Assessment Questions**
- 12.8 Reference Books**

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**12.1 INTRODUCTION**

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An analysis of cash flow of a concern during a specified period, presented in the form of a statement is known as cash flow analysis. The cash flow statement can be for the past or can be projection for the future. The cash flow of the concern in the near future, say for a period of six months or one year, can be prepared based on the past trends and expectations of the concern regarding factors that would affect its cash receipts and cash payments. Such an estimate of future cash flows is better termed 'cash budget'. Cash flow statement generally refers to the statement showing the receipts (inflows) and payments (outflows) of cash during the period covered by two consecutive balance sheets.

George Phillipatos is of the view that, in its generic sense, a cash flow is the receipt and the payment of amount of money and that it implies more than our accrual or a financial obligation, hence cash flow is a movement of cash which is real one. Leon Simons observes that a cash flow is frequently and erroneously assumed to include only current operations.

Cash flow analysis enables the management to plan and co-ordinate the financial operations of the enterprise, and furnish the basis for evaluating financing policies. It provides a barometer for ensuring the profitability of the business, and makes financing problems of the business much more manageable.

## 12.2. DISTINCTION BETWEEN FUNDS FLOW AND CASH FLOW STATEMENT

A cash flow statement is similar in design to a funds flow statement. Both the statements are prepared from the same data, viz., the balance sheets of the concern and additional information made available. Both the statements focus on the financial position of the concern. A cash flow statement differs from a funds flow statement in that the former confines only to cash flows and does not include non-cash flow of funds. For instance, if assets are acquired by the concern by issue of share capital, the transaction should not enter into cash flow statement as there is neither cash payment nor receipt.

### Distinction between Funds Flow Statement and Cash Flow Statement

Basis for Difference	Funds Flow	Cash Flow
<b>1. Basis of accounting</b>	It is based on accrued basis of accounting.	It is based on cash basis of accounting.
<b>2. Subject matter</b>	Funds flow statement is concerned with changes in Working Capital position between two Balance Sheet dates.	Cash Flow statement is concerned only with the changes in cash position.
<b>3. Concept of Fund</b>	Funds Flow statement is based on a wider concept of funds i.e., working capital	Cash Flow statement is based on the narrow concept of funds i.e., cash only which is only one component of working capital.
<b>4. Schedule of Working Capital Changes</b>	A schedule of Working capital changes is prepared in the case of Funds Flow Statement.	No such schedule is prepared in the case of Cash Flow Statement.
<b>5. Showing of Balance</b>	It shows the changes of not only cash but also of other current assets like debtors, stock etc.	It shows the change of the opening cash balance into the closing cash balance.

Basis for Difference	Funds Flow	Cash Flow
<b>6. Opening and Closing Balance</b>	The statement does not start with any opening of balance of any account and does not even end with any such closing balance of any account.	The statement starts with the opening cash and bank balances and ends with the closing cash and bank balances in most of the cases.
<b>7. Current Liabilities</b>	It shows the change in the current liabilities like sundry creditors, bills payable etc.	It does not show the changes in the current liabilities of the enterprise.
<b>8. Source</b>	In this case, the profit from operation or the net profit is considered as a principal source of fund.	In this case, the main source of cash inflow is considered to be the sales and not the net profit of the business.
<b>9. Utility</b>	Funds Flow statement is useful for long-term financial analysis and solvency of the firm.	Cash Flow Statement as a tool of financial analysis is more useful to the management in cash planning and short-term analysis.

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## 12.3. USES OF CASH FLOW ANALYSIS

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A Cash Flow Statement is an important financial tool for management in efficient short-term financial planning. It enable the management to plan and co-ordinate the financial operation of the concern, and furnish the basis for evaluating financing policies. It help the management in making the financing problems of the business much more manageable. The following are the uses of cash flow analysis.

- 1. Helpful in efficient cash management:** It is very helpful in understanding the cash position of a firm. Since cash is the basis for carrying on business operations, the cash flow statement is very useful in evaluating the current cash position.
- 2. Planning of Programmes:** The repayment of loans, replacement of assets and other such programmes can be planned on its basis.
- 3. Helpful in Short-term financial decisions:** The cash flow statement is helpful in making short-term financial decisions relating to liquidity, and the ways and means position of the firm.

4. **Useful in Capital budgeting:** Cash flow statement is also useful for making appraisal of different capital investment projects in order to determine their viability and profitability.
5. **Useful as a control device:** It helps the management to understand the past behaviour of the cash cycle, and to control the uses of cash in future. A comparison of the projected cash flow statement helps the management in appraising the inflows and outflows of cash according to the plan and taking the necessary remedial measures.
6. **Useful to Outsiders:** Cash flow statement is also very useful to external analysis like bankers, creditors etc., for assessing the short-term solvency of a business concern as well as its capacity to meet its short-term obligations.

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## 12.4. PREPARATION OF CASH FLOW STATEMENT

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The Cash Flow Statement is to be presented as per the AS-3 of the Institute of Chartered Accountants of India (ICAI). The ICAI issued AS-3 in June, 1981 for the first time. Later in March, 1997 it revised the standard. The model stipulated in AS-3 is the widely accepted model for presentation of Cash Flow Statements.

All the listed companies/entities whose financial year ends on March, 1996 and thereafter will be required to give Cash Flow Statement along with Balance Sheet and Profit and Loss Account. The above amendment comes into effect immediately i.e., w.e.f. 15-2-1996.

### 12.4.1 Accounting Standard – 3

The standard prescribes two alternative formats for presentation of Cash Flow. The first one is known as Direct Method and the second one is the Indirect Method. The key difference in these two methods lies in their presentation of 'Cash flows from operating activities'. In the direct method, operating cash receipts and payments are reported directly. In the indirect method, cash flows from operating activities are reported by way of adjustments of the reporting period's net profit reported in the profit and loss account. Users prefer the indirect method because it establishes linkage between the cash flow statement, the balance sheet and the profit and loss account. SEBI requires listed companies to use the indirect method to present the cash flow statement.

### 12.4.2 Definitions:

The following are used in this statement with the meaning specified:

- i. Cash comprises cash on hand and demand deposits with banks
- ii. Cash equivalents are short-term highly liquid investments, that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

- iii. Cash flows are inflows and outflows of cash and cash equivalents.
- iv. Operating activities are the principal revenue-producing activities of the enterprise and other activities and are not investing or financing activities.
- v. Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents.
- vi. Financing activities are activities that result in changes in the size and composition of the owner's capital (including preference share capital in the case of a company) and borrowings of the enterprise.

#### **12.4.3 Cash and Cash Equivalents:**

Cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent, it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents, for example, preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

Cash flows exclude movements between items that constitute cash or cash equivalents because these components are part of the cash management of an enterprise rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

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## **12.5. CLASSIFICATION OF CASH FLOWS**

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The model prescribed in AS-3, 'Cash Flow Statement, classifies cash flows into three categories: Cash flow from operating activities, cash flow from investing activities, and cash flow from financing activities.

#### **12.5.1 Operating Activities:**

Operating activities are those transactions which are considered in the determination of net income. Examples of cash inflows in this category are cash received from debtors for goods and services, interest and dividend received on loan and investment. Examples of cash outflows in this category are cash payments for goods and services; merchandise; wages; interest; taxes; supplies and others.

**12.5.2 Investing Activities:**

Investing activities include acquisition of long-term or fixed assets; disposal debentures and other securities; lending of money and its subsequent collection. Cash inflows from investing activities generally include cash sales of property, plant, equipment and intangible assets, cash sales of investments in shares, debentures and other securities, cash collection (loan repayments) from borrowers. Cash outflows are purchase of shares, debentures and securities other enterprises, purchase of property, plant, equipment and other long-term assets, loan given to other firms.

**12.5.3 Financing Activities:**

Financing activities relate to long-term liability and equity capital. A firm engages in financing activities when it obtains resources from owners, returns resources to owners, borrows resources from creditors and repays amounts borrowed. Cash inflows include proceeds from issue of shares and short-term and long-term borrowings. Cash outflows include repayment of loan and payments to owners, including cash dividends. Repayments of accounts payable or accrued liabilities are not considered repayment of loans under financing activities but are classified as cash outflows under operating activities.

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## 12.6. PRESENTATION OF CASH FLOW STATEMENT

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While preparing the cash flow statement, cash flows from operating activities are presented first, followed by investing activities and then financing activities. The individual inflows and outflows relating to investing and financing activities are presented separately in their respective categories. The operating activities section can be presented using the direct method or indirect method. In the direct method cash flow statement is presented primarily on a cash receipts and cash payments basis, instead of on accrual basis. In the indirect method, net income is adjusted for items that affected net income but did not affect cash.

**12.6.1 Direct Method:**

**Cash Flow Statement (Direct Method)**  
**XYZ Company for the year ended 31<sup>st</sup> March, 2011**

	Rs.	Rs.
<b>A. Cash Flow from Operating Activities</b>		
Cash Receipts from:		
Sales	x x x	
Interest Received	x x x	
Cash payments for		
Purchases	x x x	

	Rs.	Rs.
Operating Expenses	x x x	
Interest taxes	x x x	
Income taxes	x x x	x x x
<b>Net Cash Flow from Operating Activities</b>		x x x
<b>B. Cash Flows form Investing Activities</b>		
Sale of Plant Assets	x x x	
Sale of Investments	x x x	
Purchase of Plant Assets	x x x	
Purchase of Investments	x x x	
<b>Net Cash Flow used by Investing Activities</b>		x x x
<b>C. Cash Flows from Financing Activities</b>		
Repayment of Bonds and Debentures	x x x	
Issue of Common Shares	x x x	
Dividend paid	x x x	
Net cash flows from Financing Activities	x x x	x x x
<b>Net Increase/Decrease in Cash</b>		x x x

### 12.6.2 Indirect Method

#### Cash Flow Statement (Indirect Method)

XYZ Company for the year ended 31<sup>st</sup> March, 2011

	Rs.	Rs.
<b>A. Cash Flow from Operating Activities</b>		
Net Income	x x x	
Adjustments to Reconcile Net income to Net cash provided by Operating Activities		
Depreciation	x x x	
Gain on sale of Investments	x x x	
Loss on Sale of Plant Asset	x x x	
Decrease in Account receivable	x x x	
Decrease in Inventory	x x x	
Decrease in prepaid Expenses	x x x	
Increase in Accounts payable	x x x	
Increase in Accrued Liabilities	x x x	
Decrease in Income Taxes payable	x x x	
<b>Net Cash Flows from operating Activities</b>		x x x
<b>B. Cash Flow from Investing Activities</b>		
Sale of Fixed Assets	x x x	
Sale of Investments	x x x	
Purchase of Fixed Assets	x x x	
Purchase of Investments	x x x	
<b>Net Cash Flows used by Investing Activities</b>		x x x

<b>C. Cash Flows from Financing Activities</b>	<b>Rs.</b>	<b>Rs.</b>
Repayment of Bonds and Debentures	x x x	
Issue of common shares	x x x	
Dividends paid	x x x	
<b>Net Cash flows from Financing Activities</b>		<b>x x x</b>
<b>Net Increase/Decrease in Cash</b>		<b>x x x</b>

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## 12.7 SELF ASSESSMENT QUESTIONS

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1. Explain the meaning of cash flow statement.
2. Distinguish between Funds Flow Statement and Cash Flow Statement.
3. Explain the significance of Cash Flow Statement.
4. How do you classify the cash flows? Explain briefly.
5. What are Operating Activities?
6. What are Investing Activities?
7. What are Financing Activities?
8. State the salient features of the Revised Accounting Standard 3

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## 12.8 REFERENCE BOOKS :

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1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi
2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
7. Manmohan & Goyal, Management Accounting
8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting



## APPENDIX

### AS 3 : CASH FLOW STATEMENTS\*

The following is the text of the revised Accounting Standard (AS) 3, 'Cash Flow Statements' issues by the Council of the Institute of Chartered Accountants of India. This standard supersedes Accounting Standard (AS) 3, 'Changes in Financial Position', issued in June, 1981.

In the initial years, this accounting standard will be recommendatory in character. During this period this standard is recommended for use by companies listed on a recognised stock exchange and other commercial, industrial and business enterprises in the public and private sectors.

#### **Objectives:**

Information about the cash flows of an enterprise is useful in providing users of financial statements with a basis to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilise those cash flows. The economic decisions that are taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and the timing and certain of their generation.

The Statement deals with the provisions of information about the historical changes in cash and cash equivalents of an enterprise by means of a cash flow statement which classifies cash flows during the period from operating, investing and financing activities.

#### **Scope:**

1. An enterprise should prepare a cash flow statement and should present it for each period for which financial statements are presented.

2. Users of an enterprise's financial statements are interested in how the enterprise generates and uses cash and cash equivalents. This is the case regardless of the nature of the enterprise's activities and irrespective of whether cash can be viewed as the product of the enterprise, as may be the case with a financial enterprise. Enterprise need cash for essentially the same reasons, however different their principal revenue producing activities might be. They need cash to conduct their operations, to pay their obligations and to provide returns to their investors.

#### **Benefits of Cash Flow Information:**

3. A cash flow statement, when used in conjunction with the other financial statements, provides information that enables users to evaluate the changes in net assets of an enterprise,

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\* The Council of the Institute of Chartered Accounts of India issued this Standard originally in 1991 and it was revised in March, 1997.

its financial structure (including its liquidity and solvency) and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities. Cash flow information is useful in assessing the ability of the enterprise to generate cash and cash equivalent and enables user to develop models to assess and compare the present value of the future cash flows of different enterprises. It also enhances the comparability of the reporting of operating performance by different enterprises because it eliminates the effects of using different accounting treatments for the same transactions and events.

4. Historical cash flow information is often used as an indicator of the amount, timing and certainty of future cash flows. It is also useful in checking the accuracy of past assessments of future cash flows and in examining the relationship between profitability and net cash flow and the impact of changing prices.

#### **Definitions:**

5. The following are used in this statement with the meaning specified:
- i. Cash comprises cash on hand and demand deposits with banks
  - ii. Cash equivalents are short-term highly liquid investments, that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.
  - iii. Cash flows are inflows and outflows of cash and cash equivalents.
  - iv. Operating activities are the principal revenue producing activities of the enterprise and other activities and are not investing or financing activities.
  - v. Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents.
  - vi. Financing activities are activities that result in changes in the size and composition of the owners' capital (including preference share capital in the case of company) and borrowings of the enterprise.

#### **Cash and Cash Equivalents:**

6. Cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent, it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents; for example, preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

7. Cash flows exclude movements between items that constitute cash or cash or cash equivalents because these components are part of the cash management of an enterprise

rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

### **Presentation of a Cash Flow Statement:**

**8.** The cash flow statement should report cash flows during the period classified by operating, investing and financing activities.

**9.** An enterprise presents its cash flows from operating, investing and financing activities in a manner which is most appropriate to its business. Classification by activity provides information that allows users to assess the impact of those activities on the financial position of the enterprise and the amount of its cash and cash equivalents. This information may also be used to evaluate the relationships among these activities.

**10.** A single transaction may include cash flows that are classified differently. For example, when the installment aid in respect of a fixed asset acquired on different payment basis includes both interest and loan, the interest element is classified under financing activities and the loan element is classified under investing activities.

### **Operating Activities:**

**11.** The amount of cash flows arising from operating activities is a key indicator of the extent to which the operations of the enterprise have generated sufficient cash flows to maintain the operating capability of the enterprise, pay dividends, repay loans and make new investments without recourse to external sources of financing. Information about the specific components of historical operating cash flows is useful, conjunction with other information, in forecasting future operating cash flows.

**12.** Cash flows from operating activities are primarily derived from the principal revenue-producing activities of the enterprise. Therefore, they generally result from the transactions and other events that enter into the determination of net profit or loss. Examples of cash flows from operating activities are:

- a. Cash receipts from the sale of goods and the rendering of services;
- b. Cash receipts from royalties, fees, commission and other revenue;
- c. Cash payments to suppliers for goods and services;
- d. Cash payments to and on behalf of employees
- e. Cash receipts and cash payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;
- f. Cash payment of refunds of income taxes, unless they can be specifically identified with financing and investing activities; and
- g. Cash receipts and payments relating to future contracts, forward contracts, option contracts and swap contracts when the contracts are held for dealing or trading purposes.

**13.** Some transactions, such as the sale of an item of plant, may give rise to gain or loss which is included in the determination of net profit or loss. However, the cash flows relating to such transactions are cash flows from investing activities.

**14.** An enterprise may hold securities and loans for dealing or trading purposes, in which case they are similarly to inventory acquired specifically for resale. Therefore, cash flows arising from the purchase and sale of dealing or trading securities are classified as operating activities. Similarly cash advances and loans made by financial enterprises are usually classified as operating activities since they relate to the main revenue producing activity of that enterprise.

### **Investing Activities:**

**15.** The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditure have been made for resources intended to generate future income and cash flows. Example of cash flows arising from investing are:

- a. Cash payments to acquire fixed assets (including intangible). These payments include those relating to capitalised research and development costs and self-constructed fixed assets;
- b. Cash receipts from disposal of fixed assets (including intangible);
- c. Cash payments to acquire share, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing for trading purposes);
- d. Cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipt from those instruments considered to be cash equivalents and those held for dealing or trading purposes);
- e. Cash advances and loans made to third parties (other than advances and loans made by a finance enterprise);
- f. Cash receipts from the repayment to advances and loans made to third parties (other than advances and loans of a financial enterprise);
- g. Cash payments for future contracts, forward contracts, option contracts and swap contracts excepts when the contracts are held for dealing or trading purposes; or the payments are classified as financing activities; and
- h. Cash receipts from futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

**16.** When a contract is accounted for as a hedge of an identifiable position, the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

**Financing Activities:**

**17.** The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds (both capital and borrowings) to enterprise. Examples of cash flows arising from financing activities are:

- a. Cash proceeds from issuing shares or other similarly instruments;
- b. Cash proceeds from issuing debentures, loans, notes, bonds, and other short or long-term borrowings, and
- c. Cash repayments of amounts borrowed

**Reporting Cash Flows from Operating Activities:**

**18.** An enterprise should report cash flows from operating activities using either:

- 1. Direct method:** the direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or
- 2. Indirect Method:** The indirect method, whereby net profit or loss is adjusted for the effects of transactions of a non-cash nature, any deferrals or accruals of past or future operating cash receipts or payments and item of income or expenses associated with investing or financing cash flows.

**19.** The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method and is, therefore, considered more appropriate than the indirect method. Under the direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

- a. from the accounting records of the enterprise; or
- b. by adjusting sales, cost of sales (interest and similar income and interest expenses and similar charges for a financial enterprise) and other items in the statement of profit and loss for:
  - i. changes during the period in inventories and operating receivable and payable.
  - ii. other non-cash items; and
  - iii. other items for which the cash effects are investing or financing cash flows.

**20.** Under the indirect method, the net cash flow from operating activities is determined by adjusting net profit or loss for the effects of:

- a. changes during the period in inventories and operating receivables and payables;
- b. non-cash items such as depreciation, provisions, deferred taxes, and unrealised foreign exchanges gains and losses; and
- c. all other items for which the cash effects are investing or financing cash flows.

Alternatively, the net cash flow from operating activities may be presented under the indirect method by showing the operating revenues and expenses, excluding non-cash items disclosed in the statement of profit and loss and changes during the period in inventories and operating receivables and payables.

### **Reporting Cash Flows from Investing and Financing Activities:**

21. An enterprise should report separately major classes of gross cash receipts and gross cash payments arising from investing and financing activities, except to the extent that cash flows described in paragraphs 22 and 24 are reported on a net basis.

### **Reporting Cash Flows on a Net Basis:**

22. Cash flows arising from the following operating, investing or financing activities may be reported on a net basis.

- a. Cash receipts and payments on behalf of customers when the cash flows reflect the activities of the customer rather than those of the enterprises; and
- b. Cash receipts and payments for items in which the turnover is quick, the amounts are large, and the maturities are short.

23. Example of cash receipts and payments referred to in paragraph 22 (a) are:

- a. the acceptance and repayment of demand deposits by a bank.
- b. Funds held for a customer by an investment enterprise; and
- c. Rents collected on behalf of, and paid over to, the owners of properties.

Examples of cash receipts and payments referred to in paragraph 22(b) are advances made for and the repayment of

- a. principle amounts relating to credit card customers;
- b. the purchase and sale of investments; and
- c. other short-term borrowings, for example, those which have a maturity period of three months or less.

24. Cash flow arising from each of the following activities of a financial enterprise may be reported on a net basis.

- a. cash receipts and payments for the acceptance and repayment of deposits with a fixed maturity date;
- b. the placement of deposits with and withdrawal of deposits from other financial enterprises and;
- c. cash advances and loans made to customers and the repayment of those advances and loans.

**Foreign Currency Cash Flows:**

**25.** Cash flows arising from transactions in a foreign currency should be recorded in an enterprise's reporting currency by applying to the foreign currency amount the exchange rate between the reporting currency and the foreign currency at the date of the cash flow. A rate that approximate the actual rate may be used if the result is substantially the same as would arise if the rates at the dates of the cash flows were used. The effect of changes in exchanges rates on cash and cash equivalents held in a foreign currency should be reported as a separate part of the reconciliation of the changes in cash and cash equipment during the period.

**26.** Cash flows denominated in foreign currency are reported in a manner consistent with Accounting Standard (AS) II. Accounting for the Effects of changes in Foreign Exchange Rates. This permits the use a period may be used for recording foreign currency transactions.

**27.** Unrealised gain and losses arising from changes in foreign exchange rates are not cash flows. However, the effect of exchange rate changes on cash and cash equivalents held or the in a foreign currency is reported in the cash flow statement in order to reconcile cash and cash equivalents at the beginning and the end of the period. This amount is presented separately from cash flows from operating, investing and financing activities and includes the differences, if any, had those cash flows been reported at the end of period exchange rates.

**Extraordinary Items:**

**28.** The cash flows associated with extraordinary items should be classified as arising from operating investing or financing activities as appropriate and separately disclosed.

**29.** The cash flows associated with extraordinary items are disclosed separately as arising from operating, investing or financing activities in the cash flow statement, to enable users to understand their nature and effect on the present and future cash flows of the enterprise. These disclosures are in addition to the separate disclosures of the nature and amount of extraordinary items required by Accounting Standard (AS) 5. Net Profit or loss for the period, prior period items and changes in Accounting Policies.

**Interest and Dividends:**

**30.** Cash flows from interest and paid should each be disclosed separately. Cash flows arising from interest paid and interest and dividends received in the case of a financial enterprise should be classified as cash flow arising from operating activities. In the case of other enterprises, cash flows arising from interest paid should be classified as cash flows from investing activities. Dividends paid should be classified as cash flows from financing activities.

**31.** The total amount of interest paid during the period is disclosed in the cash flow statement whether it has been recognised as an expense in the statement of profit and loss or capitalised in accordance with Accounting Standard (AS) 10, Accounting for Fixed Assets.

**32.** Interest paid and Interest and dividends received, are usually classified as operating cash flows for a financial enterprise. However, there is no consensus on the classification of these cash flows for other enterprises. Some argue that interest paid and interest and dividends received may be classified as operating cash flows because they enter into the determination of net profit or loss. However, it is more appropriate that interest paid and interest and dividends received are classified as financing cash flows and investing cash flows respectively, because they are cost of obtaining financial resources or returns on investments.

**33.** Some argue that dividends paid may be classified as a component of cash flows from operating activities in order to assist users to determine the ability of an enterprise to pay dividends out of operating cash flows. However, it is considered more appropriate that dividends paid should be classified as cash flows from financing activities because they are cost of obtaining financial resources.

#### **Taxes on Income:**

**34.** Cash flows arising from taxes on income should be separately disclosed and should be classified as cash flows from operating activities unless they can be specifically identified with financing and investing activities.

**35.** Taxes on income arise on transactions that give rise to cash flows that are classified as operating investing or financing activities in a cash flow statement. While tax expenses may be readily identifiable with investing or financing activities, the related tax cash flows are often impracticable to identify and may arise in different period from the cash flows of the underlying transactions. Therefore, taxes paid are usually classified as cash flows from operating activities. However, when it is practicable to identify the tax cash flow with an individual transaction that gives rise to cash flows that are classified as investing or financing activities the tax cash flow is classified as an investing or financing activity as appropriate. When tax cash flows are allocated over more than one class of activity, the total amount of taxes paid is disclosed.

#### **Investments in Subsidiaries, Associated and Joint Ventures:**

**36.** When accounting for an investment in an associate or a subsidiary or a joint venture, an investor restricts its reporting in the cash flow statement to the cash flows between itself and the investee/joint venture, for example cash flows relating to dividends and advances.



**Acquisition and Disposals of Subsidiaries and Other Business Units:**

**37.** The aggregate cash flows arising from acquisitions and from disposals of subsidiaries or other business units should be presented separately and classified as investing activities.

**38.** An enterprise should disclose, in aggregate, in respect of both acquisition and disposal of subsidiaries or other business units during the period each of the following.

- a. the total purchase a disposal consideration; and
- b. the portion of the purchase or disposal consideration discharged by mean of cash and cash equivalents.

**39.** The separate presentation of the cash flow effects of acquisitions and disposals of subsidiaries and other business units as single line items helps to distinguish those cash flows from other cash flows. The cash flow effects of disposals are not deducted from those of acquisition.

**Non-Cash Transactions:**

**40.** Investing and financing transactions that do not require the use of cash or cash equivalents should be excluded from a cash flow statement. Such transactions should be disclose elsewhere in the financial statements in the way that provides all the relevant information about these investing and financing activities.

**41.** Many investing and financing activities do not have a impact on current cash flow although they do effect the capital and asset structure of an enterprise. The exclusion of non-cash transactions from the cash flow statement is consistent with the objective of a cash flow statement as these items do not involve cash flows in the current period. Examples of non-cash transactions are:

- a. the acquisition of assets by assuming directly related liabilities;
- b. the acquisition of an enterprise by means of issue of shares;
- c. the conversion of debt to equity.

**Components of Cash and Cash equivalents:**

**42.** An enterprise should disclose the components of cash and cash equivalents and should present a reconciliation of the amounts in its cash flow statements with the equivalent items reported in the balance sheet.

**43.** In view of the variety of cash management practices, an enterprise discloses the policy which it adopts in determining the composition of cash and cash equivalents.

**44.** The effect of any change in the policy for determining components of cash and cash equivalents is reported in accordance with Accounting Standard (AS) 5. Net Profit or loss for the period, Prior Period Items and Changes in Accounting Policies.

**Other Disclosures:**

**45.** An enterprise should disclose, together with a commentary by management the amount of significant cash and cash equivalent balances held by the enterprise that are not available for use by it.

**46.** There are various circumstances in which cash and cash equivalent balance held by an enterprise are not available for use by it. Examples include cash and cash equivalent balances held by a branch of the enterprise that operates in a country where exchange controls or other legal restrictions apply as a result of which the balance are not available for use by the enterprise.

**47.** Additional information may be relevant to users in understanding the financial position and liquidity of an enterprise. Disclosure of this information, together with a commentary by management is encouraged and may include.

- a. the amount of undrawn borrowing facilities that may be available for future operating activities and to settle capital commitments, indicating any restrictions on the use of these facilities; and
- b. the aggregate amount of cash flows that represent increase in operating capacity separately from those cash flows that are required to maintain operating capacity.

**48.** The separate disclosure of cash flows that represent increases in operating capacity and cash flows that are required to maintain operating capacity is useful in enabling user to determine whether the enterprise is investing adequately in the maintenance of its operating capacity. An enterprise that does not invest adequately in the maintenance of its operating capacity may be prejudicing future profitability for the sake of current liquidity and distribution to owners.

**CASH FLOW STATEMENT FOR AN ENTERPRISE OTHER THAN A  
FINANCIAL ENTERPRISE**

The appendix is illustrative only and does not form part of the accounting standard. The purpose of this appendix is to illustrate application of the accounting standard.

1. The example shows only current period amounts.
2. Information from the statement of profit and loss and balance sheet is provided to show how the statements of cash flow under the direct method the indirect method have been derived. Neither the statements of profit and loss nor the balance sheet is presented in conformity with the disclosure and presentation requirements of applicable laws and accounting standards. The working notes given towards the end of this appendix in the

cash flow statement have been derived. These working notes do not form part of the cash flow statement and, accordingly, need not be published.

3. The following additional information is also relevant for the preparation of the statement of cash flows (figure are in Rs.'000)
- An amount of 250 was raised from the issue of share capital and a further 250 was raised from long term borrowings.
  - Interest expenses was 400 of which 170 was paid during the period. 100 relating to interest expenses of the prior period was also paid during the period.
  - Dividends paid were Rs.1,200
  - Tax deducted at source on dividends received (included in the tax expenses of 300 for the year mounted to Rs.40)
  - During the period the enterprise acquired fixed assets for 350. The payment was made in cash.
  - Plant with original cost of Rs.80 and accumulated depreciation of Rs.60 was sold for Rs.20
  - Foreign exchange loss of 40 represents the reduction in the carrying amount of a short-term investment in foreign currency designated bonds arising out of a change in exchange rate between the date of acquisition of the investment and the balance sheet date.
  - Sundry debtors and sundry creditors include amounts relating to credit sales and credit purchases only.

**Balance sheet as on 31-12-2011**

	Rs.	1996 Rs.	Rs.	1995 Rs.
<b>Assets</b>				
Cash on hand and balance with banks		200		25
Short-term investments		670		135
Sundry debtors		1,700		1,200
Interest receivable		100		--
Inventories		900	1,950	
Long-term investments	2,500		2,500	
Fixed asset at cost	2,180		1,910	
Accumulated depreciation	(1,450)		(1,060)	
Fixed assets (net)		730		850
<b>Total Assets</b>		6,800		6,660
<b>Liabilities:</b>				
Sundry creditors		150		1,890
Interest payable		230		100
Income taxes payable		400		1,000
Long-term debt		1,110		1,040
<b>Total Liabilities</b>		1,890		4,030

	Rs.	1996 Rs.	Rs.	1995 Rs.
<b>Shareholders' funds</b>				
Share capital		1,500		1,250
Reserves		3,410		1,380
<b>Total Shareholders Funds</b>		4,910		2,630
<b>Total liabilities and Shareholders Funds</b>		6,800		6,660

**Statement of Profit and Loss for the period ended 31-12-2011**

	(Rs.'000) 1996
Sales	30,650
Cost of Sales	(26,000)
Gross Profit	4,650
Depreciation	(450)
Administrative and selling expenses	(910)
Interest expenses	(400)
Interest income	300
Dividend income	200
Foreign exchange loss	(40)
Net profit before taxation and extraordinary item	3,350
Extraordinary item- Insurance proceeds from earthquake disaster settlement	180
Net profit after extraordinary item	3,530
Income tax	(300)
Net Profit	3,230

**Direct Method Cash Flow Statement [Paragraph 18 (a)]**

	(Rs.'000) 1996
<b>Cash Flows from operating Activities:</b>	
Cash receipts from customers	30,150
Cash paid to suppliers and employees	(27,600)
Cash generated from operations	2,550
Income taxes paid	(860)
Cash flow before extraordinary item	1,690
Proceeds from earthquake disaster settlement	180
<b>Net cash from operating activities</b>	1,870
<b>Cash flows from Investing activities</b>	
Purchase of fixed assets	(350)

		(Rs.'000)
Proceeds from sale of equipment	20	
Interest received	200	
Dividends received	160	
<b>Net cash from investing activities</b>		30
<b>Cash flow from financing activities</b>		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowings	250	
Repayment of long-term borrowings	(180)	
Interest paid	(270)	
Dividends paid	(1,200)	
<b>Net cash used in financing activities</b>		(1,150)
<b>Net increase in cash and cash equivalents</b>		750
Cash and Cash equivalents at beginning of period (See Note 1)		
Cash and Cash equivalents at end of period (See Note 1)		160
		910

### Indirect Method Cash Flow Statement [Paragraph 18 (b)]

	(Rs.'000)	
	Rs.	Rs.
<b>Cash Flow from operating Activities</b>		
Net profit before taxation, and extraordinary item	3,350	
Adjustment for:		
Depreciation	450	
Foreign exchange loss	40	
Interest income	(300)	
Dividend income	(200)	
Interest expenses	400	
Operating profit before working capital changes	3,740	
Interest in Sundry debtors	(500)	
Decrease in inventories	1,050	
Decrease in sundry creditors	(1,740)	
Cash generated from operations	2,550	
Income taxes paid	(860)	
Cash flow before extraordinary item	1,690	
Proceeds form earthquake disaster settlement	180	
<b>Net cash from operating activities</b>		1,870
<b>Cash flows from investing activities</b>		
Purchase of fixed assets	(350)	
Proceeds from sale of equipment	20	
Interest received	200	
Dividends received	160	

	Rs.	Rs.
<b>Net cash from investing activities</b>		30
<b>Cash flows from financing activities</b>		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowings	250	
Repayment of long-term borrowings	(180)	
Interest paid	(270)	
Dividends paid	(1,200)	
Net cash used in financing activities		(1,150)
<b>Net increase in cash and cash equivalents</b>		750
Cash and cash equivalents at beginning of period (See Note 1)		160
<b>Cash and Cash equivalents at end of period (See Note I)</b>		910

**Notes to the Cash Flow Statement**  
(Direct method and indirect method)

**1. Cash and Cash Equivalents:**

Cash and cash equivalents consists of cash and hand and balances with bank and investments in money-market instruments. Cash and cash equivalents included in the cash flow statement comprise the following balance sheet amounts.

	1996	1995
Cash on hand and balances with banks	200	25
Short-term investments	670	135
Cash and cash equivalents	870	160
Effect of exchange rate changes	40	--
Cash and cash equivalents as restated	910	160

Cash and cash equivalents at the end of the period include deposits with banks of 100 held by a branch which are not freely remissible to the company because of currency exchange restrictions.

The company has undrawn borrowing facilities of 2,000 of which 700 may be used only for future expansion.

**2. Total tax paid during the year** (including tax deducted at source on dividends received) amounted to Rs.900.

**Alternative Presentation (indirect method)**

As an alternative, in an indirect method cash flow statement, operating profit before working capital changes is sometimes presented as follows:

	1996	1995
Revenue excluding investment income	30,650	
Operating expenses excluding depreciation	(26,910)	
Operating profit before working capital changes		3,740

**Working Notes:**

The working notes given below do not form part of the cash flow statement and, accordingly, need not be published. The purpose of these working notes is merely to assist in understanding the manner in which various figures in the cash flow statement have been derived (Figures are in Rs.'000)

		Rs.	Rs.
<b>1. Cash receipts from Customers</b>			
Sales			30,650
Add: Sundry debtors at the end of the year			1,200
			<u>31,850</u>
Less: Sundry debtors at the end of the year			1,700
			<u>30,150</u>
<b>2. Cash paid to suppliers and employees:</b>			
Cost of Sales			26,000
Administrative and selling expenses			910
			<u>26,910</u>
Add: Sundry creditors at the beginning of the year	1,890		
Inventories at the end of the year	900		2,790
			<u>29,700</u>
Less: Sundry creditors at the end of the year	150		
Inventories at the beginning of the year	1,950		2,100
			<u>27,600</u>
<b>3. Income taxes paid (including tax deducted at sources from dividends received)</b>			
Income tax expenses for the year (including tax deducted at sources from dividends received)			300
Add: Income tax liability at the beginning of the year			1,000
			<u>1,300</u>
Less: Income tax liability at the end of the year			400
			<u>900</u>

Out of Rs.900, tax deducted at source on dividends received (amount to Rs.40) is included in cash flows from investing activities and the balance of Rs.860 is included in cash flow from operation activities (see paragraph 34).

		Rs.	.
<b>4.</b>	<b>Repayment of long-term borrowings:</b>		
	Long-term debt at the beginning of the year		1,040
	Add: Long-term borrowings made during the year		250
			1,290
	Less: Long-term borrowings at the end of the year		1,110
			180
<b>5.</b>	<b>Interest paid</b>		
	Interest expenses for the year		400
	Add: Interest payable at the beginning of the year		100
			500
	Less: Interest paid at the end of the year		230
			270

#### Cash flow statement for a Financial Enterprise

The appendix is illustrative only and does not form part of the accounting standard. The purpose of this appendix is to illustrate the application of the accounting standard.

	Rs.	(Rs.'000) 1996
<b>Cash Flow from operating activities</b>		
Interest and commission receipts	28,447	
Interest payments	(23,463)	
Recoveries on loans previously written off	237	
Cash payments to employees and suppliers	(997)	
Operating profit before changes in operating assets	4,224	
(Increase) Decrease in operating assets:		
Short-term funds	(650)	
Deposits held for regulatory or monetary control purposes	234	
Funds advanced to customer	(288)	
Net increase in credit card receivables	(360)	
Other short-term securities)	(120)	
Increase (Decrease) in operating liabilities		
Deposits from customers	600	
Certificates of deposit	(200)	
Net cash from operating activities before income tax	3,440	
Income taxes paid	(100)	
Net cash from operating activities		3,340



	Rs.	(Rs.'000) 1996
<b>Cash flows from investing activities</b>		
Dividends received	250	
Interest received	300	
Proceeds from sale of permanent investments	1,200	
Purchase of permanent investments	(600)	
Purchase of fixed assets	(500)	
Net cash from investing activities		650
<b>Cash flow from financing activities</b>		
Issue of shares	1,800	
Repayment of long-term borrowings	(200)	
Net Decrease in other borrowings	(1,000)	
Dividends paid	(400)	
Net cash from Financing activities		200
<b>Net increase in cash and cash equivalents</b>		4,190
<b>Cash and cash equivalents at beginning of period</b>		4,650
<b>Cash and cash equivalents at the end of period</b>		8,840

**Chapter – 13**

# PREPARATION OF CASH FLOW STATEMENT

**Objectives :**

After studying this unit you should be able to

- know the steps in the preparation of cash flow statement
- determine cash from operations, investing activities and financing activities

**Structure :**

- 13.1 Steps in the preparation of Cash Flow Statement**
- 13.2 Reporting Cash flows from Operating Activities**
- 13.3 Investing Activities**
- 13.4 Financing Activities**
- 13.5 Self Assessment Questions**
- 13.6 Exercises**
- 13.7 Reference books**

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## 13.1 STEPS IN PREPARATION OF CASH FLOW STATEMENT

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Before preparing cash flow statement, first of all, the following three steps have to be completed.

1. Determining cash flows from operations or operating activities;
2. Determining cash flows from investing activities;
3. Determining cash flows from financing activities.

### 13.1.1 Cash from Operations:

The profit and loss account focuses on net income determination from operating activities. However, it does not show cash inflow and outflow relating to operating activities because the profit and loss account is prepared on accrual basis. In preparing profit and loss account, revenues are recorded even though cash for them has not been received. Similarly, expenses are recorded even though may not been paid. Therefore, to find cash flows operations, one need to convert accrual basis income statement figures to cash basis by making adjustments. By way of adjustments, earned revenues will be converted into cash received from sales or customers and incurred expenses will be converted into cash expended, i.e., expenses actually paid in cash.

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## 13.2 REPORTING CASH FLOWS FROM OPERATING ACTIVITIES:

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An enterprise should report cash flows from operating activities using either:

1. **Direct method:** the direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or
2. **Indirect Method:** This indirect method, whereby net profit and loss is adjusted for the effects of transactions of a non-cash nature, and deferrals or accruals of past or future operating cash receipts or payments and item of income or expenses associated with investing or financing cash flows.

The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method and is, therefore, considered more appropriate than the indirect method. Under the direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

- a. from the accounting records of the enterprise; or
- b. by adjusting sales, cost of sales (interest and similar income and interest expenses and similar charges for a financial enterprise) and other items in the statement of profit and loss for:
  - i. changes during the period in inventories and operating receivable and payable.
  - ii. other non-cash items; and
  - iii. other items for which the cash effects are investing or financing cash flows.

Under the indirect method, the net cash flow from operating activities is determined by adjusting net profit or loss for the effects of:

- a. changes during the period in inventories and operating receivables and payables;
- b. non-cash items such as depreciation, provisions, deferred taxes, and unrealised foreign exchanges gains and losses; and
- c. all other items for which the cash effects are investing or financing cash flows.

**Alternatively,** the net cash flow from operating activities may be presented under the indirect method by showing the operating revenues and expenses, excluding non-cash items disclosed in the statement of profit and loss and changes during the period in inventories and operating receivables and payables.

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### 13.3 INVESTING ACTIVITIES:

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The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditures have been made for resources intended to generate future income and cash flows. Example of cash flows arising from investing are:

- a. Cash payments to acquire fixed assets (including intangible). These payments include those relating to capitalised research and development costs and self-constructed fixed assets;
- b. cash receipts from disposal of fixed assets (including intangible);
- c. cash payments to acquire share, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing for trading purpose);
- d. cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipt from those instruments considered to be cash equivalents and those held for dealing or trading purposes);
- e. cash advances and loans made to third parties (other than advances and loans made by a finance enterprise);
- f. cash receipts from the repayment to advances and loans made to third parties (other than advances and loans of a financial enterprise);
- g. cash payments for futures contracts, forward contracts, option contracts and swap contracts excepts when the contracts are held for dealing or trading purposes; or the payments are classified as financing activities; and
- h. cash receipts from futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

When a contract is accounted for as a hedge of an identifiable position, the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

### 13.4 FINANCING ACTIVITIES:

The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds (both capital and borrowings) to enterprise. Examples of cash flows arising from financing activities are:

- cash proceeds from issuing shares or other similarly instruments.
- cash proceeds from issuing debentures, loans, notes, bonds, and other short or long-term borrowings, and
- cash repayments of amounts borrowed.

**Illu.1: From the following comparative balance sheet of Sankalp Ltd. for the year 2000 and 2001 prepare Cash Flow Statements:**

#### Balance Sheets

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Equity Share Capital	7,00,000	7,40,000	Cash	90,000	78,000
10% Debentures	1,20,000	60,000	Debtors	1,42,000	1,69,000
Creditors	1,03,600	1,18,400	Stock	4,92,000	4,27,000
Profit & Loss a/c	1,00,400	1,05,600	Land	2,00,000	3,00,000
			Goodwill	1,00,000	50,000
	10,24,000	10,24,000		10,24,000	10,24,000

**Solution:**

#### Cash Flow Statement for the year ending 31-12-2001

	Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>		
Net Profit (Rs.1,05,600 – 1,00,400) (A)	5,200	
Add: Non Operating Expenses and Losses: (B)		
Goodwill written off	50,000	
	55,200	
Less: Non-Operating Incomes and Gains (C)	Nil	
Operating profit before working capital changes (A+B-C) D	55,200	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities:		
Stock (Rs.4,92,000 – 4,27,000)	65,000	
Creditors (Rs.1,18,400 – 1,03,600)	14,800	
	1,35,000 (E)	
<b>Less:</b> Increase in Current assets and decrease in Current liabilities:		
Debtors (Rs.1,69,000 – 1,42,000) (F)	27,000	
Cash from operating activities (D+E-F) (G)		1,08,000

		Rs.	Rs.
<b>II. Cash from Investing Activities:</b>			
<b>Add:</b> Cash Inflows		Nil	
<b>Less:</b> Cash outflows			
Purchases of land	(H)	1,00,000	
Net cash from Investing Activities	(I)		(-) 1,00,000
<b>III. Cash from financing Activities</b>			
<b>Add:</b> Cash inflows:			
Issues of share capital	(J)	40,000	
<b>Less:</b> Cash outflows:			
Redemption of Debentures	(K)	60,000	
Net cash from Financing Activities (J-K)	(L)		(-) 20,000
Net Decrease in Cash equivalent (Rs.78,000 – 90,000)			(-) 12,000
Cash and cash equivalents at the beginning of the period			90,000
Cash and cash equivalents at the end of the period			78,000

**Working Notes:**

Dr.	Land a/c		Cr.
	Rs.		Rs.
To Balance b/d	2,00,000	By Balance c/d	3,00,000
To Bank (outflow)	1,00,000		
(Balancing Figure)			
	3,00,000		3,00,000

Dr.	Goodwill a/c		Cr.
	Rs.		Rs.
To Balance b/d	1,00,000	By Profit & Loss adjustment a/c (Balancing Figure)	50,000
		By Balance c/d	50,000
	1,00,000		1,00,000

Dr.	Equity Share Capital a/c		Cr.
	Rs.		Rs.
To Balance c/d	7,40,000	By Balance b/d	7,00,000
		By Bank (inflow)	40,000
		(Balancing Figure)	
	7,40,000		7,40,000

Dr.		<b>10% debentures a/c</b>		Cr.	
		Rs.			Rs.
To Bank (outflow) (Balancing Figure)	60,000	By Balance b/d			1,20,000
To Balance c/d	60,000				
	1,20,000				1,20,000

Dr.		<b>Profit &amp; Loss adjustment a/c</b>		Cr.	
		Rs.			Rs.
To Goodwill	50,000	By Balance b/d			1,00,400
To Balance c/d	1,05,600	By Operating Profit (Balancing Figure)			55,200
	1,55,600				1,55,600

**Illu.2: Prepare Cash flow statements from the following:**

Liabilities	2001 Rs.	2002 Rs.
Equity Share Capital	3,00,000	4,00,000
6% Redeemable Preference Share Capital	1,50,000	1,00,000
Capital Reserve	---	20,000
General Reserve	40,000	50,000
Profit & Loss a/c	30,000	48,000
Proposed dividend	42,000	50,000
Creditors	25,000	47,000
Bills Payable	20,000	16,000
Preliminary for expenses	30,000	36,000
Provision for taxation	40,000	50,000
	<b>6,77,000</b>	<b>8,17,000</b>
Assets	2001 Rs.	2002 Rs.
Goodwill	1,00,000	80,000
Land & Buildings	2,00,000	1,70,000
Plant	80,000	2,00,000
Investments	20,000	30,000
Debtors	1,40,000	1,70,000
Stock	77,000	1,09,000
Bills Receivable	20,000	30,000
Cash in hand	15,000	10,000
Cash at bank	10,000	8,000
Preliminary Expenses	15,000	10,000
	<b>6,77,000</b>	<b>8,17,000</b>

1. A piece of land had been sold in 2002 and profit on sale has been credited to capital reserve a/c.

2. A machine has been sold for Rs.10,000, W.D.12,000 Depreciation of Rs.10,000 is charged on plant a/c in 2002.
3. Investments are trade investments Rs.3,000 by way of dividend is received including 1,000 from preacquisition profit which has been credited to investments a/c.
4. Interim dividend of 20,000 has been paid in 2002.

**Solution:**

**Cash Flow Statement for the year ending 31-3-2002**

		Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>			
Net Profit (Rs.48,000 – 30,000)	(A)	18,000	
<b>Add:</b> Non Operating Expenses and Losses:			
Goodwill written off		20,000	
Depreciation on plant		10,000	
Loss on sale of plant		2,000	
Preliminary expenses written off		5,000	
Transfer to General reserve		10,000	
Proposed Dividends		50,000	
Payment of Dividends		20,000	
Total Non-Operating Expenses and Losses	(B)	1,17,000	
<b>Less:</b> Non-Operating Incomes and Gains		Nil	
Dividends on Investments	(C)	2,000	
Operating profit before working capital changes (A+B-C)	D	1,33,000	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities:			
Creditors (Rs.47,000 – 25,000)		22,000	
Liabilities for Expenses (Rs.36,000 – 30,000)		6,000	
Provision for Taxation (Rs.50,000 – 40,000)		10,000	
Total decrease in Current assets and Increase in Current Liabilities	(E)	38,000	
<b>Less:</b> Increase in Current assets and decrease in Current Liabilities:			
Debtors (1,70,000 – 1,40,000)		30,000	
Stock (1,09,000 – 77,000)		32,000	
Bills Receivable (30,000 – 20,000)		10,000	
Bills Payable (20,000 – 16,000)		4,000	
Total Increase in Current Assets and <b>Decrease in Current Liabilities</b>	(F)	76,000	
<b>Cash from operating activities (D+E-F)</b>	(G)		95,000



<b>II. Cash Flow from Investing Activities:</b>		<b>Rs.</b>	<b>Rs.</b>
<b>Add: Cash Inflows</b>			
Sale of lands and Buildings		50,000	
Sale of Machinery		10,000	
Dividends from Investments		2,000	
Preacquisition profit on Investments		1,000	
Total Cash Inflows	(H)	63,000	
<b>Less: Cash outflows</b>			
Purchase of land		1,42,000	
Purchase of Investments		11,000	
Total Cash outflows	(I)	1,53,000	
Net cash from Investing Activities (H-I)	(J)		(-) 90,000
<b>III. Cash from financing Activities</b>			
<b>Add: Cash inflows:</b>			
Issues of Equity share capital	(K)	1,00,000	
<b>Less: Cash outflows:</b>			
Redemption of pref. Share capital		50,000	
Payment of proposed dividend		42,000	
Payment of Dividend		20,000	
Total Cash outflows	(L)	1,12,000	
Net cash from Financing Activities (K-L)			(-) 12,000
Net Decrease in Cash equivalent			(-) 7,000
Cash and Cash equivalents at the beginning of the period			25,000
Cash and Cash equivalents at the end of the period			18,000

**Working Notes:**

Dr.		<b>Goodwill a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	1,00,000	By Profit & Loss adjustment a/c (Balancing Figure)			20,000
		By Balance c/d			80,000
	1,00,000				1,00,000

Dr.		<b>Land &amp; Buildings a/c</b>		Cr.	
	Rs.				Rs.
To Balance b/d	2,00,000	By Bank (inflow) (Balancing Figure)			50,000
To Capital Reserve (Profit)	20,000	By Balance c/d			1,70,000
	2,20,000				2,20,000

Dr.	<b>Capital Reserve a/c</b>		Cr.
	Rs.		Rs.
To Balance c/d	20,000	By Land a/c	20,000
	20,000		20,000

Dr.	<b>Plant a/c</b>		Cr.
	Rs.		Rs.
To Balance b/d	80,000	By Bank (inflow)	10,000
To Bank (outflow) (Balancing Figure)	1,42,000	By Profit & Loss adjustment a/c (depreciation)	10,000
		By Profit & Loss a/c (loss)	2,000
		By Balance c/d	2,00,000
	2,22,000		2,22,000

Dr.	<b>Preliminary Expenses a/c</b>		Cr.
	Rs.		Rs.
To Balance b/d	15,000	By Profit & Loss adjustment a/c (Balancing Figure)	5,000
		By Balance c/d	10,000
	15,000		15,000

Dr.	<b>Equity Share Capital a/c</b>		Cr.
	Rs.		Rs.
To Balance c/d	4,00,000	By Balance b/d	3,00,000
		By Bank (inflow) (Balancing Figure)	1,00,000
	4,00,000		4,00,000

Dr.	<b>Investments a/c</b>		Cr.
	Rs.		Rs.
To Balance b/d	20,000	By Bank (inflow) (Pre-acquisition profit)	1,000
To Bank (outflow) (Balancing Figure)	11,000	By Balance c/d	30,000
	31,000		31,000

Dr.		<b>6% Preference Share Capital a/c</b>		Cr.	
	Rs.				Rs.
To Bank (outflow) (Balancing Figure)	50,000	By Balance b/d			1,50,000
To Balance c/d	1,00,000				
	1,50,000				1,50,000

Dr.		<b>General Reserve a/c</b>		Cr.	
	Rs.				Rs.
To Balance c/d	50,000	By Balance b/d			40,000
		By Profit & Loss adjustment a/c (Balancing Figure)			10,000
	50,000				50,000

Dr.		<b>Proposed Dividend a/c</b>		Cr.	
	Rs.				Rs.
To Bank (outflow)	42,000	By Balance b/d			42,000
To Balance c/d	50,000	By Profit & Loss adjustment a/c (Balancing Figure)			50,000
	92,000				92,000

Dr.		<b>Profit &amp; Loss adjustment a/c</b>		Cr.	
	Rs.				Rs.
To Goodwill	20,000	By Balance b/d			30,000
To Plant (depreciation)	10,000	By Dividend on investments (inflow)			2,000
To Plant (loss)	2,000	By Operating Profit (Balancing Figure)			1,33,000
To Preliminary expenses	5,000				
To General Reserve	10,000				
To Proposed dividend	50,000				
To Dividend (outflow)	20,000				
To Balance c/d	48,000				
	1,65,000				1,65,000

**Illu.3: The financial position of M/s Jayco Traders on January 1 and December 31, 2001 was as follows:**

Liabilities	1 <sup>st</sup> Jan. Rs.	31 <sup>st</sup> Dec. Rs.	Assets	1 <sup>st</sup> Jan. Rs.	31 <sup>st</sup> Dec. Rs.
<b>Current Liabilities</b>	<b>36,000</b>	<b>40,600</b>	<b>Cash</b>	<b>4,000</b>	<b>3,600</b>
<b>Loans from Individuals</b>	<b>---</b>	<b>40,000</b>	<b>Debtors</b>	<b>35,000</b>	<b>38,000</b>
<b>Loan from Bank</b>	<b>30,000</b>	<b>25,000</b>	<b>Stock</b>	<b>25,000</b>	<b>22,000</b>
<b>Capital</b>	<b>1,48,000</b>	<b>1,54,000</b>	<b>Land</b>	<b>20,000</b>	<b>30,000</b>
			<b>Buildings</b>	<b>50,000</b>	<b>55,000</b>
			<b>Machinery</b>	<b>80,000</b>	<b>86,000</b>
			<b>Van</b>	<b>---</b>	<b>25,000</b>
	<b>2,14,000</b>	<b>2,59,600</b>		<b>2,14,000</b>	<b>2,59,600</b>

The Van was purchased in December in 2001; a payment of Rs.5,000 was made immediately and the balance of the amount is to be paid in 20 monthly installments of Rs.1,000 each together with interest @ 12% p.a. During the year the partners withdrew Rs.26,000 for their use. The provision for depreciation against machinery on 31-12-2000 was Rs.27,000 and on 31-12-2001 Rs.36,000. You are required to prepare the cash flow statement.

**Solution:**

**Cash Flow Statement for the year ending 31-12-2001**

		Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>			
Net Profit	(A)	32,000	
<b>Add:</b> Non Operating Expenses and Losses:			
Provision for Depreciation	(B)	9,000	
<b>Less:</b> Non-Operating Incomes and Gains	(C)	Nil	
Operating profit before working capital changes (A+B-C)	(D)	41,000	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities:			
Stock (Rs.25,000 – 22,000)		3,000	
Current Liabilities (Rs.40,600 – 36,000)		4,600	
Total decreases in Current assets and Increase in Current Liabilities	(E)	7,600	
<b>Less:</b> Increase in Current assets and decrease in Current liabilities:			
Debtors (Rs.38,000 – 35,000)	(F)	3,000	
Cash from operating activities (D+E-F)	(G)		45,600
<b>II. Cash Flow from Investing Activities:</b>			
<b>Add:</b> Cash Inflows		Nil	
<b>Less:</b> Cash Outflows			

		Rs.	Rs.
Purchase of Land		10,000	
Purchase of Building		5,000	
Purchase of Machinery		15,000	
Down payment for Delivery van		5,000	
Total of Cash outflows	(H)	35,000	
<b>Net cash from Investing Activities (H-I)</b>	(I)		(-) 35,000
<b>III. Cash from financing Activities</b>			
<b>Add: Cash inflows</b>			
Loans taken from Individuals	(J)	20,000	
<b>Less: Cash outflows:</b>			
Bank loan Repayment		5,000	
Drawings		26,000	
Total Cash outflows	(K)	31,000	
<b>Net cash used in Financing Activities (J-K)</b>	(L)		(-) 11,000
Net increase in Cash and cash equivalent (I+II+III)			(-) 400
Cash and Cash equivalents at the beginning of the period			4,000
Cash and Cash equivalents at the end of the period			3,600

**Working Notes:**

Dr.		Land a/c		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	20,000	By Balance c/d			30,000
To Bank (outflow)	10,000				
(Balancing Figure)					
	30,000				30,000

Dr.		Building a/c		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d	50,000	By Balance c/d			55,000
To Bank (outflow)	5,000				
(Balancing Figure)					
	55,000				55,000

Dr.		Machinery a/c		Cr.	
	Rs.		Rs.		Rs.
To Balance b/d (80,000+27,000)	1,07,000	By Balance c/d (86,000+36,000)			1,22,000
To Bank (outflow)	15,000				
(Balancing figure)					
	1,22,000				1,22,000

Dr. **Provision for depreciation a/c** Cr.

	Rs.		Rs.
To Balance c/d	36,000	By Balance b/d	27,000
		By Profit & Loss adjustment a/c (Balancing Figure)	9,000
	36,000		36,000

Dr. **Van a/c** Cr.

	Rs.		Rs.
To Hire Vendor (loan from individuals)	25,000	By Balance c/d	25,000
	25,000		25,000

Dr. **Loan from individual a/c** Cr.

	Rs.		Rs.
To Bank (outflow) (down payment)	5,000	By Van	25,000
To Balance c/d	40,000	By Bank (inflow) (Balancing Figure)	20,000
	45,000		45,000

Dr. **Loan from bank a/c** Cr.

	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	5,000	By Balance b/d	30,000
To Balance c/d	25,000		
	30,000		30,000

Dr. **Capital a/c** Cr.

	Rs.		Rs.
To Bank (drawings) (Outflow)	26,000	By Balance b/d	1,48,000
To Balance c/d	1,54,000	By Profit & Loss a/c (Profit)	32,000
	1,80,000		1,80,000

Dr.		Profit & Loss adjustment a/c		Cr.	
		Rs.			Rs.
To Provision for Depreciation		9,000	By Operating profit		41,000
			(Balancing Figure)		
To Capital		32,000			
		41,000			41,000

Illu.4: ANLEX Ltd. has presented the following Balance Sheet as at 31<sup>st</sup> December, 2000 and 2001.

	2000 Rs.	2001 Rs.		2000 Rs.	2001 Rs.
Share Capital	6,00,000	6,00,000	Building less Depreciation	5,00,000	4,80,000
General Reserve	26,500	12,000	Plant less Depreciation	90,000	85,000
Creditors	8,500	4,000	Stock	5,000	1,000
			Debtors	15,000	10,000
			Cash	25,000	40,000
	6,35,000	6,16,000		6,35,000	6,16,000

Sales made by the company amounted to Rs.21,85,000 during the year 2001. No dividend has been paid. The changes in Building and Plant values are fully due to depreciation charges for 2000. Prepare a Cash Flow Statement.

**Solution:**

**Cash Flow Statement for the year ending 31-12-2001**

		Rs.	Rs.
<b>I</b>	<b>Cash Flow from Operating Activities:</b>		
	Net Profit (A)	Nil	
	<b>Add: Non Operating Expenses and Losses:</b>		
	Depreciation on Buildings	20,000	
	Depreciation on Plant	5,000	
	Total Non-Operating Expenses and Losses (B)	25,000	
	<b>Less: Non-Operating Incomes and Gains</b>		
	General Reserve	14,500	
	Cost of Sales	21,85,000	
	Total Non-Operating Incomes and Gains (C)	21,99,500	
	Gross Operating Loss before changes in the Working Capital (B-C) D	21,74,500	

		Rs.	Rs.
<b>Less:</b> Sales	(E)	21,85,000	
Net Operating Profit Before changes in the Working Capital (D-E)	(F)	10,500	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities:			
Stock (Rs.5,000 – 1,000)		4,000	
Debtors (Rs.15,000 – 10,000)		5,000	
Total Decrease in Current Assets and Increase in Current Liabilities	(G)	9,000	
<b>Less:</b> Increase in Current assets and decrease in Current liabilities:			
Creditors (Rs.8,500 – 4,000)	(H)	4,500	
Cash from operating activities (F+G-H)	(I)		15,000
<b>II Cash from Investing Activities:</b>			<b>Nil</b>
<b>III Cash from Financing Activities:</b>			<b>Nil</b>
Net Increase in Cash equivalent (I+II+III)			15,000
Cash and Cash equivalents at the beginning of the period			25,000
Cash and Cash equivalents at the end of period			40,000

**Working Notes:**

Dr.	<b>Buildings a/c</b>		Cr.
	Rs.		Rs.
To Balance b/d	5,00,000	By Profit & Loss adjustment a/c (depreciation) (Balancing Figure)	20,000
		By Balance c/d	4,80,000
	5,00,000		5,00,000

Dr.	<b>Plant a/c</b>		Cr.
	Rs.		Rs.
To Balance b/d	90,000	By Profit & Loss adjustment a/c (depreciation) (Balancing Figure)	5,000
		By Balance c/d	85,000
	90,000		90,000



Dr.		General Reserve a/c		Cr.	
	Rs.				Rs.
To Profit & Loss adjustment a/c (Balancing Figure)	14,500	By Balance b/d			26,500
To Balance c/d	12,000				
	26,500				26,500

Dr.		Profit & Loss adjustment a/c		Cr.	
	Rs.				Rs.
To Depreciation on Buildings	20,000	By General Reserve			14,500
To Depreciation on Plant	5,000	By Cost of Sales			21,85,000
To Operating loss (Balancing Figure)	21,74,500				
	21,99,500				21,99,500

**Illu.5: The directors of Durex Tools Ltd. are very much worried at the deteriorating financial position of the concern. The concern has availed full overdraft facility from SBI of India and still it is not able to pay off its creditors on due dates notwithstanding satisfactory profits earned by it. The following are the Balance Sheets as at 31<sup>st</sup> December, 2000 and 2001.**

	2000 Rs.	2001 Rs.		2000 Rs.	2001 Rs.
Share Capital in Share of Rs.10 fully paid	1,00,000	1,00,000	Land & Buildings	30,000	50,000
Profit & Loss a/c	6,000	8,000	Plant & Machinery (cost)	50,000	60,000
Bank Overdraft	16,000	60,000	Vehicles (cost)	11,600	12,400
Creditors	20,000	60,000	Stock	22,000	72,000
Provision for Depreciation: Plant & Machinery	12,000	18,000	Debtors	46,000	60,000
Vehicles	5,600	8,400			
	1,59,600	2,54,400		1,59,600	2,54,400

During the year a dividend of 10% was paid to share holders. On 1<sup>st</sup> January, 2001 a motor car which was originally purchased for Rs.2,000 and showing a book value of Rs.1,000 was sold for Rs.1,600. You are required to prepare a statement which should indicate as what has happened to the money which has come into the business during the year 2001.

**Solution:****Cash Flow Statement for the year ending 31-12-2001**

		Rs.	Rs.
<b>I Cash Flow from Operating Activities:</b>			
Net Profit (Rs.8,000 – 6,000)	(A)	2,000	
<b>Add:</b> Non Operating Expenses and Losses:			
Provision for Depreciation on Plant & Machinery		6,000	
Provision for Depreciation on Vehicles		3,800	
Payment of Dividend		10,000	
Total Non-operating Expenses and Losses	(B)	19,800	
<b>Less:</b> Non-Operating Incomes and Gains			
Profit on sale of Motor car	(C)	600	
Operating Profit Before changes in Working Capital (A+B-C)	(D)	21,200	
<b>Add:</b> Decrease in Current asset and increase in Current Liabilities:			
Creditors (Rs.60,000 – 20,000)		40,000	
<b>Less:</b> Increase in Current assets and decrease in Current Liabilities:			
Stock (Rs.72,000 – 22,000)		50,000	
Debtors (Rs.60,000 – 46,000)		14,000	
Total Increase in Current assets and decrease in Current Liabilities	(F)	64,000	
<b>Cash from operating activities (D+E-F)</b>	(G)		(-) 2,800
<b>II Cash from Investing Activities:</b>			
<b>Add:</b> Cash Inflows		Nil	
<b>Less:</b> Cash outflows			
Purchases of land		1,00,000	
Net cash from Investing Activities			(-) 1,00,000
<b>III Cash from Financing Activities</b>			
<b>Add:</b> Cash inflows:			
Sale of motor car	(H)	1,600	
<b>Less:</b> Cash outflows:			
Purchase of land and buildings		20,000	
Purchase of Plant and Machinery		10,000	
Purchase of Vehicles		2,800	
Total Cash outflows	(I)	32,800	
Net cash from Investing Activities (H-I)	(J)		(-) 31,200
Net cash from Financing Activities			
<b>Add:</b> Cash Inflows:			
Bank Overdraft (16,000 – 60,000)	(K)	44,000	

<b>Less: Cash Outflows:</b>			<b>Rs.</b>	<b>Rs.</b>
Payment of Dividend	(L)		10,000	
Net Cash from financing activities (K-L)	(M)			34,000
Net Increase/Decrease in Cash				Nil
Cash and Cash equivalents at the beginning of the period				Nil
Cash and Cash equivalents at the end of the period				Nil

**Working Notes:**

Dr.		<b>Land &amp; Buildings a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		30,000	By Balance c/d		50,000
To Bank (outflow)	(Balancing Figure)	20,000			
		50,000			50,000

Dr.		<b>Plant &amp; Machinery a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		50,000	By Balance c/d		60,000
To Bank (outflow)	(Balancing Figure)	10,000			
		60,000			60,000

Dr.		<b>Vehicles a/c</b>		Cr.	
		Rs.			Rs.
To Balance b/d		11,600	By Bank (inflow)		1,600
To Profit & Loss adjustment a/c	(Profit)	600	By Depreciation on Vehicles		1,000
To Bank (outflow)	(Balancing Figure)	2,800	By Balance c/d		12,400
		15,000			15,000

Dr.		<b>Profit &amp; Loss adjustment a/c</b>		Cr.	
		Rs.			Rs.
To Provision for depreciation on Plant & Machinery		6,000	By Balance b/d		6,000
To Provision for depreciation on Vehicles		3,800	By Profit on sale of motor car		600
To Dividend (outflow)	$(1,00,000 \times \frac{10}{100})$	10,000	By Operating profit		21,200
			(Balancing Figure)		
To Balance c/d		8,000			
		27,800			27,800

**Provision for depreciation on Plant & Machinery**

	Rs.		Rs.
To Balance c/d	18,000	By Balance b/d	12,000
		By Profit and Loss adjustment a/c (Balancing Figure)	6,000
	18,000		18,000

**Provision for depreciation on Vehicles**

	Rs.		Rs.
To Vehicles	1,000	By Balance b/d	5,600
To Balance c/d	8,400	By Profit and Loss adjustment a/c (Balancing Figure)	3,800
	9,400		9,400

**Illu.6:** The following is the summary of annual accounts Mythreyee Company Ltd. for the two years 2001 and 2002.

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Capital Notes Payable	20,000		Cash	5,000	3,000
Notes payable	5,000	8,000	Marketable Securities	5,000	7,000
Accounts payable	3,000	5,000	Accounts Receivable	10,000	15,000
Accrued Taxes	3,000	5,000	Inventory	12,000	15,000
Accrued Wages	2,000	2,000	Fixed Assets (Net)	50,000	55,000
Long term loan		15,000	Other Assets	8,000	5,000
Shareholders Fund	60,000	70,000			
	90,000	1,00,000		90,000	1,00,000

**Profit and Loss Account**  
(for the year ending December 31, 2002)

	Rs.	Rs.
Net Sales		50,000
Less: Expenses		
Cost of Goods sold	25,000	
Selling & Administration	5,000	
Depreciation	5,000	
Interest	1,000	
		36,000

	Rs.	Rs.
<b>Net profit before Tax</b>		<b>14,000</b>
<b>Less: Income Tax (50%)</b>		<b>7,000</b>
<b>Net profit before Tax</b>		<b>7,000</b>
<b>Add: P &amp; L a/c balance on 1-1-2002</b>		<b>40,000</b>
		<b>47,000</b>
<b>Less: Dividends</b>		<b>3,000</b>
<b>P &amp; L a/c balance on 31-12-2002</b>		<b>4,000</b>

**Solution:****Cash flow Statement for the year ended 31-12-2002**

		Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>			
Net Profit (Rs.44,000-40,000)	(A)	4,000	
Add: Non Operating Expenses and Losses:			
Depreciation on Fixed Assets		5,000	
Depreciation on Other Assets		3,000	
Payment of Dividend		3,000	
Total Non-Operating Expenses and Losses	(B)	11,000	
Less: Non-Operating Incomes and Gains	(C)	Nil	
Operating Profit Before changes in Working Capital (A+B-C)	(D)	15,000	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities			
Accounts Payable (Rs.8,000-5,000)		3,000	
Accrued Taxes (Rs.5,000-3,000)		2,000	
Total of Decrease in Current Assets and increase in Current liabilities	(E)	5,000	
<b>Less:</b> Increase in Current assets and decrease in Current liabilities:			
Marketable Securities (Rs.7,000-5,000)		2,000	
Accounts Receivable (Rs.15,000-10,000)		5,000	
Inventory (Rs.15,000-12,000)		3,000	
Bills payable (Rs.20,000-0)		20,000	
Total of Increase in Current Assets and decrease in Current liabilities	(F)	30,000	
<b>Cash from operating activities (D+E-F)</b>	(G)		(-) 10,000
<b>II. Cash from Investing Activities:</b>			
<b>Add:</b> Cash Inflows	H	Nil	
<b>Less:</b> Cash outflows			
Purchases of fixed assets	(I)	10,000	
<b>Net cash from Investing Activities (H-I)</b>	J		(-) 10,000

III. Cash from financing Activities		Rs.	Rs.
<b>Add:</b> Cash inflows:			
Long term loan taken	(J)	15,000	
<b>Less:</b> Cash outflows:			
Payment of Dividends	(K)	3,000	
<b>Net cash from Investing Activities (J-K)</b>	(L)		12,000
Net cash from Financing Activities			(-) 8,000
Net Increase/Decrease in Cash equivalent			5,000
Cash and Cash equivalents at the beginning of the period			3,000
Cash and Cash equivalents at the end of the period			3,000

**Working Notes:**

Shareholders fund means : Share capital + Reserves.

Dr. Fixed assets a/c		Cr.	
	Rs.		Rs.
To Balance b/d	50,000	By Profit & Loss adjustment a/c (depreciation)	5,000
To Bank (outflow) (Balancing Figure)	10,000	By Balance c/d	55,000
	60,000		60,000

Dr. Other Assets a/c		Cr.	
	Rs.		Rs.
To Balance b/d	8,000	By P & L adjustment a/c (depreciation) (Balancing Figure)	5,000
		By Balance c/d	5,000
	8,000		8,000

Dr. Long term loan a/c		Cr.	
	Rs.		Rs.
To Balance c/d	15,000	By Bank (inflow) (Balancing Figure)	15,000
	15,000		15,000

Dr. Shareholder's Fund a/c		Cr.	
	Rs.		Rs.
To P & L adjustment a/c (Opening balance of Profit)	40,000	By Balance b/d	60,000
To Balance c/d	70,000	By P & L adjustment a/c (Closing balance of Profit)	44,000
		By Bank (inflow) (Balancing Figure)	6,000
	1,10,000		1,10,000

Dr.	<b>Profit &amp; Loss Adjustment a/c</b>		Cr.
	Rs.		Rs.
To Depreciation on fixed assets	5,000	By Shareholder's fund	40,000
To Depreciation on other assets (written off)	3,000	By Operating profit (Balancing Figure)	15,000
To Shareholders fund	44,000		
To Dividend (outflow)	3,000		
	55,000		55,000

**Note:** Shareholder's fund = share capital + reserves. Reserves include Profit & Loss a/c opening and closing balances. To find out the actual capital issues, we have to open the shareholders find account.

**Illu.7: The Balance Sheets of EPL Limited as at 31-12-2001 were as under:**

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
<b>Share Capital</b>	<b>30,000</b>	<b>30,000</b>	<b>Freehold property at cost</b>	<b>22,500</b>	<b>24,000</b>
<b>Reserves</b>	<b>22,500</b>	<b>24,000</b>	<b>Plant and Machinery (at cost Less: Depreciation</b>	<b>13,500</b>	<b>16,500</b>
<b>6% Debentures (Unsecured)</b>	<b>7,500</b>	<b>7,500</b>	<b>Investment in shares of companies under the same management (unquoted)</b>	<b>15,000</b>	<b>15,000</b>
<b>Mortgage on Freehold property</b>	<b>2,700</b>	<b>1,425</b>	<b>Investments in share of other companies (quoted)</b>	<b>11,250</b>	<b>11,250</b>
<b>Creditors</b>	<b>4,500</b>	<b>4,500</b>	<b>Stock</b>	<b>5,250</b>	<b>7,500</b>
<b>Proposed Dividend</b>	<b>2,250</b>	<b>2,325</b>	<b>Debtors</b>	<b>4,500</b>	<b>7,500</b>
<b>Provision for tax</b>	<b>2,100</b>	<b>3,750</b>	<b>Bank</b>	<b>1,050</b>	<b>--</b>
<b>Secured Overdraft (by floating charge on assets)</b>	<b>1,500</b>	<b>8,250</b>			
	<b>73,050</b>	<b>81,750</b>		<b>73,050</b>	<b>81,750</b>

The following additional information for the year 2001 are relevant:

		Rs.
1.	<b>Sales</b>	<b>67,500</b>
2.	<b>Purchases</b>	<b>52,000</b>
3.	<b>Overheads</b>	<b>8,375</b>
4.	<b>Depreciation on Plant &amp; Machinery</b>	<b>1,750</b>
5.	<b>Dividend for the year 2001 was paid in full</b>	
6.	<b>Amount paid towards tax for 2001</b>	<b>2,150</b>

In view of the credit squeeze, the Company has been asked by the bank to reduce the overdraft substantially within 6 months, if possible by 50%.

**Solution:**

**Cash Flow Statement for the year ending 31-12-2001**

		Rs.	Rs.
<b>I.</b>	<b>Cash Flow from Operating Activities:</b>		
	Net Profit (A)	Nil	
	<b>Add:</b> Non Operating Expenses and Losses:		
	Depreciation on Plant and Machinery	1,750	
	Proposed Dividend	2,325	
	Provision for Tax	3,800	
	Transfers to Reserves	1,500	
	Total of Non-operating Expenses and Losses (B)	9,375	
	Less: Non-Operating Incomes and Gains (C)	Nil	
	Operating profit before changes in working capital changes (D)	9,375	
	<b>Add:</b> Decrease in Current assets and increase in Current Liabilities:	Nil	
	<b>Less:</b> Increase in Current assets and decrease in Current liabilities:		
	Stock (Rs.7,500-5,250)	2,250	
	Debtors (Rs.7,500-4,500)	3,000	
	Total Increase in Current Assets and Decreased in Current Liabilities (F)	5,250	
	<b>Cash from operating activities (D+E-F) (G)</b>		4,125
<b>II.</b>	<b>Cash from Investing Activities:</b>		
	<b>Add:</b> Cash Inflows	Nil	
	<b>Less:</b> Cash outflows		
	Purchases of freehold property	1,500	
	Purchase of Plant and Machinery	4,750	
	Total Cash outflows (I)	6,250	
	Net cash from Investing Activities		(-) 6,250



III. Cash from financing Activities		Rs.	Rs.
Add: Cash inflows:			
Bank Overdraft (8,250-1,500)	(K)	6,750	
Less: Cash outflows:			
Payment of Mortgage		1,275	
Payment of proposed dividend		2,250	
Payment of tax		2,150	
Total Cash outflows	(L)	5,675	
<b>Net cash from Financing Activities</b>			1,075
Net Decrease in Cash equivalent			(-) 1,050
Cash and Cash equivalent at the beginning of the period			1,050
Cash and Cash equivalent at the end of the period			Nil

**Working Notes:**

Dr. Freehold Property a/c		Cr.	
	Rs.		Rs.
To Balance b/d	22,500	By Balance c/d	24,000
To Bank (outflow) (Balancing Figure)	1,500		
	24,000		24,000

Dr. Plant and Machinery a/c		Cr.	
	Rs.		Rs.
To Balance b/d	13,500	By P & L adjustment a/c (depreciation)	1,750
To Bank (outflow) (Balancing Figure)	4,750	By Balance c/d	16,500
	18,250		18,250

Dr. Mortgage on freehold property a/c		Cr.	
	Rs.		Rs.
To Bank (outflow) (Balancing Figure)	1,275	By Balance b/d	2,700
To Balance c/d	1,425		
	2,700		2,700

Dr. Proposed dividend a/c		Cr.	
	Rs.		Rs.
To Bank (outflow)	2,250	By Balance b/d	2,250
To Balance c/d	2,325	By P & L adjustment a/c (Balancing Figure)	2,325
	4,575		4,575

Dr.		Provision for tax a/c		Cr.	
	Rs.				Rs.
To Bank (outflow)	2,150	By Balance b/d			2,100
To Balance c/d	3,750	By Profit & Loss adjustment a/c (Balancing Figure)			3,800
	5,900				5,900

Dr.		Reserve a/c		Cr.	
	Rs.				Rs.
To Balance c/d	24,000	By Balance b/d			22,500
		By P & L adjustment a/c (Balancing Figure)			1,500
	24,000				24,000

Dr.		Profit & Loss adjustment a/c		Cr.	
	Rs.				Rs.
To Depreciation on Plant and Machinery	1,750	By Operating profit (Balancing figure)			9,375
To Proposed dividend	2,325				
To Provision for tax	3,800				
To Reserve	1,500				
	9,375				9,375

**Illu.8: Ravindra Ltd., had the following figures on 1<sup>st</sup> January 2002:**

	Rs.
<b>Fixed Assets</b>	<b>3,00,000</b>
<b>Less: Depreciation</b>	<b>1,05,000</b>
	<b>1,95,000</b>
<b>Bank balance</b>	<b>17,500</b>
<b>Other Current Assets</b>	<b>1,25,000</b>
<b>Capital (Shares of Rs.10 each)</b>	<b>1,50,000</b>
<b>Current liabilities</b>	<b>50,000</b>

The company has prepared the following estimates for 2002

- Profit would be Rs.27,500 after depreciation of Rs.30,000
- The company will acquire Fixed Assets costing Rs.5,00,000 after selling one machine for Rs.10,000 costing Rs.25,000 and on which depreciation provided amounted to Rs.17,500.
- Current Assets and Current Liabilities other than Bank balance at the end of 2002 are expected to be Rs.1,47,500 and Rs.1,15,000 respectively.
- The company will pay Dividend at 10%.

**Prepare estimated Cash Flow Statement.**

**Solution:**

**Estimated Cash Flow Statement for the year ending 31-12-2002**

		Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>			
Net Profit	(A)	27,500	
<b>Add:</b> Non Operating Expenses and Losses:			
Depreciation	(B)	30,000	
<b>Less:</b> Non-Operating Incomes and Gains			
Profit on Sale of machinery	(C)	2,500	
Operating profit before working capital changes (A+B-C)	(D)	55,000	
<b>Add:</b> Decrease in Current assets and increase in Current liabilities:			
Current Liabilities (1,15,000 – 50,000)	(E)	65,000	
<b>Less:</b> Increase in Current assets and decrease in Current liabilities:			
Current assets (1,47,500 – 1,25,000)	(F)	22,500	
<b>Cash from operating activities (D+E-F)</b>	(G)		97,500
<b>II. Cash from Investing Activities:</b>			
<b>Add:</b> Cash Inflows			
Sale of Machinery	(H)	10,000	
<b>Less:</b> Cash outflows			
Purchases of fixed assets	(I)	5,00,000	
Net cash from Investing Activities (H-J)	(J)		(-) 4,90,000
<b>III. Cash from financing Activities</b>			
<b>Add:</b> Cash inflows:			
Bank Overdraft	(K)	3,90,000	
<b>Less:</b> Cash outflows:			
Payment of dividend	(L)	15,000	
<b>Net cash from financing activities (K-L)</b>	(M)	3,75,000	
Net Decrease in Cash equivalent			(-) 17,500
Cash and Cash equivalent at the beginning of the period			17,500
Cash and Cash equivalent at the end of the period			Nil

**Working Notes:**

Purchase of fixed assets (outflow) = 5,00,000

Sale of machine (inflow) = 10,000

<b>Calculation of profit or loss on sale of machine:</b>	Rs.
Cost of the machine	25,000
<b>Less:</b> Depreciation	17,500
Book value	7,500
<b>Less:</b> Selling price	10,000
Profit on sale	2,500

**Calculation of dividend: (Current year  $1,50,000 \times \frac{10}{100} = 15,000$  (outflow))**

Dr.		<b>Profit &amp; Loss adjustment a/c</b>		Cr.	
	Rs.				Rs.
To Depreciation	30,000	By Profit on sale of machinery			2,500
To Balance c/d	27,500	By Operating profit (Balancing Figure)			55,000
	57,500				57,500

**Illu.9: The Balance Sheet of XYZ Limited is as follows:**

Liabilities	1998	1999	Assets	1998	1999
	Rs.	Rs.		Rs.	Rs.
Equity	800	900	Fixed Assets	600	800
General Reserve	300	400	Additions	200	100
Profit & Loss A/c	200	300		800	900
Provision for taxation	300	400	Depreciation	300	350
Overdraft	300	464		500	550
Sundry Creditors	1,200	1,000	Investments	200	--
Proposed Dividend	80	90	Stock	1,400	1,230
			Debtors	1,080	1,774
	3,180	3,554		3,180	3,554

**Profit and Loss Account (for the year ending .....)**

Liabilities	1998	1999	Assets	1998	1999
	Rs.	Rs.		Rs.	Rs.
To Taxation	250	450	By Trading profit	430	660
To Proposed Dividend	80	90	By Profit on sale of investment	--	30
To Transfer to General Reserve	100	100	By Income tax excess provided in the previous year	--	50
To Balance c/d	200	300	By Balance from last year	200	200
	630	940		630	940

**Additional Information:**

1. For the year ending 31-12-99 purchases were Rs.60 lakhs and sales Rs.70 lakhs.
  2. Trading profit of the year ended 31-12-99 was arrived at after charging depreciation Rs.50,000 and directors remuneration Rs.1,20,000.
- Prepare the Cash Flow Statement.

**Solution:****Cash Flow Statement for the year ending 31-12-1999**

		Rs.	Rs.
<b>I. Cash Flow from Operating Activities:</b>			
Net Profit (Rs.300-200)	(A)	100	
<b>Add:</b> Non Operating Expenses and Losses:			
Provision for Depreciation		50	
Transfers to General Reserve		100	
Proposed Dividend		90	
Provision for tax		450	
Total Non-Operating Expenses and Losses	(B)	690	
<b>Less:</b> Non-Operating Incomes and Gains			
Profit on Investments		30	
Provision for tax		50	
Total Non-Operating Incomes and gains	(C)	80	
Operating profit before working capital changes (A+B-C)	D	710	
<b>Add:</b> Decrease in Current assets and increase in Current Liabilities:			
Stock (1,400-1,230)	(E)	170	
<b>Less:</b> Increase in Current assets and decrease in Current Liabilities			
Debtors (1,774 – 1,080)		694	
Creditors (1,200 – 1,000)		200	
Total Increase in Current assets and Decrease in Current Liabilities	(F)	894	
<b>Cash from operating activities (D+E-F)</b>	(G)		-(14)
<b>II. Cash from Investing Activities:</b>			
<b>Add:</b> Cash Inflows			
Sale of Investments	(H)	230	
<b>Less:</b> Cash outflows			
Purchases of fixed assets	(I)	100	
<b>Net cash from Investing Activities (H-I)</b>	(J)		130

III. Cash from financing Activities		Rs.	Rs.
<b>Add:</b> Cash inflows:			
Issues of capital	(K)	100	
<b>Less:</b> Cash outflows:			
Payment of Tax		300	
Payment of Proposed Dividend		80	
	(L)	380	
<b>Net cash from Financing Activities (K-L)</b>	(M)		(-) 280
Net Decrease in Cash equivalent			(-) 164
Cash and Cash equivalent at the beginning of the period			(-) 300
Cash and Cash equivalent at the end of the period			(-) 464

**Working Notes:**

Dr.	Fixed Assets a/c		Cr.
	Rs.		Rs.
To Balance b/d (600+200)	800	By Balance c/d (800+100)	900
To Bank (outflow) (Balancing Figure)	100		
	900		900

Dr.	Provision for depreciation a/c		Cr.
	Rs.		Rs.
To Balance b/d	350	By Balance c/d	300
		By Profit & Loss adjustment a/c	50
	350		350

Dr.	Investments a/c		Cr.
	Rs.		Rs.
To Balance b/d	200	By Bank (inflow) (Balancing Figure)	230
To P & L adjustment a/c (Profit on sale)	30		
	230		230

Dr.	Equity Share Capital a/c		Cr.
	Rs.		Rs.
To Balance c/d	900	By Balance b/d	800
		By Bank (inflow) (Balancing Figure)	100
	900		900

Dr.		General Reserve a/c		Cr.	
	Rs.				Rs.
To Balance c/d	400	By Balance c/d			300
		By Profit & Loss adjustment a/c (Balancing Figure)			100
	400				400

Dr.		Provision for taxation a/c		Cr.	
	Rs.				Rs.
To Profit & Loss adjustment a/c (excess provision cancelled)	50	By Balance b/d			300
To Bank (outflow) (Balancing figure)	300	By Profit and Loss adjustment a/c (current year provision)			450
To Balance c/d	400				
	750				750

Dr.		Proposed dividend a/c		Cr.	
	Rs.				Rs.
To Bank (outflow)	80	By Balance b/d			80
To Balance c/d	90	By Profit & Loss adjustment a/c (Balancing Figure)			90
	170				170

Dr.		Profit & Loss adjustment a/c		Cr.	
	Rs.				Rs.
To Provision for depreciation	50	By Balance b/d			200
To General Reserve	100	By Investments (Profit)			30
To Proposed dividend	90	By Provision for tax			50
To Provision for tax	450	By Operating profit (Balancing Figure)			710
To Balance c/d	300				
	990				990

**Illu.10: From the following particulars prepare cash flow statement.**

1. Net profit for 2009 after giving effect to the following was Rs.67,000
2. Plant sold during the year for Rs.1,23,000 cost being Rs.2,00,000, provision for depreciation Rs.50,000.
3. A part of old premises was disposed off for Rs.49,000 its cost was Rs.13,000 and depreciation was Rs.8,000.
4. Remaining part of old premises was renovated at a cost of Rs.52,000, its cost earlier being Rs.98,000 and depreciation provided Rs.16,000.
5. No depreciation was provided during the year on 2,3 and 4

6. 12% preference shares 3,00,000 were redeemed at a premium of 10%.
7. 15% debentures 2,00,000 were issued at a discount of 5%.
8. 10,000 equity shares of 100 each were converted into 1,00,000 equity shares of 10 each.
9. A plant costing 10,000 was exchanged for furniture of the same value.
10. Cash at bank as at the beginning was Rs.40,000 and at the end Rs.1,10,000.

**Solution:****Cash Flow Statement for the year ending 31-12-2009**

		Rs.	Rs.
<b>I</b>	<b>Cash Flow from Operating Activities:</b>		
	Net Profit (A)	67,000	
	<b>Add:</b> Non Operating Expenses and Losses:		
	Loss on sale of plant	27,000	
	Premium on Preference shares	30,000	
	Discount on issue of Debentures	10,000	
	Total Non-Operating Expenses and losses (B)	67,000	
	<b>Less:</b> Non-Operating Incomes and Gains		
	Profit on sale of premises (C)	44,000	
	Operating profit before changes in working capital (A+B-C) (D)	90,000	
	<b>Add:</b> Decrease in Current assets and increase in Current Liabilities (E)	Nil	
	<b>Less:</b> Increase in Current assets and decrease in Current liabilities (F)	Nil	
	Cash from operating activities (D+E-F) (G)		90,000
<b>II</b>	<b>Cash from Investing Activities:</b>		
	<b>Add:</b> Cash Inflows		
	Sale of Plant	1,23,000	
	Sale of premises	49,000	
	Total Cash inflows (H)	1,72,000	
	<b>Less:</b> Cash outflows		
	Renovation of premises (I)	52,000	
	Net cash from Investing Activities (H-I) (J)		1,20,000
<b>III</b>	<b>Cash from financing Activities</b>		
	<b>Add:</b> Cash inflows:		
	Issues of Debentures (2,00,000-10,000) (K)	1,90,000	
	<b>Less:</b> Cash outflows:		
	Redemption of Pref. shares (3,00,000+30,000) (L)	3,30,000	
	Net cash from Financing Activities (K-L) (M)		(-) 1,40,000



	Rs.	Rs.
Net Increase in Cash equivalent		70,000
Cash and cash equivalents at the beginning of the period		40,000
Cash and cash equivalents at the end of the period		1,10,000

**Working Notes:**

Dr.	Profit & Loss adjustment a/c		Cr.
	Rs.		Rs.
To Loss on sale of plant	27,000	By Profit on sale of premises	44,000
To Premium on preference shares $3,00,000 \times \frac{10}{100}$	30,000	By Operating profit (Balancing Figure)	90,000
To Discount on issue of debentures $(2,00,000 \times \frac{5}{100})$	10,000	(or) Cash flow operations (inflow)	
To Balance c/d	67,000		
	1,34,000		1,34,000

	Rs.	
Plant cost	2,00,000	
<b>Less: Depreciation</b>	50,000	
	1,50,000	
<b>Less: Sales</b>	1,23,000	(inflow)
Loss	27,000	
Cost of Old premises	13,000	
<b>Less: Depreciation</b>	8,000	
	5,000	
<b>Less: Sales</b>	49,000	(inflow)
Profit	44,000	

**Note:** It was mentioned in 5<sup>th</sup> point that no depreciation was provided on 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> points. Hence depreciation was not recorded in Profit & Loss account. Those amounts were taken only at the time of ascertaining the profit or loss.

**13.5 QUESTIONS**

1. Explain the role of non-current assets and non-current liabilities in the generation of cash.
2. Explain the various items regarding inflow and outflow of cash.

## 13.6 EXERCISES

1. The following details are available from a company Balance Sheet as on 31<sup>st</sup> December:

Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Provision for doubtful debts	700	800	Stock	49,200	42,700
Trade creditors	10,360	11,840	Land	20,000	30,000
Profit & Loss a/c	10,040	10,560	Goodwill	10,000	5,000
	1,03,100	1,03,200		1,03,100	1,03,200
Profit & Loss a/c	10,000	10,600			

In addition, you are given:

- Dividend paid during the year 2002 Rs.3,500
  - Land was purchased for Rs.10,000. Amount provided for amortization of goodwill Rs.5,000.
  - Paid for debentures redemption Rs.6,000
- Prepare Cash Flow Statement.

**[Ans.: Net Cash from operating Activities Rs.14,300; Net Cash used in Investing Activities Rs.(-) 10,000; Net Cash from financing activities Rs.(-) 5,500; Net decrease in cash Rs.(-) 1,200]**

2. The following are the balance sheets of Sarat Ltd. at the end of the year 1997:

Assets	1-1-1997 Rs.	31-12-1997 Rs.
Cash and bank balances	45,000	45,000
Sundry Debtors	33,500	21,500
Temporary Investments	55,000	37,000
Pre-paid expenses	500	1,000
Stock-in-trade	41,000	53,000
Land and Buildings	75,000	75,000
Machinery	26,000	35,000
	2,76,000	2,67,500
Liabilities and Capital		
Sundry Creditors	51,500	48,000
Outstanding expenses	6,500	6,000

Assets	1-1-1997 Rs.	31-12-1997 Rs.
8% Debentures	45,000	35,000
Depreciation fund	20,000	22,000
Reserve for contingencies	30,000	30,000
Profit and Loss Account	8,000	11,500
Capital	1,15,000	1,15,000
	2,76,000	2,67,500

The following information is also available:

- a. 10% dividend was paid in cash.
  - b. New machinery for Rs.15,000 was purchased but old machinery costing Rs.6,000 was sold for Rs.2,000; accumulated depreciation was Rs.3,000.
  - c. Rs.10,000 8% Debentures were redeemed by purchase from open market @ 96 per debenture of Rs.100.
  - d. Rs.18,000 investments were sold at book value.
- You are required to prepare Cash Flow Statement.

**[Ans.: Net Cash from operating Activities Rs.16,100; Net Cash used in Investing Activities Rs.(-) 13,000; Net Cash from Financing activities Rs.(-) 21,100; Net decrease in cash Rs.(-) 18,000]**

3. From the following prepare a cash flow statement for XYZ Ltd. for the year 2006.

**XYZ Ltd.,**

**Balance Sheet as at 1<sup>st</sup> January, 2006**

Liabilities and Equity	Rs.('000)	Assets	Rs.	Rs.('000)
Paid up capital	50	Gross Fixed Assets	1,000	
Retained earnings	350	Less: Accum.Dep.	100	
Long-term debt	500			900
Notes payable	80	Inventory		100
Accounts payable	80	Accounts receivables		50
		Cash		10
	1,060			1,060

**Balance Sheet as at 31<sup>st</sup> December, 2006**

Liabilities and Equity	Rs.('000)	Assets	Rs.	Rs.('000)
Paid up capital	50	Gross Fixed Assets	1,125	
Retained earnings	415	Less: Accum.Dep.	175	950
Long-term debt	550	Inventory		110
Notes payable	100	Accounts receivables		60
Accounts payable	90	Cash		85
	1,205			1,205

<b>Income Statement 31<sup>st</sup> December, 2006</b>		(Rs.'000)
Sales	1,200	
Less: Cost of goods sold	(-) 800	
Gross Profit	400	
Less: Selling, General, administration expenses	(-) 150	
EBIT	250	
Less: Interest expenses	(-) 50	
EBT	200	
Less: Taxes (50%)	(-) 100	
Net Income	100	
<b>Additional Information:</b>		
(i) Dividend paid	35	
(ii) Additions to retained earnings	65	
(iii) Depreciation	75	

**[Ans.: Net Cash from operating Activities Rs.1,85,000; Net Cash used in Investing Activities Rs.(-) 1,25,000; Net Cash from financing activities Rs.15,000; Net increase in cash Rs.75,000]**

4. The following are the Balance Sheet of PQR Ltd., for the years 2001 and 2002. Prepare a cash flow statement and comment.

<b>Balance Sheet as at 31<sup>st</sup> March</b>			(Rs. in lakhs)		
Liabilities	2001 Rs.	2002 Rs.	Assets	2001 Rs.	2002 Rs.
Share capital	300	460	Fixed Assets	630	690
General reserves	150	180	Investments	130	180
P & L a/c	30	65	Current assets, loans and advances		
Term loans	210	150	Inventories	180	220
Bank overdraft	250	300	Debtors	135	220
Sundry Creditors	80	100	Cash and Bank balances	5	15
Other Liabilities	85	100	Other advances	25	30
	1,105	1,355		1,105	1,355

**Additional Information:**

- a. Dividend was declared @ 25% of the share capital. Additional capital of Rs.160 lakhs was brought in during the beginning of January, 2002 and is eligible for dividend on prorata.
- b. Depreciation on fixed assets provides in Rs.75 lakhs for 2001 and Rs.90 lakhs for 2002 respectively.

**[Ans.: Net Cash from operating Activities Rs.60,00,000; Net Cash used in Investing Activities Rs.(-) 200,00,000; Net Cash from financing activities Rs.150,00,000; Net increase in cash Rs.10,00,000]**

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## 13.7 REFERENCE BOOKS

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5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
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10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

**Chapter – 14**

# MARGINAL COSTING

**Objectives :**

After studying this unit you should be able to :

- know the meaning and importance of marginal costing
- distinguish between absorption costing and marginal costing
- determine the margin of safety
- understand the benefits and limitations of marginal costing

**Structure :**

- 14.1 Introduction
- 14.2 Marginal Costing
- 14.3 Absorption Costing and Marginal Costing
- 14.4 Benefits of Marginal Costing
- 14.5 Limitations of Marginal Costing.
- 14.6 Self Assessment Questions
- 14.7 Exercises
- 14.8 Reference Books

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## 14.1 INTRODUCTION

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Marginal Costing is a useful technique which guides management in pricing, decision making and assessment of profitability. It classifies costs into fixed and variable ones. The expenses which vary directly in proportion to the volume of production are termed as 'variable expenses'. The expenses which remain constant or unaffected by the change in output are called 'fixed expenses'. This distinction forms the basis of marginal costing.

Profit is influenced by the changes in fixed expenses and these expenses will remain static and do not affect decision – making. More over they are largely uncontrollable. The theory of marginal costing, therefore, argues that only variable expenses should be taken into account for purposes of product pricing, inventory valuation and other important management decisions.

### 14.1.1 Marginal Cost:

The Institute of Cost and Works Accountants, London, defined marginal costs as "the amount at any given volume of output by which aggregate costs are changed, if the volume of

output is increased or decreased by one unit of output". It is the additional cost of producing one additional unit. It arises from the production of additional increments of output.

**Illu.1: A factory produces plastic cans. The variable cost of the can is Rs.5. The fixed costs are Rs.5,000 per annum. Presently 200 cans are produced annually. The cost sheet of 200 cans would be:**

	Rs.
Variable cost (200 × Rs.5)	1,000
Fixed cost	5,000
Total cost	6,000

If production is increased by one plastic can, the cost sheet of 201 can would be:

	Rs.
Variable Cost (201 × 5)	1,005
Fixed Cost	5,000
Total Cost	6,005

Marginal cost per unit is Rs.5 (i.e., the cost of producing one additional unit). Marginal cost, thus consists of prime cost plus total variable overheads. It should also be remembered that marginal cost takes into account only variable cost and excludes the fixed cost. Within the capacity of an organisation, an increase of one unit in production, obviously, will cause an increase in variable costs only. The following illustration will make this clear.

**Illu.2: Following information relates to a factory, manufacturing good quality fountain pens:**

Total cost Rs.	Production (units)	Direct material Rs.	Labour Rs.	Other variable costs Rs.	Fixed costs Rs.
3,250	500	1,000	750	500	1,000
5,500	1,000	2,000	1,500	1,000	1,000
7,750	1,500	3,000	2,250	1,500	1,000
10,000	2,000	4,000	3,000	2,000	1,000
12,250	2,500	5,000	3,750	2,500	1,000

**Calculate marginal cost of production.**

**Solution:****Marginal Cost of Production**

Production Units	Total Costs (a)		Fixed Costs (b)		Marginal Cost (c) = (a) – (b)	
	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.
500	3,250	6.50	1,000	2.00	2,250	4.50
1,000	5,500	5.50	1,000	1.00	4,450	4.50
1,500	7,750	5.17	1,000	0.67	6,750	4.50
2,000	10,000	5.00	1,000	0.50	9,000	4.50
2,500	12,250	4.90	1,000	0.40	11,250	4.50

The above table shows that with an increase in production the total cost per unit is decreasing. This happens because the fixed overheads which are constant at all levels of output are apportioned over larger outputs. Hence, cost of output per unit goes on declining with every increase in volume of output. It will be seen that while the marginal cost of production per unit remains constant (at Rs.4.50), the fixed cost per unit decreases from Rs.2 to Rs.0.40. Marginal cost has been calculated thus:

$$\text{Marginal Cost} = \text{Direct Material Cost} + \text{Direct Labour Cost} + \text{Direct expenses} + \text{Variable overheads}$$

**OR**

$$\text{Marginal Cost} = \text{Total Cost} - \text{Fixed Cost}$$

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## 14.2. MARGINAL COSTING

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Marginal Costing is a technique where only the variable costs are taken into account while calculating the cost of product. The fixed costs are met against the total fund arising out of excess of selling price over total variable cost. This fund is called **Contribution**. Let us know go through various definitions given for Marginal Costing.

- 1. ICMA London:** According to ICMA London, Marginal Costing is a technique where only the variable costs are charged to cost units, the fixed cost attributable being written off in full against the contribution for the period.
- 2. D. Joseph:** Marginal Costing is a technique of determining the amount of change in the aggregate cost due to an increase of one unit over the existing level of production.
- 3. Horold J. Wheldon:** Other things being equal, the fixed overhead will, in total remain fixed during changes in production achieved and the rate per unit will



consequently vary, where as that variable overhead will remain constant per unit of production and vary in total.

#### 14.2.1 Characteristics of Marginal Costing:

1. It is a technique of analysis and presentation of cost rather than an independent method of costing. It can be applied with any method of costing.
2. Basically it involves differentiation of variable costs from fixed costs. It considers only variable costs in its analysis.
3. It guides pricing and other managerial decisions on the basis of contribution.
4. The stock of finished goods and work-in-progress are valued at marginal cost.
5. Fixed costs are charged against the contribution earned during a period. No portion of fixed cost is carried forward to next period.
6. The difference between the contribution and fixed cost represents either profit or loss, excess of contribution and fixed cost is the profit and the deficiency of contribution to fixed cost is the loss.

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### 14.3 ABSORPTION COSTING AND MARGINAL COSTING

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Absorption Costing technique is also known as Traditional or Full Cost Method. In this method, both fixed and variable costs are recovered from production. The variable costs, such as those of direct materials, direct labour etc., are directly charged to the products, while fixed costs are apportioned on a suitable basis over various products manufactured during a period. All costs are, thus, identified with manufactured products.

**Illu.3: A Company is manufacturing 3 products A, B and C. The costs of their manufacture are as follows:**

	A Rs.	B Rs.	C Rs.
Direct material pre Unit	3	4	5
Direct labour	2	3	4
Selling price	10	15	20
Output (Units)	1,000	1,000	1,000

The total overheads are Rs.12,000 out of which Rs.9,000 are fixed and rest are variable. It is decided to apportion these costs over different products in the ratio of output. You are required to prepare:

- (a) A statement showing cost of each product and profit according to absorption costing and
- (b) A statement of cost and profit according to the Marginal costing technique.

**Solution: (A)**

**Statement Showing Cost and Profit  
(According to Absorption Costing Technique)**

Particulars	A = 1,000		B = 1,000		C = 1,000	
	Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Direct Material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Prime Cost	5	5,000	7	7,000	9	9,000
<b>Add: Overheads:</b>						
Fixed	3	3,000	3	3,000	3	3,000
Variable	1	1,000	1	1,000	1	1,000
Total Cost	9	9,000	11	11,000	13	13,000
Profit	1	1,000	4	4,000	7	7,000
Sales	10	10,000	15	15,000	20	20,000

Total Profit = Rs.1,000 + Rs.4,000 + Rs.7,000 = Rs.12,000

The system of absorption costing has a number of limitations. It assumes that prices are simply a function of costs. The demand side of the product is thoroughly discounted. Only past costs are considered which arriving at pricing decisions. Further, it does not offer information which helps decision making in a changing environment.

More importantly charging of fixed costs to different products on a suitable basis poses innumerable problems. These costs have to be incurred whether there is production or not. In other words, the cost of a product not only depends on expenses which have been incurred directly but also on the volume of output. For example, if the cost of direct material and direct labour for a product is Rs.2 and Rs.4 respectively and the volume of output is 500 units the total cost of production will be as under:

	Rs.
Costs of Direct material and labour	3,000
Fixed Overheads	1,000
Total Cost	4,000

The cost per unit comes to Rs.8. In case the output is only 400 units the cost of production ( $400 \times 6 + 10,000$ ) would be Rs.3,400 and cost per unit would increase not because prices of materials or labour have gone up, but because lower level of production. Obviously, the whole exercise seems to be illogical. The technique of marginal costing is employed to overcome this deficiency, by charging, fixed costs against the total fund arising out of excess of selling price over variable cost.

**(b) Marginal Cost Statement**

Particulars	A = 1,000		B = 1,000		C = 1,000	
	Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Sales (S)	10	10,000	15	15,000	20	20,000
<b>Less: Marginal Cost:</b>						
Direct Material	3	3,000	4	4,000	5	5,000
Direct Labour	2	2,000	3	3,000	4	4,000
<b>Prime Cost</b>	5	5,000	7	7,000	9	9,000
Variable Overheads	1	1,000	1	1,000	1	1,000
Total Marginal Cost (V)	6	6,000	8	8,000	10	10,000
<b>Contribution (S-V) (C)</b>	4	4,000	7	7,000	10	10,000
Selling Price	10	10,000	15	15,000	20	20,000

Thus, the total contribution from the three products, A, B and C is Rs.21,000. The profit will now be computed as follows:

	Rs.
Total Contribution	21,000
Fixed costs	9,000
Profit	12,000

**14.3.3 Differences between Marginal Costing and Absorption Costing:**

The difference between absorption costing and marginal costing, as the above illustrations show, is based on the recovery to fixed overheads. In absorption costing both fixed and variable overheads are charged to production. As a result, work in progress and finished goods are valued at 'works cost' and 'total cost of production' respectively, giving effect to fixed overheads. In marginal costing only variable overheads are charged to production, thereby leading to under-recovery of overheads. This obviously leads to undervaluation of closing stock. But this does not result in carrying over of fixed overheads of one period to another, as it happens in absorption costing. The main points of difference between absorption costing and marginal costing are given below:

**Differences between Marginal and Absorption Costing**

Basis of Difference	Absorption Costing	Marginal Costing
<b>1. Fixed Costs</b>	Fixed overheads are charged to the product to be subsequently released as a part of cost of goods sold i.e., it is included in cost per unit.	Fixed costs are not included while computing cost per unit.

<b>Basis of Difference</b>	<b>Absorption Costing</b>	<b>Marginal Costing</b>
<b>2. Profit</b>	Profit is the difference between sales and cost of goods sold.	Profit in marginal costing is ascertained by establishing the total contribution and then deducting therefrom the total fixed expenses. Contribution is the excess of sales over variable cost.
<b>3. Classification of Costs</b>	Costs are rarely classified into variable and fixed. Although such a classification is possible, it fails to establish a cost – volume profit relationship.	Cost – Volume – Profit relationship is an essential part of marginal costing. Costs have to be classified into fixed costs and variable costs.
<b>4. Valuation of Inventories</b>	If inventories increase during a period, this method will reveal more profit than marginal costing. When inventories decrease, less profits are reported because in this method closing stock is valued at higher figures.	If inventories increase during a period, this method generally reports less income than absorption costing, but when inventories decrease this method reports more net income.
<b>5. Recovery of Overheads</b>	Apportionment of fixed costs is arbitrary and this may result in under recovery of overheads.	There is no arbitrary apportionment of fixed overheads, as fixed costs are excluded.

#### 14.3.4 Contribution:

Contribution represents the difference between sales and variable costs. It may be considered as some sort of fund from out of which all fixed costs are to be met. The difference between contribution and fixed costs represents either profit or loss, as the case may be. Contribution is also called 'Gross Margin'. Contribution can be expressed thus:

Contribution	=	Selling Price – Variable cost
		Or
		Fixed Cost + Profit or Loss
Profit/Los	=	Contribution – Fixed Cost

### 14.3.5 Marginal Cost Equation:

The algebraic expression of contribution is known as Marginal Cost Equation. It can be expressed as follows:

$$S - V = F + P$$

Where

S = Selling Price

V = Variable Cost

F = Fixed Cost

P = Profit

**Illu.4: From the following information find out the amount of profit earned during the year using marginal cost technique.**

**Fixed cost Rs.5,00,000**

**Variable cost Rs.10 per unit**

**Selling price Rs.15 per unit**

**Output level 1,50,000 units.**

**Solution:**

Sales = 1,50,000 units × 15 = Rs.22,50,000

Variable cost = Rs.1,50,000 × 10 = Rs.15,00,000

Fixed cost = Rs.5,00,000

$S - V = F + P$

$\text{Rs.}22,50,000 - \text{Rs.}15,00,000 = 5,00,000 + P$

$\text{Rs.}7,50,000 - 5,00,000 = P$

$\text{Rs.}2,50,000 = P$

$P = \text{Rs.}2,50,000$

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## 14.4. BENEFITS OF MARGINAL COSTING

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The technique of marginal costing is of immense use to the management in taking various decisions. It helps the management in taking the following decisions:

- 1. Helps in determining level of output:** Marginal costing helps in finding out the output which is most profitable for running a concern. This, in turn, helps in utilising plant capacity in full, and realise maximum profits. By determining the most profitable relationships between cost, price and volume, marginal costing helps a business to determine most competitive prices for its product.
- 2. Help in selection of most suitable product mix:** By applying marginal costing techniques, the most suitable production line could be determined. The profitability

of various products can be compared and the most products which languish behind and which do not seem to be feasible (in view of their inability to recover marginal cost) may be eliminated from the production line by keeping the capacity and resources constraints in mind. It will also serve as a guide in arriving at the price for new products.

3. **Helps in determining Make or Buy decisions:** The marginal cost of producing an article inside the factory serves as a useful guide while arriving at make or buy decisions. The costs of manufacturing can be compared with the costs of buying outside and a suitable decision can be arrived at easily.
4. **Helps in the selection of method of production – Manual or Machine Based:** In case a particular product can be produced by two or more methods, ascertaining the marginal cost of producing the product by each method will help in deciding as to which method should be followed. The same is true in case of decisions to use machine power in place of manual labour.
5. **Helps in decision making during Recessionary period:** In periods of trade depression, marginal costing helps in deciding whether production in the plant should be suspended temporarily or continued in spite of low demand for the firm's product.
6. **Help in product planning:** Marginal costing helps in determining the no-profit no-loss point. The efficiency and economy of various products, plants, departments can also be determined. This helps in profit planning as well as cost control.

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## 14.5 LIMITATIONS OF MARGINAL COSTING

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Marginal costing has the following limitations:

1. **Difficulty in Classifications:** In marginal costing, costs are segregated into fixed and variable. In actual practice, this classification scheme proves to be superfluous in that certain costs may be partly fixed and partly variable and certain other costs may have no relation to volume of output or even with the time. In short, the categorization of costs into fixed and variable elements is a difficult and tedious job.
2. **Difficulty in Application:** The marginal costing technique cannot be applied in industries where large stocks in the form of work in progress (job and contracting firms)
3. **Defective Inventory Valuation:** Under marginal costing, fixed costs are not included in the value of stock of finished goods and work in progress. As fixed costs are also incurred, these should form part of the cost of the product. By eliminating fixed costs from

finished stock and work in progress, marginal cost is objectionable because of other reasons also:

- i. In case of loss by fire, full loss cannot be recovered from the insurance company.
- ii. Profits will be lower, than that shown under absorption costing and hence may be objected by taxation authorities.
- iii. Circulating assets will be estimated in the balance sheet.

**4. Objectionable basis of Pricing:** In marginal costing, sale prices are arrived at on the basis of contribution alone. This is an objectionable practice. For example, in the long run, the selling price should not be fixed on the basis of contribution alone as it may result in losses or low profits. Other important factors such as fixed costs, capital employed should also be taken into account while fixing selling prices. Further, it is also not correct to lay more stress in selling function, as is done in marginal costing and relegate production function to the background.

**5. Limited scope:** The utility of marginal costing is limited to short run profit planning and decision making. For decisions of far reaching importance, one is interested in special purpose cost rather than variable cost. Important decisions on several occasions, depend on non-cost considerations also, which are thoroughly discounted in marginal costing.

In view of these limitations marginal costing needs to be applied with necessary care and caution. Fruitful results will emerge only when management tries to apply the technique in combination with other useful techniques such as budgetary control and standard costing.

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## 14.6 QUESTIONS

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### I. Short Questions:

1. Defined the term 'marginal costing'.
2. How can the cost be classified on the basis of variability?
3. What is contribution?

### II. Essay type questions:

1. Explain the advantages and disadvantages of marginal costing.
2. Discuss the applications of the marginal costing technique.
3. Define Marginal Costing. Explain the advantages and limitations of Marginal Costing.
4. Define Marginal Costing. Explain the differences between Marginal Costing and absorption costing.
5. What is marginal costing? Explain the advantages and disadvantages of marginal costing.

## 14.7 EXERCISES

1. What is the amount of Fixed Costs when sales in Rs.2,40,000; Direct Material is Rs.80,000; Direct Labour is Rs.50,000, Variable overheads are Rs.20,000 and profit is Rs.50,000?

**[Ans.: Fixed Costs: Rs.40,000]**

2. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

**[Ans.: Margin of Safety Rs.40,000]**

3. Given, fixed cost of Rs.5,00,000; variable cost as Rs.10 per unit; selling price of Rs.15 per unit and output as 1,50,000 units, find the profit earned.

**[Ans.: Profit Rs.2,50,000]**

4. Using the information given below, prepare operating statements for the months of June and July, 2007 using.

- (i) Marginal costing technique and (ii) Absorption costing

	Per unit Rs.
Selling price	50
Direct material cost	18
Direct labour cost	4
Variable production overhead	3

Monthly costs:

Fixed production overheads	99,000
Fixed selling expenses	15,000
Fixed administration expenses	25,000



Variable selling costs are 10% of sales revenue and normal production capacity is 11,000 units per month. The other details are:

	Sales (units)	Production (units)
June	10,000	12,000
July	12,000	10,000

**[Ans.: Profits: (i) Rs.61,000; Rs.1,01,000; (ii) Rs.81,670; 80,330]**

5. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

**[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000 4,000 = 10,000 units]**

6. On the basis of the following data prepare a Marginal cost statement:

Variable Cost	Rs.	Rs.
Direct Material	4,500	
Direct Wages	2,500	
Factory overhead	1,050	
Administration, selling and distribution overhead	1,600	9,650
<b>Fixed Cost</b>		
Factory overhead	400	
Administration, selling and distribution overhead	670	1,070
Total Cost		10,720
Profit		4,280
Sales		15,000

**[Ans.: Profit Rs.4,280]**

7. Takur Ltd., produces 1 standard type of article. The results of last 4 months of 2007 are as follows.

	September	October	November	December
Output in Units	200	300	400	600

Prime Cost is Rs.10 per unit

Variable expenses are Rs.2 per unit

Fixed expenses are Rs.36,000 p.a.

Find out cost per unit of each month.

**[Ans.: Cost per unit: Oct. Rs.10; Nov. Rs.7.50; Dec. Rs.5]**

8. Calculate the fixed cost from the following information:

	2006	2007
Sales (Rs.)	4,00,000	6,00,000
Profit (Rs.)	80,000	2,00,000

**[Ans.: Rs.1,60,000]**

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## 14.8 REFERENCE BOOKS

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2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
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10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

**Chapter – 15****MARGINAL COSTING – CVP ANALYSIS****Objectives :**

After reading this lesson you should be able to :

- understand the break even analysis and profit/volume ratio
- know the meaning and importance of margin of safety
- prepare break even chart of an organization

**Structure :**

- 15.1 Break Even Analysis**
- 15.2 Profit/Volume Ratio**
- 15.3 Margin of Safety**
- 15.4 Break Even chart**
- 15.5 Advantages of Break-Even Analysis**
- 15.6 Limitations of Break-Even Analysis**
- 15.7 Self Assessment Questions**
- 15.8 Exercises**
- 15.9 Reference Books**

**15.1. BREAK-EVEN ANALYSIS**

Break even analysis is a specific method of presenting and studying the inter relationship between costs, volume and profits. (Hence, it also known as Cost – volume – Profit Analysis – C.V.P Analysis). It is an important tool of financial analysis whereby the impact on profit of the changes in volume, price, costs and mix can be found out with a certain amount of accuracy. A business is said to break even when its total sales are equal to its total costs. Break even point is a point of no profit or no loss. At this point contribution is just sufficient to recover the fixed costs. Break even point can be calculated in units or sales. It can be calculated with the help of any of the following formulae.

1. 
$$\text{B.E.P. (in Units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$= \frac{\text{Fixed cost}}{\text{Selling price per unit} - \text{Variable cost per unit}}$$
2. 
$$\text{B.E.P. (Sales)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} \times \text{Selling price per unit}$$
3. 
$$\frac{\text{Fixed cost}}{\text{Total contribution}} \times \text{Total sales (Or)} \frac{F \times S}{S - V}$$

$$4. \frac{\text{Fixed cost}}{1 - \frac{\text{Variable Cost per unit}}{\text{Selling Price per unit}}} = \frac{\text{Fixed cost}}{\text{P/V Ratio}}$$

$$5. \text{B.E.P.} = \frac{\text{Fixed cost}}{\text{Fixed costs} + \text{net profit}} \times \text{Sales}$$

At break-even point the desired profit will be zero. Where the volume of output sales is to be calculated so as to earn a desired amount of profit, the amount of desired profit has to be added to the fixed cost.

$$\text{Units to earn a desired profit:} = \frac{\text{Fixed cost} + \text{Desired Profit}}{\text{Contribution Per Unit}}$$

$$\text{Sales to earn a desired profit:} = \frac{\text{Fixed cost} + \text{Desired Profit}}{\text{P/V Ratio}}$$

**Illu.1: From the following particulars calculate the Break-even point in terms of both quantity and value:**

<b>Production in units</b>	<b>10,000</b>
<b>Sales price</b>	<b>Rs.5.00 per unit</b>
<b>Variable costs</b>	<b>Rs.20,000</b>
<b>Fixed costs</b>	<b>Rs.12,000</b>

**Solution: Calculation of Break-even Point**

**Break-even Point (in terms of quantity):**

$$= \frac{\text{Fixed Expenses}}{\text{Selling Price per unit} - \text{Variable Cost Per Unit}} = \frac{\text{Rs.12,000}}{5.00 - 2.00} = 4,000 \text{ Units.}$$

Break-even Point in quantity = 4,000 Units

Break-even Point in Value = Break-even Point in Quantity × Selling price per unit

$$= 4,000 \text{ Units} \times \text{Rs.5.00} = \text{Rs.20,000.}$$

**Note:** Variable Cost per unit =  $\frac{\text{Rs.20,000}}{10,000 \text{ units}} = \text{Rs.2.00}$

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## 15.2. PROFIT/VOLUME RATIO

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The profitability of business operations could be found out by calculating the profit – volume ratio (P/V Ratio). It is the ratio of contribution to sales. It is also known as **marginal – income ratio, contribution – Sales ratio or variable – profit ratio**. The ratio can be shown in the form of a percentage also.

$$\begin{aligned}
 \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \text{ or } \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \\
 &= \frac{C}{S} \text{ or } \frac{S - V}{S} \text{ or } \frac{F + P}{S} \\
 &= 1 - \frac{\text{Variable Costs}}{\text{Sales}}
 \end{aligned}$$

The ratio can also be shown by comparing the change in contribution to change in sales, or change in profit to change in sales. Any increase in contribution, obviously, would mean increase in profit, as fixed expenses are assumed to be constant at all levels of production.

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

The importance of P/V Ratio lies in its use for evaluating the profitability of alternative products or proposals. A higher ratio shows greater profitability. Management should, therefore, try to increase P/V Ratio by widening the gap between the selling price and the variable costs. This can be achieved by increasing sale price, reducing variable costs or switching over to more profitable products.

**Illu.2: A Company producing a single article sells at Rs.20 each. The marginal costs of production is Rs.12 each and fixed cost is Rs.8,000 p.a. calculate i) the P/V ratio, ii) sales required to break – even.**

**Solution:**

**(i) Calculation of P/V. Ratio:**

	Rs.
Fixed Cost	8,000
Selling price per unit	20
Margin cost per unit	12

$$\begin{aligned}
 \text{P/V. Ratio} &= \frac{\text{Sales} - \text{Margin Cost}}{\text{Sales}} \times 100 \\
 &= \frac{20 - 12}{20} \times 100 = 40\% \\
 \text{P/V. Ratio} &= 40\%
 \end{aligned}$$

**(ii) Sales Required to Break-even:**  $\frac{\text{Fixed Cost}}{\text{P. V. Ratio}} = \frac{8,000}{40\%} = 8,000 \times \frac{100}{40} = \text{Rs.}20,000$   
 Sales Required to Break-even = Rs.20,000.

**Illu.3: Calculate margin of safety and the amount of actual sales from the following:**

		<b>Rs.</b>
<b>(i)</b>	<b>Profit</b>	<b>10,000</b>
<b>(ii)</b>	<b>PV Ratio</b>	<b>50%</b>
<b>(iii)</b>	<b>BEP Sales</b>	<b>20,000</b>

**Solution:**

**(i) Calculation of Margin of safety and the amount of actual Sales:**

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{10,000}{50\%} = 10,000 \times \frac{100}{50} = \text{Rs.}20,000$$

$$\text{Margin of Safety} = \text{Rs.}20,000$$

**(ii) The amount of actual sales:**

Margin of Safety	=	Actual Sales – Break-even-Point sales
Rs.20,000	=	Actual Sales – Rs.20,000
Actual Sales	=	Rs.20,000 + 20,000
Actual Sales	=	Rs.40,000

**Illu.4: The following figures relating to Sales and profits of a company are of two periods.**

	<b>Sales (Rs.)</b>	<b>Profit(Rs.)</b>
<b>Year ending 31-12-2001</b>	<b>1,00,000</b>	<b>15,000</b>
<b>Year ending 31-12-2002</b>	<b>1,20,000</b>	<b>23,000</b>

**Calculate (a) P.V. ratio (b) Fixed cost, (c) Break-even point.**

**Solution:**

$$\begin{aligned} \text{i. P.V. Ratio} &= \frac{\text{Change in profit}}{\text{Change in Sales}} \times 100 \\ &= \frac{8,000}{20,000} \times 40\% \end{aligned}$$

$$\begin{aligned} \text{ii. S(P.V.Ratio)} &= F+P; 1,00,000 \left(\frac{40}{100}\right) = F + 15,000; \\ 40,000 &= F + 15,000; 40,000 - 15,000 = F; 25,000 = F, F = \text{Rs.}25,000 \end{aligned}$$

$$\text{iii. BEP Sales} = \frac{F}{\text{P.V.Ratio}} = \frac{25,000}{40\%} = \frac{25,000 \times 100}{40} = \text{Rs.}62,500$$

$$\text{iv. S (P.V. Ratio)} = F + P; 1,25,000 \left(\frac{40}{100}\right) = 25,000 + P;$$

$$50,000 = 25,000 + P = 50,000 - 25,000 = P; 25,000 = P$$

$$P = \text{Rs.}25,000$$

$$S(\text{P.V Ratio}) = F + P, S\left(\frac{40}{100}\right) = 25,000 + 20,000$$

$$S\left(\frac{40}{100}\right) = 45,000; S = 45,000 \times \frac{100}{40} = \text{Rs.}1,12,500$$

### 15.3 MARGIN OF SAFETY

Total sales minus the sales at break even point is known as the margin of safety. Lower break – even point means a higher margin of safety. Margin of safety can also be expressed as a percentage of total sales. The formula is:

$$\text{Margin of Safety} = \text{Total Sales} - \text{Sales at BEP}$$

Or

$$\frac{\text{Profit}}{\text{P/V ratio}}$$

$$\text{Margin of Safety (as a percentage)} = \frac{\text{Margin of safety}}{\text{Total sales}} \times 100$$

Higher margin on safety shows that the business is sound. Even when sales substantially come down the business may earn profit. Lower margin of safety, means that when sales come down slightly profit position may affect adversely. Thus, margin of safety can be used to test the soundness of a business. In order to improve the margin of safety, a business can increase selling prices (without affecting demand, of course) reducing fixed or variable costs and replacing unprofitable products with profitable ones.

**Illu.5: From the following information calculate:**

- (a) P/V Ratio.
- (b) Break Even Point
- (c) Margin of Safety.

	Rs.
<b>Total Sales</b>	<b>3,60,000</b>
<b>Selling price per unit</b>	<b>100</b>
<b>Variable Cost per unit</b>	<b>50</b>
<b>Fixed Costs</b>	<b>1,00,000</b>

- (d) If selling prices is reduced to Rs.90, by how much is the margin of safety is reduced?

**Solution:****(a) Calculation of Break-even-point:**

$$\text{Break-even point} = \frac{\text{Fixed Costs}}{\text{Selling price per unit} - \text{Variable cost per unit}}$$

$$\text{Break-even-Point} = \frac{1,00,000}{100 - 50} = \frac{1,00,000}{50} = 2,000 \text{ units}$$

$$\begin{aligned} \text{Break even Sales} &= 2,000 \text{ units @ Rs.100 per unit} \\ &= \text{Rs.2,00,000} \end{aligned}$$

$$\begin{aligned} \text{(b) P.V. Ratio} &= \frac{S - V}{S} \times 100 \\ &= \frac{3,60,000 - (3,600 \times 50)}{3,60,000} \times 100 \end{aligned}$$

$$= \frac{1,80,000}{3,60,000} \times 100$$

$$\text{P.V. Ratio} = 50\%$$

$$\begin{aligned} \text{(c) Margin of Safety} &= \text{Actual Sales} - \text{Break even sales} \\ &= \text{Rs.3,60,000} - 2,00,000 = \text{Rs.1,60,000} \end{aligned}$$

**(d) If Selling price is reduced to Rs.90, the Margin of safety is reduced by:**

$$\begin{aligned} \text{Margin of Safety} &= \text{Actual Sales} - \text{Break even sales} \\ &= \text{Rs.3,60,000} - (2,500 \text{ Units} \times 90) \\ &= \text{Rs.3,60,000} - 2,25,000 = \text{Rs.1,35,000} \end{aligned}$$

**Illu.6: A manufacture has supplied the following information relating to one of his product.**

<b>Total variable costs</b>	<b>Rs.30,000</b>
<b>Total sales</b>	<b>Rs.60,000</b>
<b>Units sold</b>	<b>20,000</b>
<b>Total Fixed Costs</b>	<b>Rs.18,000</b>

**Calculate:**

- Contribution per unit**
- Break-even point**
- Margin of Safety**
- Profit**
- Volume of sales to earn a profit of Rs.24,000**



**Solution:**

a. **Contribution = S-V; C = 60,000 – 30,000 = Rs.30,000**

$$\text{Contribution per unit} = \frac{30,000}{20,000 \text{ units}} = 1.50 \text{ p.}$$

b. **BEP Sales =  $\frac{F \times S}{S - V}$ ;  $\frac{18,000 \times 60,000}{60,000 - 30,000} = \text{Rs.36,000}$**

c. **Margin of Safety = Actual Sales – BEP Sales.**  
 $= 60,000 - 36,000 = \text{Rs.24,000}$

d. **Profit = S-V = F+P; 60,000 – 30,000 = 18,000+P;**  
 $= 30,000 = 18,000 + P; 30,000 - 18,000 = P.$   
 $= 12,000 = P; P = \text{Rs.12,000}$

e. **Volume of Sales to earn a profit of Rs.24,000**

$$\text{P.V. Ratio} = \frac{C}{S} \times 100; \frac{30,000}{60,000} \times 100 = 50\%.$$

$$S \left( \frac{50}{100} \right) = 18,000 + 24,000$$

$$S \left( \frac{50}{100} \right) = 42,000; S = 42,000 \times \frac{100}{50} = \text{Rs.84,000}$$

$$\text{Units} = \frac{\text{Sales Amount}}{\text{Selling Price}} = \frac{84,000}{\text{Rs.3}} = 28,000 \text{ units.}$$

**Illu.7: In 2006, Srikanth Ltd., sold its products worth Rs.40 lakhs and made a profit of Rs.4 lakhs. But in 2002, the sales dipped to Rs.30 lakhs due to competition in the market and the profit is reduced to 3 lakhs. Calculate Break – even points and profit volume ratios in 2006 and 2007.**

**Solution:**

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

$$\text{Change in Profit} = \text{Rs.1,00,000}$$

$$\text{Change in Sales} = \text{Rs.10,00,000}$$

$$\text{P.V. Ratio} = \frac{1,00,000}{10,00,000} \times 100 = 10\%$$

$$\text{Fixed Expenses: Sales (P/V ratio)} = F + P$$

**2001: When profit and sales of 2001 are taken:**

$$40,00,000 \times \frac{10}{100} = F + 4,00,000$$

$$4,00,000 = F + 4,00,000$$

$$4,00,000 - 4,00,000 = F$$

$$F = 0$$

$$\text{Break-even Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{\frac{10}{100}} = \frac{0}{10} = 0$$

**2002: When Profit and sale of 2002 are taken.**

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

$$30,00,000 \times \frac{10}{100} = F + 3,00,000$$

$$3,00,000 = F + 3,00,000$$

$$3,00,000 - 3,00,000 = F$$

$$F = 0$$

$$\text{B.E. Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{10\%} = 0 \times \frac{100}{10} = 0$$

**Illu.8: The sales and profits during two periods are as under:**

**Period I : Sales Rs.20 lakhs; profit Rs.2 lakhs**

**Period II: Sales Rs.30 lakhs; Profit Rs.4 lakhs.**

**Calculate: (a) P/V Ratio (b) Break even point (c) Sales required to earn a profit of Rs.5 lakhs (d) Profit when sales are Rs.50 lakhs, and (e) Margin of safety at a profit of Rs.2.5 lakhs.**

**Solution:**

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

$$= \frac{2,00,000}{10,00,000} \times 100 = 20\%$$

$$\text{Fixed Expenses} = S \times \text{P.V. Ratio} = F + P$$

$$\text{Rs.}20,00,000 \times 20\% = F + \text{Rs.}2,00,000$$

$$\text{Rs.}4,00,000 = F + \text{Rs.}2,00,000$$

$$\text{Rs.}4,00,000 - \text{Rs.}2,00,000 = F$$

$$F = \text{Rs.}2,00,000$$

$$\text{b. Break-even Point} = \frac{F}{\text{P.V. Ratio}}$$

$$= \frac{2,00,000}{20\%} = \text{Rs.}10,00,000$$

$$\text{c. Sales (P/V Ratio)} = F + P$$

$$S \times \frac{20}{100} = \text{Rs.}2,00,000 + \text{Rs.}5,00,000$$

$$S \times \frac{20}{100} = \text{Rs.}7,00,000$$

$$S = \text{Rs.}7,00,000 \times \frac{100}{20} = \text{Rs.}35,00,000$$

d.  $\text{Sales} \times \text{P.V. Ratio} = F + P$

$$S \times \frac{20}{100} = \text{Rs.}2,00,000 + P$$

$$\text{Rs.}50,00,000 \times \frac{20}{100} = \text{Rs.}2,00,000 + P$$

$$\text{Rs.}10,00,000 = \text{Rs.}2,00,000 + P$$

$$\text{Rs.}10,00,000 - \text{Rs.}2,00,000 = P$$

$$P = \text{Rs.}8,00,000$$

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

$$= \frac{2,50,000}{20\%} = \text{Rs.}2,50,000 \times \frac{100}{20} = \text{Rs.}12,50,000$$

**Illu.9: The following information was extracted from the books of Giridhar Mft. Co. Ltd.**

	Rs.
<b>Sales</b>	<b>1,80,000</b>
<b>Less: Variable Costs</b>	<b>1,44,000</b>
<b>Contribution</b>	<b>36,000</b>
<b>Less: Fixed costs</b>	<b>24,000</b>
<b>Net Profit</b>	<b>12,000</b>

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

**Solution:**

(a)  $\text{P.V. Ratio} = \frac{C}{S} \times 100 = \frac{36,000}{1,80,000} \times 100 = 20\%$

(b)  $\text{B.E.P} = \frac{F}{\text{P.V. Ratio}} = \frac{24,000}{20\%} = \frac{24,000}{20} \times 100 = 1,20,000$

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

$$\text{Rs.}2,70,000 \times \frac{20}{100} = \text{Rs.}24,000 + P$$

$$\text{Rs.}54,000 = \text{Rs.}24,000 + P$$

$$\text{Rs.}54,000 = \text{Rs.}24,000 + P$$

$$P = \text{Rs.}30,000$$

(d)  $S \times \text{P/V. Ratio} = F + P$

$$S \times \frac{20}{100} = \text{Rs.}24,000 + \text{Rs.}24,000$$

$$S \times \frac{20}{100} = \text{Rs.}48,000$$

$$S = \text{Rs.}48,000 \times \frac{100}{20} = \text{Rs.}2,40,000$$

**Illu.10: The price structure of a cycle made by the Cycle Company Ltd., is as follows.**

	Per Cycle Rs.
<b>Materials</b>	<b>60</b>
<b>Labour</b>	<b>20</b>
<b>Variable Overhead</b>	<b>20</b>
	<b>100</b>
<b>Fixed Overheads</b>	<b>50</b>
<b>Profit</b>	<b>50</b>
<b>Selling Price</b>	<b>200</b>

This is based on the manufacture of one lakh cycles per annum.

The company expects that due to competition they will have to reduce selling prices, but they want to keep the total profits intact. What level of production will have to be reduced i.e., how many cycles will have to be made to get the same amount of profit if:

- a. The Selling price is reduced by 10%
- b. The selling price is reduced by 20%

**Solution:**

(a) If Selling price is reduced by 10%	Rs.
Selling Price	200
Less: Price	20
Present Selling Price	180

$$V = 100 (60+20+20); P = 50;$$

$$P.V. \text{ Ratio} = \frac{C}{S} \times 100 = \frac{80}{180} \times 100 = 44.44\%$$

Sales to get the same level of profit Rs.50,00,000.

$$S (P.V. \text{ Ratio}) = E + P$$

$$S \left( \frac{44.44}{100} \right) = 50,00,000 + 50,00,000$$

$$S \left( \frac{44.44}{100} \right) = 1,00,00,000$$

$$S = 1,00,00,000 \times \frac{100}{44.44} = 22502250$$

$$\text{Selling Units} = \frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{22502250}{180} = 1,25,013 \text{ units}$$

If Selling Price is reduced by 20%	Rs.
Selling Price	200
Less: 20% reduction	40
Present Selling Price	160

V = Rs.100; P = Rs.50;

$$\text{P.V. Ratio} = \frac{C}{S} \times 100 = \frac{60}{160} \times 100 = 37.5\%$$

Sales to get the same level of profit Rs.50,00,000.

$$S(\text{P.V. Ratio}) = E + P$$

$$S\left(\frac{37.5}{100}\right) = \text{Rs.}50,00,000 + 50,00,000$$

$$S\left(\frac{37.5}{100}\right) = \text{Rs.}1,00,00,000$$

$$S = 1,00,00,000 \times \frac{100}{37.5} = 26666666$$

$$\text{Selling Units} = \frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{26666666}{160} = 1,66,667 \text{ units.}$$

**Ilu.11: Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs.Ten lakhs, Four lakhs, Four lakhs respectively.**

**Solution:**

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(i)	P.V. Ratio	=	$\frac{S - V}{S} \times 100$
		=	$\frac{10 \text{ lakhs} - 4 \text{ lakhs}}{10 \text{ lakhs}} \times 100$
		=	$\frac{10 - 4}{10} \times 100 = \frac{6}{10} \times 100 = 60\%$
	P.V. Ratio	=	60%
(ii)	Margin of Safety	=	$\frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{?}{60\%}$
	Profit	=	Contribution – Fixed cost
	Profit	=	(Sales – Variable Cost) – Fixed Cost
		=	(Rs.10 lakhs – Rs.4. lakhs) – Rs.4 lakhs
		=	Rs.2 lakhs
	Margin of Safety	=	$\frac{2 \text{ Lakhs}}{60\%} = \text{Rs.}3,33,333.33$

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**Illu.12: Fixed expenses Rs.1,50,000 percentage of variable expenses on sales is  $66\frac{2}{3}\%$ . Normal sales at 100% capacity is Rs.9,00,000.**

**Calculate,**

- P/V Ratio**
- Break even point at what percentage of sales**
- Profit at 80% of sales capacity.**

**Solution:**

$$a. \quad P/V \text{ Ratio} = \frac{S - V}{S} \times 100 = \frac{\text{Rs.}9,00,000 - \text{Rs.}6,00,000}{\text{Rs.}9,00,000} \times 100 = 33\frac{1}{3} \text{ or } \frac{1}{3}$$

$$b. \quad B.E. \text{ Point} = \frac{\text{Fixed Expenses}}{\text{Sales} - \text{Variable Costs}} = \frac{1,50,000}{9,00,000 - 6,00,000} = 50\%$$

c. Profit at 80% sales capacity:

$$\begin{aligned} \text{Profit} &= \text{Contribution} - \text{Fixed Expenses} \\ &= (\text{Sales} - \text{Variable cost}) - \text{Fixed Expenses} \\ &= (\text{Rs.}7,20,000 - \text{Rs.}4,80,000) - \text{Rs.}1,50,000 = \text{Rs.}90,000 \end{aligned}$$

Note: Sales =  $9,00,000 \times \frac{80}{100} = \text{Rs.}7,20,000$ ; Variable Costs =  $7,20,000 \times \frac{2}{3} = \text{Rs.}4,80,000$

**Illu.13: Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30<sup>th</sup> June 1996:**

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

During the second half of the year, the company has projected a loss of Rs.10,000.

**Calculate:**

- The Break-even point and Margin of safety for six months ending 30<sup>th</sup> June 1996.**
- Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.**
- The Break-even point and Margin of safety for the whole year 1996.**

**Solution:**

---

(a) P.V. Ratio	=	$\frac{\text{Fixed Expenses} + \text{Profit}}{\text{Sales}} \times 100$
	=	$\frac{\text{Rs.45,000} + \text{Rs.30,000}}{1,50,000} \times 100 = 50\%$
Break-Even Point	=	$\frac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \frac{\text{Rs.45,000}}{50\%} = \text{Rs.90,000}$
Margin of Safety	=	Actual Sales – Break-Even sales Rs.1,50,000 – Rs.90,000 = Rs.60,000
<b>Alternatively</b>		
Margin of Safety	=	$\frac{\text{Profit}}{\text{P.V. Ratio}}$
	=	$\frac{\text{Rs.30,000}}{50\%} = \text{Rs.60,000}$

---

(b) Expected Sales volume for second half year:

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Expected Sales Volume	=	$\frac{\text{Contribution}}{\text{P.V. Ratio}} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{P.V. Ratio}}$ or
	=	$\frac{\text{Fixed Cost} - \text{Loss}}{\text{P.V. Ratio}} = \frac{\text{Rs.45,000} - 10,000}{50\%}$
	=	Rs.70,000

---

(c) Break-even Point and Margin of Safety for the whole year 1996:

$$\text{Break-even Point} = \frac{\text{Fixed Expenses}}{\text{P.V. Ratio}} = \frac{\text{Rs.45,000} + \text{Rs.45,000}}{50\%} = \text{Rs.1,80,000}$$

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{\text{Rs.30,000} - 10,000}{50\%} = \text{Rs.40,000}$$

**Alternatively:**

$$\begin{aligned} \text{Margin of Safety} &= \text{Actual Sales} - \text{Break Even Sales} \\ &= (\text{Rs.1,50,000} + 70,000) - \text{Rs.1,80,000} = \text{Rs.40,000} \end{aligned}$$

**Illu.14:** The following figures relate to a company manufacturing a varied range of products.

	Total Sales Rs.	Total Cost Rs.
Year ended 31 <sup>st</sup> March, 2001	22,23,000	19,83,600
Year ended 31 <sup>st</sup> March, 2002	24,51,000	21,43,200

Assuming stability in prices, with variable costs carefully controlled to reflect predetermined relationships, and an unvarying figure for fixed costs, calculate:

- the profit/volume ratio, to reflect the rates of growth for profit and sales; and
- any other cost figures to be deduced from the data.

**Solution:**

	Sales Rs.	Cost Rs.
2001	22,23,000	19,83,600
2002	24,51,000	21,43,200
Difference	2,28,000	1,59,600

$$\text{Variable cost (\% of sales)} = \frac{1,59,600}{2,28,000} \times 100 = 70\%$$

(or in other words, variable cost is 70 paise per Re.1.00 of sales)

$$\text{Variable cost for the year 2001} = 22,23,000 \times \frac{70}{100} = \text{Rs.}15,56,100$$

$$\text{Variable cost for the year 2002} = 24,51,000 \times \frac{70}{100} = \text{Rs.}17,15,700$$

a. **P/V ratio** =  $\left( \frac{S-V}{S} \right) \times 100$

$$2001 = \frac{6,66,900}{22,23,000} \times 100 = 30\%$$

$$2002 = \frac{7,35,300}{24,51,000} \times 100 = 30\%$$

b. **Other cost figures:**

i) Fixed Cost (Total Cost – Variable cost):

$$2001 = \text{Rs.}19,83,600 - 15,56,100 = \text{Rs.}4,27,500$$

$$2002 = \text{Rs.}21,43,200 - 17,15,700 = \text{Rs.}4,27,500$$

ii) Fixed cost % of sales:

$$2001 = \frac{4,27,500}{22,23,000} \times 100 = 19\% \text{ (approx.)}$$

$$2002 = \frac{4,27,500}{24,51,000} \times 100 = 17\% \text{ (approx.)}$$

iii) Break-even point =  $\frac{F}{\text{P.V. Ratio}} = \text{Rs.} \frac{4,27,500}{30\%} = \text{Rs.}14,25,000$

iv) Margin of safety:

$$2001 = 22,23,000 - 14,25,000 = \text{Rs.}7,98,000$$

$$2002 = 24,51,000 - 14,25,000 = \text{Rs.}10,26,000$$



**Illu.15: From the following data calculate:**

- i) P/V ratio**
  - ii) Profit when sales are Rs.20,000**
  - iii) New Break-even point if selling price is reduced by 20%.**
- Fixed expenses           Rs.4,000**  
**Break-even point        Rs.10,000**

**Solution:**

i. Break-even sales =  $\frac{\text{Fixed expenses}}{\text{P/V Ratio}}$

$$\text{P/V Ratio} = \frac{\text{Fixed expenses}}{\text{Break - even sales}} = \frac{4,000}{10,000} = 40\%$$

- ii. Profit when sales are Rs.20,000  
 Profit = Sales × P/V ratio – Fixed expenses  
 = Rs.20,000 × 40% - Rs.4,000  
 = Rs.8,000 – Rs.4,000 = Rs.4,000

- iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e., 100 – 40% old P/V ratio)

$$\text{New P/V Ratio} = \frac{80 - 60}{80} = 25\%$$

$$\text{Break-even point will be} = \frac{4,000}{25\%} = \text{Rs.16,000}$$

## 15.4 . BREAK-EVEN CHART

The break even point can also be shown graphically through the break even chart. The break even chart shows the profitability or otherwise of an undertaking at various levels of activity and as a result indicate the point at which neither profit nor loss is made. It shows the relationship, through a graph between cost, volume and profit. The break even point lies at the point of intersection between the total cost line and the total sales line in the chart.

In a nut shell break – even charts are often used to depict the following.

1. Cost volume profit relationships and break-even point.
2. Profit volume ratio and margin of safety
3. The impact of change in the level of sales on likely costs and profit.
4. Profit appropriations and expense analysis.
5. For controlling profits and level of activity by comparing the budgeted with actual sales and profit.
6. For deriving the figures of optimum output.

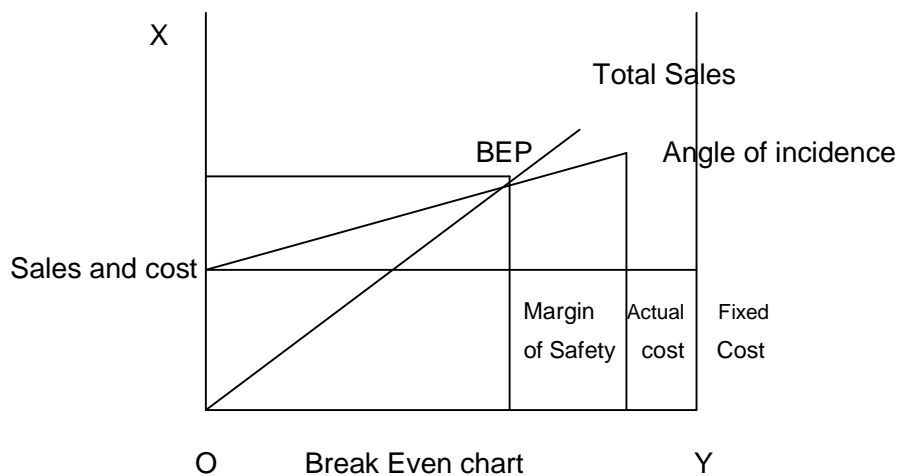
### 15.4.1 Preparation of break – even Charts:

These charts are shown on the graph paper by drawing lines at the point which are to be plotted. The sales in units are depicted on the horizontal line i.e., X-X' and costs and revenue on the vertical line i.e., Y-Y'. Both are expressed in monetary values.

First of all a line is drawn parallel to X-axis showing the fixed costs. Then the total cost line is drawn and inserted upon the fixed cost line. Thereafter the sales line is drawn diagonally touching the zero at the origin point and the highest point on the vertical scale. The point at which this sales line intersects the total cost line, is the break even point. The right sector of this point shows the profits and the left sector shows the loss. This is a simple break even chart. Suitable description regarding variable costs, fixed costs, profit or loss and break-even point are usually written on this chart.

### 15.4.2 Angle of Incidence:

It is an angle at which sales line cuts the total costs line. A high angle denotes high rate of profit while a low angle reflects poor rate of return. Obviously management must plan for high angle of incidence which can only be when variable costs bear a low proportion of cost of sales.



If the angle is large, the firm is said to be making profits at a high rate or vice versa. A large angle of incidence together with a high margin of safety indicate sound business conditions. Therefore, the management's aim will be to have as large an angle as possible; because this shows a high rate of profit once the fixed costs are met. A narrow angle, on the other hand would show that even after absorbing the fixed costs the rate of profit is comparatively low. In other words, it indicates that the variable costs form a large part of the total costs.

**Illu.16 : From the following information draw up a chart to show break-even points.**

	Rs.
<b>Fixed costs (Total)</b>	<b>40,000</b>
<b>Variable costs (per unit)</b>	<b>2</b>
<b>Selling price (per unit)</b>	<b>3</b>

**Solution:**

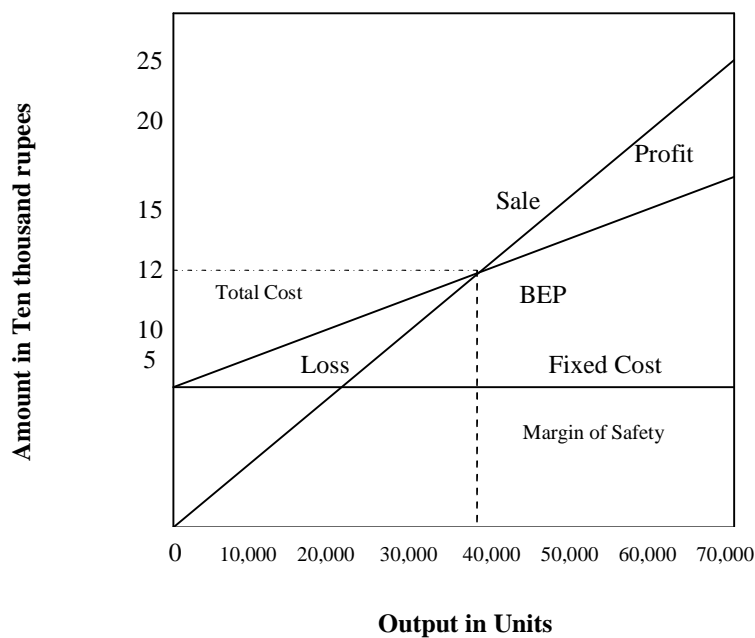
Contribution = Selling price – Variable cost per unit

Rs.3 – 2 = Rs.1

$$\text{BEP} = \frac{\text{Fixed costs}}{\text{Contribution}} = \frac{40,000}{1} = 40,000 \text{ units.}$$

40,000 units × selling price per unit i.e., Rs.3 = Rs.1,20,000 when output is 40,000 units.  
Total cost and Total sales will be Rs.1,20,000.

In the graph given below the horizontal scale OX shows volume of production expressed in units. The vertical scale OY shows sales and cost in Rs.10,000. In the chart three lines are drawn. The first line shows fixed cost which is parallel to the base scale and has not relation with the output.



The sales line (total sales) is drawn from the point where there are no sales (zero intersection of horizontal and vertical scales).

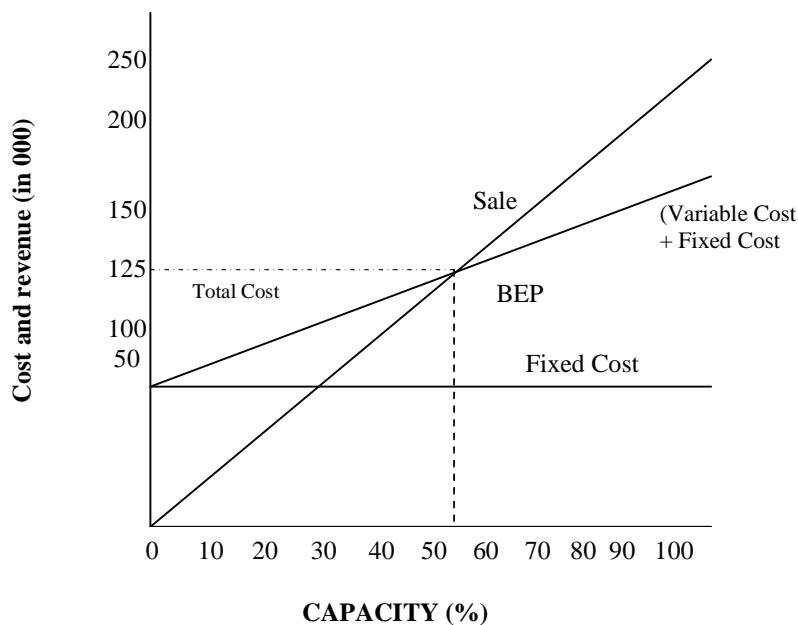
The total cost line (variable costs + fixed costs) is drawn from the point of fixed costs. The total costs and total sales lines intersect each other at point "P" which is a B.E.P. from this point perpendicular is drawn which touches output at R (40,000 units) and Revenue at Q (Rs.1,20,000). If the output is below 40,000 units there will be a loss. If output exceeds 40,000 units there will be a profit. Output in excess of 40,000 units i.e., RX shows margin of safety.

**Illu.17: The following figures relate to one year's working at 100% capacity level in a manufacturing business.**

	Rs.
Fixed Overheads	30,000
Variable Overheads	50,000
Direct Wages	40,000
Direct Materials	1,00,000
Sales	2,50,000

Represent that above figures on a break-even chart and determine from the chart the break-even point. Verify your result by calculations.

**Solution:**



**Verification:**

$$\text{BEP} = \frac{F}{\text{P/V Ratio}}$$

$$F = \text{Rs.}30,000$$

$$\text{P/V Ratio} = \frac{C}{S} = \frac{S - V}{S} = \frac{2,50,000 - 1,90,000}{2,50,000}$$

$$= \frac{60,000}{2,50,000} = \frac{6}{25}$$
$$BEP Sales = \frac{30,000}{6} \times 25 = \text{Rs. } 1,25,000$$

### Cash Break-Even Chart:

This chart is prepared to show the cash needs of a concern. Fixed expenses are to be classified as those involving cash payments and those not involving cash payments like depreciation. As the cash break even chart is designed to include only actual payments and not expenses incurred, any time lag in the payment of items included under variable cost must be taken into account. Equal care must be shown on the period of credit allowed to the debtor for the purpose of calculating the amount of cash to be received from them, during a particular period. Cash break-even point is used to assess the liquidity position of the firm. It can be calculated as under:

$$\text{Cash Break-even Point} = \frac{\text{Cash Fixed Costs}}{\text{Cash contribution per unit}}$$

### 15.4.3 Assumptions of Break even Analysis:

Break even analysis is based on the following assumptions.

- i Fixed cost remains constant at all levels of output.
- ii Variable costs fluctuate in direct proportion to volume of output.
- iii Selling prices do not change as volume changes.
- iv There is only one product and in the case of multiple products, the sales mix remains constant.
- v There will be no change in general price level.
- vi Productivity per worker will remain unchanged.
- vii There is synchronization between productions and sales, i.e., whatever is produced is sold out.

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## 15.5. ADVANTAGES OF BREAK EVEN ANALYSIS

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The break even analysis is a simple tool employed to graphically represent accounting data. The data revealed by financial statements and reports are difficult to understand and interpret. But when the same are presented through break even charts, it becomes easy to understand them. Break even charts help in:

1. Determining total cost, variable cost and fixed cost at a given level of activity;
2. Finding out break even output or sales;

3. Understanding the cost, volume, profit relationship;
4. Making inter-firm comparisons;
5. Forecasting profits;
6. Selecting the best product mix; and
7. Enforcing cost control.

Thus, the break even analysis can be used to find out the effect of all these changes which influence total revenue and total cost and thereby the profitability of a business. The marginal cost approach, which is better termed as relevant cost approach, is vital for making a choice out of various alternatives. But to make all decision on the basis of marginal cost would be wrong. Normal prices for example are based on full costs and not marginal cost.

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## 15.6. LIMITATIONS OF BREAK EVEN ANALYSIS

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On the negative side, break even analysis suffers from the following limitations.

1. **Difficulty in segregation of Costs:** It is very difficult, if not impossible, to segregate costs into fixed and variable components. Further, fixed costs do not always remain constant. They have a tendency to rise to some extent after production reaches certain level. Like wise, variable costs do not always vary proportionately.
2. **Complicated Calculations:** The application of break even analysis to a multi-product firm is very difficult. A lot of complications are involved.
3. **Limited Importance:** The break even point has limited importance. At best it would help management to indulge in cost reduction in times of dull business. Normally, it is not the objective of business to break even, because no business is carried on in order to break even. Thus, the BEP 'Provides neither a standard of performance nor a guide for executive decisions.
4. **Limitations application in long-range planning:** Break even analysis is a short run concept, and it has a limited application in the long range planning.

Despite these limitations, break even analysis has some practical utility in that it helps management in profit planning. According to Wheldon, "if the limitations are accepted, and the chart is considered as being an instantaneous photograph of the present position and possible trends, there are some very importance conclusions to be drawn from such a chart".

**Illu.18: A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets for annum.**

The present cost break-up for one bucket is as under:

	Rs.
Material	10
Labour Cost	3
Overheads	5(60% fixed)
The selling price is Rs.20 per bucket.	

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the prices of material.

You are required to calculate the profit at 50% and 90% capacities and also the break-even points for the same capacity productions.

**Solution:**

**Statement showing profit and break-even point at different capacity levels**

	Capacity level Production (Units)	50% 12,500		90% 22,500	
		Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.
a)	Sales	19.40	2,42,500	19.00	4,27,500
	Variable cost material	10.00	1,25,000	9.50	2,13,750
	Wages	3.00	37,500	3.00	67,500
	Variable overhead	2.00	25,000	2.00	45,000
b)	Total variable cost	15.00	1,87,500	14.50	3,26,250
c)	Contribution (S-V)				
	<b>Or (a-b)</b>	4.40	55,000	4.50	1,01,250
	Less: Fixed cost		30,000		30,000
	Net profit		25,000		71,250
	Break-even point at		50%		90%

$$\text{Units} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{30,000}{4.40} = 6,818 \text{ units} \quad \frac{30,000}{4.50} = 6,667 \text{ units}$$

Sales value

Rs.1,32,269

Rs.1,26,673

**Illu.19 : From the following data calculate:**

- i) P/V ratio
- ii) Profit when sales are Rs.20,000
- iii) New Break-even point if selling price is reduced by 20%.

<b>Fixed expenses</b>	<b>Rs.4,000</b>
<b>Break-even point</b>	<b>Rs.10,000</b>

**Solution:**

i. **Break-even sales** =  $\frac{\text{Fixed expenses}}{\text{P/V Ratio}}$

$$\text{P/V Ratio} = \frac{\text{Fixed expenses}}{\text{Break - even sales}} = \frac{4,000}{10,000} \times 100 = 40\%$$

ii. Profit when sales are Rs.20,000

$$\begin{aligned} \text{Profit} &= \text{Sales} \times \text{P/V ratio} - \text{Fixed expenses.} \\ &= \text{Rs.20,000} \times 40\% - \text{Rs.4,000} \\ &= \text{Rs.8,000} - \text{Rs.4,000} = \text{Rs.4,000} \end{aligned}$$

iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e. 100-40% old P/V ratio)

$$\text{New P/V Ratio} = \frac{80 - 60}{80} = 25\%$$

$$\text{Break-even point will be} = \frac{4,000}{25\%} = \text{Rs.16,000}$$

**Illu.20: The sales and profit during the years were as follows.**

	<b>Sales Rs.</b>	<b>Profit Rs.</b>
<b>2001</b>	<b>1,50,000</b>	<b>20,000</b>
<b>2002</b>	<b>1,70,000</b>	<b>25,000</b>

You are required to calculate

- P/V Ratio**
- Break even level**
- Sales required to earn a profit of Rs.40,000**
- Margin of Safety at a profit of Rs.2,50,000**
- Profit made when sales are Rs.50,000**
- Variable Cost in the two periods.**

**Solution:**

a) P.V. Ratio =  $\frac{\text{Change in Profit in 2 periods}}{\text{Change in Sales in 2 periods}} \times 100$

$$= \frac{\text{Rs.25,000} - 20,000}{\text{Rs.1,70,000} - 1,50,000} \times 100 = \frac{5,000}{20,000} \times 100 = 25\%$$

b) **Break Even Level** =  $\frac{\text{Fixed Cost}}{\text{P.V. Ratio}}$



$$\begin{aligned}
 \text{Fixed Cost} &= \text{Contribution} - \text{Profit} \\
 \text{Fixed Cost} &= (\text{Sales} \times \text{P.V. Ratio}) - \text{Profit} \\
 &= (1,50,000 \times \frac{25}{100}) - 20,000 = \text{Rs.}17,500 \\
 \text{Break Even Level} &= \frac{\text{Rs.}17,500}{25\%} = \text{Rs.}70,000
 \end{aligned}$$

**c) Sales required to earn a profit of Rs.40,000**

$$\begin{aligned}
 &= \frac{\text{Fixed expenses} + \text{Required Profit}}{\text{P.V. Ratio}} = \frac{\text{Rs.}17,500 + 40,000}{25\%} \\
 &= \text{Rs.}57,500 \times \frac{100}{25} = \text{Rs.}2,30,000
 \end{aligned}$$

**d) Margin of Safety at a profit of Rs.2,50,000**

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{2,50,000}{25\%} = \text{Rs.}10,00,000$$

**e) Profit when sales are Rs.2,50,000**

$$\begin{aligned}
 \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\
 &= (\text{Sales} \times \text{P.V. Ratio}) - \text{Fixed Cost} \\
 &= (\text{Rs.}2,50,000 \times \frac{25}{100}) - \text{Rs.}17,500 = \text{Rs.}45,000
 \end{aligned}$$

**f) Variable Cost in the two periods:**

$$\begin{aligned}
 \text{Variable Cost} &= \text{Sales} - \text{Profit} - \text{Fixed Cost} \\
 2001 &= \text{Rs.}1,50,000 - 20,000 - 17,500 = \text{Rs.}1,12,500 \\
 2002 &= \text{Rs.}1,70,000 - 25,000 - 17,500 = \text{Rs.}1,27,500
 \end{aligned}$$

**Illu.21: Assuming that the cost structure and selling prices remain the same in periods I and II find out:**

**(a) Profit volume ratio, (b) Profit when sales are Rs.1,00,000.**

Periods	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

**Solution:**

$$a. \quad P/V \text{ Ratio} = \frac{\text{Change in Profit}}{\text{Change in sales}} \times 100; \frac{4,000}{20,000} \times 100 = 20\%$$

Calculation of Fixed Expenses:

$$S (\text{P/V Ratio}) = F + P; 1,20,000 \left( \frac{20}{100} \right) = F + 9,000; 24,000 = F + 9,000; 24,000 - 9,000 = F; 15,000 = F; F = \text{Rs.}15,000$$

$$b. \quad S (\text{P/V Ratio}) = F + P; 1,00,000 \left( \frac{20}{100} \right) = 15,000 + P; 20,000 = 15,000 + P; 20,000 - 15,000 = P; 5,000 = P; P = \text{Rs.}5,000$$

**15.7 SELF ASSESSMENT QUESTIONS****I. Short Questions:**

1. What is break-even point?
2. What is margin of safety?
3. What is profit-volume ratio?
4. What is contribution?
5. What is angle of incidence?
6. What is Cash break-even point?

**II. Essay type questions:**

1. Explain cost-volume profit analysis.
2. Explain the ways by which profit-volume ratio can be improved.
3. Explain the uses of break-even analysis in profit planning.
4. What assumption are made to construct a simple Break-even Chart?
5. Explain the utility of Break-even Analysis in Managerial Decisions
6. What do you meant by Break-even level of output?
7. What are the limitations of the break-even charts?
8. What are the managerial uses of break-even analysis?
9. What is Profit volume ratio and Profit Volume graph? How is Profit-volume graph technique helpful to management.
10. What is C.V.P.? Analyse and state its uses and applications.
11. Explain 'Break-Even Analysis'. Discuss the assumptions that underline the technique and the practical usefulness of Break-even analysis.
12. Define Break-even-Point and explain its advantage and limitations.
13. What do you mean by P/V Ratio? What are its uses?
14. What are the assumptions of Break-even-Analysis?
15. Explain the concepts of marginal costing and Break-even analysis.
16. Explain about Break-even Analysis. What are its applications?

## 15.8 EXERCISES

1. From the following particulars calculate the Break-even point in terms of both quantity and value:

Production in units	10,000
Sales price	Rs.5,00 per unit
Variable costs	Rs.20,000
Fixed costs	Rs.12,000

**[Ans.: (a) 4,000 units; (b) Rs.20,000]**

3. What is the break-even-point when sales is Rs.6.0 lakhs; Fixed expenses are Rs.1.5 lakhs and Variable costs are Rs.4.0 lakhs?

**[Ans.: Rs.4.5 lakhs]**

4. Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs. Ten lakhs, Four lakhs, Four lakhs respectively.

**[Ans.: P.V. Ratio = 60%; MOS = Rs.3,33,333]**

5. The following information is extracted from the books of Harish Ltd.

Year	Sales Rs.	Cost Rs.
2006	2,00,000	1,40,000
2007	2,40,000	1,60,000
Calculate B.E.P.		

**[Ans.: BEP Rs.80,000; P.V. Ratio = 50%; Fixed Cost Rs.40,000]**

6. A company estimates that next year it will earn a profit of Rs.50,000. The budgeted fixed costs and sales are Rs.2,50,000 and Rs.9,93,000 respectively. Find out Break-Even point.

**[Ans.: Rs.8,27,500]**

7. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

**[Ans.: Margin of Safety Rs.40,000]**

8. From the following details calculate BEP, Margin of safety:

	Rs.
Sales	4,20,000
Fixed cost	90,000
Variable cost ratio	55% of sales

**[Ans.: BEP Rs.2,00,000; Margin of Safety Rs.2,20,000]**

9. From the following particulars calculate the margin of safety Sales units: 15,000; Fixed costs Rs.34,000; Selling price per unit Rs.10; Variable cost per unit Rs.6.

**[Ans.: Margin of Safety Rs.65,000]**

10. From the following information calculate:

- Break-even point
- Turnover required to earn a profit of Rs.36,000.
- Margin of safety for Rs.36,000 profit. Fixed overhead Rs.1,80,000 Variable cost per unit Rs.2 Selling price per unit Rs.20.

**[Ans.: (a) Rs.10,000 units; Value Rs.2,00,000; (b) 12,000 units; Value Rs.2,40,000; (c) Rs.40,000]**

11. Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30<sup>th</sup> June 2007:

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

During the second half of the year, the company has projected a loss of Rs.10,000. Calculate:

- (a) The Break-even point and Margin of safety for six months ending 30<sup>th</sup> June 2007.  
 (b) Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.  
 (c) The Break-even point and Margin of safety for the whole year 2007.

**[Ans.: (a) BEP Rs.90,000; MOS Rs.60,000; (c) BEP Rs.1,80,000; MOS Rs.40,000]**

12. You are given the following data for the year of a company.

	Rs.	%
Variable costs	6,00,000	60
Fixed costs	3,00,000	30
Net profit	1,00,000	10
	10,00,000	100

Find out

- (a) Break even point  
 (b) P/V Ratio.  
 (c) Margin of safety.

**[Ans.: (a) Rs.7,50,000; (b) 40%; (c) Rs.2,50,000]**

13. The following information relates to an article produced by EM EM Ltd:

	Rs.
Total fixed costs	18,000
Total variable costs	30,000
Total sales	60,000
Units sold	20,000

From the above information find out (a) Per unit contribution (b) Break-even-point (c) Safety margin and (d) Sales required to earn a profit of Rs.24,000.

**[Ans.: (a) Rs.1.50 (b) 12,000 units Rs.36,000; (c) 8,000 units – Rs.24,000; (d) 28,000 units value Rs.84,000]**

14. From the following figures, calculate P/V ratio, BEP, profit on estimated sales of Rs.1,25,000 and sales required to earn a profit of Rs.20,000:

	Sales Rs.	Profit Rs.
Period I	1,00,000	15,000
Period II	1,20,000	23,000

**[Ans.: P.V. Ratio = 40%; BEP Rs.62,500; Profit Rs.25,000; Sales required Rs.1,12,500]**

15. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

**[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000 4,000 = 10,000 units]**

16. From the following particulars calculate:

- Contribution
- P/V Ratio
- Break-even in units and in Rupees
- What will be the selling price per unit if the break-even is brought down to 25,000 units?

	Rs.
Fixed Expenses:	1,50,000
Variable cost per unit	10
Selling price per unit	15

**[Ans.: (a) Rs.5; (b)  $33\frac{1}{3}$  or  $\frac{1}{3}$  (c) 30,000 units; Rs.4,50,000; and (d) Rs.16]**

17. Bhargavi Ltd. incurred a total cost of Rs.40,000 on a sales of Rs.45,000 in the 1<sup>st</sup> half year and Rs.43,000 cost on sales of Rs.50,000 in the 2<sup>nd</sup> half year. Assuming that costs and prices remained the same, calculate for the entire year:

- (i) P.V. Ratio (ii) Fixed Expenses  
(iii) Break-even sales (iv) % of margin of safety.

**[Ans.: (i) 40%; (ii) Rs.26,000; (iii) Rs.65,000; (iv) Rs.30,000 and 31.58%]**

18. The sales and profit during two years are as follows:

Year	Sales Rs.	Profit Rs.
2006	3,00,000	30,000
2007	4,00,000	50,000

You are required to calculate (i) p/v ratio (ii) Break even sales (iii) Margin of Safety at a Profits of Rs.40,000.

**[Ans.: (i) 20% or  $\frac{1}{5}$ ; (ii) Rs.1,50,000 (iii) Rs.2,00,000]**

19. From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even volume:

Selling Price per unit	:	Rs.10
Trade discount	:	5%
Fixed overheads	:	Rs.10,000
Variable cost per unit	:	Rs.7

**[Ans.: B.E.P = 4,000 Units; Net Profit = Rs.1,000; Rs.1,500]**

20. The following figures are available from the records of Sindhu enterprises as at 31<sup>st</sup> December:

	2006 Rs. in lakhs	2007 Rs. in lakhs
Sales	150	200
Profit	30	50

Calculate:

- (a) The p/v ratio and total fixed expenses.  
(b) The break-even level of sales.  
(c) Sales required to earn a profit of Rs.90 lakhs.  
(d) Profit or loss that would arise if the sales were Rs.280 lakhs.

**[Ans.: (a) 40% & Rs.30,00,000; (b) Rs.75,00,000 (c) Rs.3,00,00,000 (d) 82,00,000]**

21. Calculate the Break-even point from the following particulars:

Budgeted output 70,000 units

Fixed cost (Rs.) 4,00,000

Variable cost per unit (Rs.) 12

Selling price per unit (Rs.) 22

If the selling price is reduced to (Rs.) 20 per unit what will be the revised Break-even point?

**[Ans.: BEP = 40,000 units Value Rs.8,80,000; Revised BEP = 50,000 units Value Rs.10,00,000]**

22. From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even Volume:-

Selling price per unit:	Rs.10
Trade discount:	5%
Fixed overheads:	Rs.10,000
Variable cost per unit	Rs.7

**[Ans.: BEP = 400 Units: Profits Rs.(i) Rs.1,000; (ii) Rs.1,500]**

23. Sales of a product amount to 200 units per month at Rs.10 per unit. Fixed overhead is Rs.400 per month and variable cost Rs.6 per unit. There is a proposal to reduce prices by 10%. Calculate present and future P/V ratio, how many units must be sold to maintain total profit.

**[Ans.: Present and future P/V ratios 40% and  $33\frac{1}{3}\%$ , Units to maintain total Profit = 267]**

24. From the following particulars calculate the P/V ratio Break-even sales and Fixed Costs. Profit Rs.2,000 which represents 10% of sales Margin of safety = Rs.10,000.

**[Ans.: P/V ratio =  $\frac{1}{5}$ ; Break-even sales Rs.10,000; Fixed cost Rs.2,000]**

25. From the following particulars calculate (a) Fixed costs (b) Break Eve Sales (c) Total Sales and (d) Profit.

Margin of Safety = Rs.10,000 (which represents 40% of sales) P/V Ratio = 50%.

**[Ans.: (a) Rs.7,500; (b) 15,000; (c) Rs.25,000; (d) Rs.5,000.]**



26. Given:

Sales 10,000 units  
 Variable cost Rs.1,00,000  
 Sales value Rs.2,00,000  
 Fixed cost Rs.40,000  
 Selling Price per unit Rs.20

You are required to calculate:

(a) P/V Ratio (b) Break-even point (c) Margin of safety (d) Sales to earn a profit of Rs.30,000.

**[Ans.: (a) 50% (b) Rs.80,000 (c) Rs.1,20,000 (d) Rs.1,40,000]**

27. Assuming that the cost structure and selling prices remain the same in Periods I and II, find out:

- Profit Volume Ratio;
- Fixed Cost;
- Break Even Point for Sales;
- Profit when Sales are of Rs.1,00,000;
- Sales required to earn a Profit of Rs.20,000; and
- Margin of Safety at a profit of Rs.15,000;
- Variable cost in Period II

Period	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

**[Ans.: (a) 20% (b) Rs.15,000 (c) Rs.75,000 (d) Rs.5,000 (e) Rs.1,75,000 (f) Rs.75,000 (g) Rs.1,12,000]**

28. The sales turnover and profit of M/s Sreenivasa & Co. Ltd. during the two years 2006 and 2007 were as follows:

	Sales (Rs.)	Profit (Rs.)
2006	4,50,000	60,000
2007	5,10,000	75,000

You are required to calculate:

- Profit-volume ratio.
- Break-even point.
- The sales required to earn a profit of Rs.1,20,000.

4. The profit made when sales are Rs.7,50,000.
5. Margin of safety at a profit of Rs.1,50,000.
6. Variable costs of the two periods.

**[Ans.: (1) 25% (2) Rs.2,10,000 (3) Rs.6,90,000 (4) Rs.1,35,000 (5) Rs.6,00,000 (6) 1989 = Rs.3,37,500; 1990 = Rs.3,82,500]**

29. Following are the particulars of Pennar Tubes Ltd:  
Sales Rs.30,00,000; Fixed costs Rs.9,00,000; Variable costs Rs.15,00,000. Calculate (a) P/V ratio, (b) Break-even point (c) Margins of safety and (d) Margin of safety ratio.

**[Ans.: (a) 50% (b) Rs.18,00,000 (c) Rs.12,00,000 (d) 40%]**

30. M Ltd., manufacturing and selling industrial boxes. It is proposed to decrease the prices due to heavy competition. By decreasing the selling prices by 10% and 15%, how many units to be sold to maintain the current level of profit. The additional information is given:

Current sales 30,000 units		Rs.3,00,000
Variable cost 30,000 units	1,80,000	
Fixed cost	70,000	2,50,000
Net profit		50,000

**[Ans.: Sale of Units at 10% reduction in selling price 40,000; Sale of Units at 15% reduction in selling price 48,000]**

31. From the following details calculate:
- (a) P/V Ratio
  - (b) BE Point
  - (c) Margin of safety
  - (d) Effect of 10% increase in SP on BEP.
  - (e) Effect of 10% decrease in SP on BEP.

	Rs.
Sales	60,000
Variable Cost	30,000
Fixed Cost	15,000

**[Ans.: (a) 50, (b) Rs.30,000; (c) Rs.30,000; (d) BEP Rs.27,500; (e) Rs.33,750]**

32. From the following particulars find

(i) Contribution, (ii) P/V Ratio:

Variable cost per unit Rs.20; Selling price per unit Rs.40; Fixed expenses Rs.1,00,000; Output 5,000 units.

**[Ans.: Contribution per unit Rs.20; P.V. Ratio: 50%]**

33. Ramachandra sells a line of Men's footwears for Rs.18 a pair. Each pair that is sold contributes Rs.6 to the recovery of fixed costs and to profits. His fixed costs amounts to Rs.84,000 a year.

You are asked to (a) show how many pairs must be sold in a year to Break Even. (b) Break Even sales revenue at the Break Even Point. (c) Desired sales to earn a profit of Rs.54,000.

**[Ans.: (a) 14,000 units (b) Rs.2,52,000 (c) Rs.4,14,000]**

34. From the following details, compute: (i) P.V. Ratio (ii) Profit

Fixed Costs Rs.50,000

Sales Rs.3,00,000

Variable costs  $66\frac{2}{3}$  % of sales.

**[Ans.: (i)  $33\frac{1}{3}$  % (ii) Rs.50,000]**

35. From the following details compute: (a) Variable Costs; (b) P/V Ratio.

	Rs.
Sales	3,00,000
Fixed Costs	70,000
Profit	80,000

**[Ans.: (a) Rs.1,50,000 (b) Rs.50%]**

36. From the following data, you are required to calculate

a. P/V Ratio

b. Break even sales with the help of P/V ratio

c. Sales required to earn a profit of Rs.4,50,000

Fixed expenses Rs.90,000

Variable cost per unit:

Direct material = Rs.5

Direct Labour = Rs.2

Direct overheads = 100 per cent of direct labour

Selling price per unit = Rs.12

**[Ans.: (a) 25% (b) 3,60,000 (c) Rs.21,60,000]**

37. From the following information pertaining to the years, calculate:
- P/V ratio
  - Amount of sales to earn profit of Rs.40,000
  - Profit on sales Rs.1,20,000

Years	Sales Rs.	Profit Rs.
2006	1,40,000	15,000
2007	1,60,000	20,000

**[Ans.: (a) 25% (b) Rs.2,40,000 (c) Rs.10,000]**

38. From the following data relating to a company, calculate:
- The break-even sales; and
  - Sales required to earn a profit of Rs.6,000 per period.

Period Rs.	Total Sales Rs.	Total Cost
1.	42,500	38,700
2.	39,200	36,852

**[Ans.: (i) Rs.33,863.64 (ii) Rs.47,500]**

39. The following information was extracted from the books of Giridhar Mft. Co. Ltd.

	Rs.
Sales	1,80,000
Less: Variable Costs	1,44,000
Contribution	36,000
Less: Fixed costs	24,000
Net Profit	12,000

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

**[Ans.: (a) 20% (b) Rs.1,20,000 (c) Rs.30,000 (d) Rs.2,40,000]**

40. By making and selling 7,000 units of its product, a company would lose Rs.10,000; whereas in the case of 9,000 units it would make a profit of Rs.10,000 instead. Calculate:

- The amount of fixed expenses.

- (b) Number of units of Break-Even.
- (c) Profit or Loss for 10,000 units.
- (d) Number of units to earn a profit of Rs.40,000.

**[Ans.: P.V. Ratio = 10%; (a) 80,000 (b) 8,000 units (c) Rs.20,000 (d) 12,000 units]**

41. M/s Haripriya Ltd., sold its products worth Rs.180 lakhs and made a profit of Rs.18 lakhs in 2006. But in 2007, the sales came down to Rs.140 lakhs due to serve competition in the market. The fall in profit was Rs.4 lakhs. Calculate break-even points and profit volume ratios in 2006 and 2007.

**[Ans.: BEP = 0; P.V. Ratio : 2001 – 10%; 2002 – 10%]**

42. Two competing companies P Ltd. and Q Ltd. produce and sell the same type of product in the same market. For the year ended March 2008, their forecasted profit and loss accounts are as follows:

	Rs.	P. Ltd. Rs.	Rs.	Q. Ltd. Rs.
Sales		3,00,000		3,00,000
Selling Price Expenses	2,00,000		2,25,000	
Fixed Cost	50,000	2,50,000	25,000	2,50,000
		50,000		50,000

You are required to calculate the following:

- (a) Profit volume ratio, Break-even Point and Margin of Safety of each business.
- (b) Sales volume at which each business will earn a profit of Rs.30,000.
- (c) Explain, giving reasons which business is likely to earn greater profits in conditions of (i) heavy demand for the product, (ii) low demand for the product.

**[Ans.: (a) P.V. Ratio : P Ltd. 33.33%; Q Ltd. 25%; BEP Sales : P Ltd., Rs.1,50,015; Q Ltd., Rs.1,00,000; Margin of safety : P Ltd. Rs.1,50,015; Q Ltd., Rs.2,00,000; (b) P Ltd. Rs.2,40,024; Q Ltd. Rs.3,00,000 (c) (i) In case of heavy demand the product of P Ltd., is more profitable, because P.V. ratio of P Ltd., is greater than Q Ltd. (ii) In case of low demand, the product Q Ltd., is more preferable since it provides more profit. It is because BEP of Q Ltd., is lower than the BEP of P Ltd.]**

43. Following information has been obtained from the revenue account of Balaji Ltd. for the year ended 31<sup>st</sup> December, 2007:

	Rs.	Rs.

Sales		6,00,000
Direct materials	1,80,000	
Direct wages	1,20,000	
Variable overheads	48,000	
Fixed overheads	1,72,000	5,20,000
Profit		80,000

It is proposed to reduce the selling price by 5%. What would be the sales volume if the present level of Profit is to be maintained. Assume no change in cost structure.

**[Ans.: Old P.V. Ratio : 42%; New P.V. Ratio : 38.95%; Sales Volume at present level of profit Rs.6,46,938]**

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## 15.9 REFERENCE BOOKS :

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**Chapter – 16**

# MARGINAL COSTING - MANAGERIAL DECISIONS

**Objectives**

After studying this chapter you should be able to

- understand the uses of marginal costing and taking various managerial decisions
- explain the problems relating to profit planning, introduction of new product, planning the level of activity. Key factor, suitable product mix, pricing decisions etc.

**Structure :**

**16.1 Marginal Costing and Decision making**

**16.2 Buy or Make Decisions**

**16.3 Self Assessment Questions**

**16.4 Exercises**

**16.5 Reference Books**

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## 16.1. MARGINAL COSTING AND DECISION MAKING

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Marginal costing techniques may be applied in various fields to aid management in arriving at many important policy decisions. These include:

1. Profit planning
2. Introduction of new product
3. Planning of level of activity
4. Key factor
5. Determination of suitable product – mix
6. Pricing Decisions
7. Foreign Market offer
8. Make or buy decisions

**16.1.1 Profit Planning:**

Profit planning is the planning of future operations so as to attain maximum profit. The contribution ratio shows the relative profitability of various sectors of the business whenever there is a change in selling price, variable costs or product mix. There are four important ways to improve the profit performance of a business.

- (i) By increasing volume
- (ii) By increasing selling price
- (iii) By reducing variable costs, and
- (iv) By reducing fixed costs.

**Illu.1: The following are the budgeted data relating to AB Ltd., and CD Ltd., producing identical products.**

	Rs.	Rs.	Rs.	Rs.
<b>Sales</b>		<b>1,50,000</b>		<b>1,50,000</b>
<b>Less: Variable cost</b>	<b>1,20,000</b>		<b>1,00,000</b>	
<b>Fixed Cost</b>	<b>15,000</b>	<b>1,35,000</b>	<b>35,000</b>	<b>1,35,000</b>
<b>Net Profit</b>		<b>15,000</b>		<b>15,000</b>

- a. Calculate break-even points, P/V ratio and margin of safety of each company:
- b. State which company is likely to earn greater profits in conditions of (i) heavy demand and (ii) low demand of the product.

**Solution:**

<b>a.(i) B.E.P. Sales</b>	=	$\frac{F \times S}{S - V}$		
AB Ltd.	=	$\frac{15,000 \times 1,50,000}{1,50,000 - 1,20,000}$	=	Rs.75,000
CD Ltd.	=	$\frac{35,000 \times 1,50,000}{1,50,000 - 1,00,000}$	=	Rs.1,05,000
<b>ii. P.V. Ratio</b>	=	$\frac{S - V}{S} \times 100$		
AB Ltd.	=	$\frac{1,50,000 - 1,20,000}{1,50,000} \times 100$	=	20%
CD Ltd.	=	$\frac{1,50,000 - 1,00,000}{1,50,000} \times 100$	=	33.33%
<b>iii. Margin of Safety</b>	=	Actual Sales - BEP Sales		
AB Ltd.	=	Rs.1,50,000 - 75,000	=	Rs.75,000
CD Ltd.	=	Rs.1,50,000 - 1,05,000	=	Rs.45,000

- (b) In case of heavy demand, CD Ltd., will earn higher profit since the P/V Ratio is higher for the company. In case of low demand, AB Ltd., may earn higher profit since its break even point is low and margin of safety is higher.



**16.1.2 Introduction of New Product:**

Sometime, a product may be added to the existing lines of products with a view to utilise idle facilities to capture new market or for any other purpose. The profitability of this new product has to be found out initially. Usually, the new product will be manufactured if it is capable of contributing something towards fixed costs and profit after meeting its variable costs.

**Illu.2: A firm manufacturing Product X has provided the following information.**

	Rs.
<b>Sales</b>	<b>75,000</b>
<b>Direct materials</b>	<b>30,000</b>
<b>Direct labour</b>	<b>10,000</b>
<b>Variable overhead</b>	<b>10,000</b>
<b>Fixed overhead</b>	<b>15,000</b>

In order to increase its sales by Rs.25,000, the firm wants to introduce the Product Y, and estimates the costs in connection therewith as under:

	Rs.
<b>Direct materials</b>	<b>10,000</b>
<b>Direct labour</b>	<b>8,000</b>
<b>Variable overhead</b>	<b>5,000</b>
<b>Fixed overhead</b>	<b>Nil</b>

**Advise whether the Product Y will be profitable or not.**

**Solution:**

**Marginal Cost Statement**

	X Rs.	Y Rs.	Total Rs.
Sales	75,000	25,000	1,00,000
Less: Material cost:			
Direct materials	30,000	10,000	40,000
Direct labour	10,000	8,000	18,000
Variable overhead	10,000	5,000	15,000
	50,000	23,000	73,000
Contribution	25,000	2,000	27,000
Fixed Costs			15,000
Profit			12,000

**Commentary:** If product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 towards fixed cost and profit. Therefore, Product Y should be introduced.

### 16.1.3 Planning the Level of Activity:

Marginal costing is of great help while planning the level of activity. Maximum contribution at a particular the level of activity will show the position of maximum profitability.

**Illu.3: Excellent company is currently working at 50% capacity and produces 10,000 units.**

**At 60% capacity, raw material cost increases by 2% and selling price falls by 2%. At 80% working, raw material cost increase by 5% and selling price falls by 5%. At 50% capacity working, the product costs Rs.180 per unit and is sold at Rs.2.00 per unit.**

**The unit cost of Rs.180 is made up as follows.**

<b>Materials</b>	<b>Rs.100</b>
<b>Wages</b>	<b>Rs.30</b>
<b>Factory overheads</b>	<b>Rs.30(40% fixed)</b>
<b>Administrative overheads</b>	<b>Rs.20 (50% fixed)</b>

**You are required to work out the material cost, fixed cost, total cost and profit for three capacity levels.**

**Solution:**

#### **Statement Showing Material Cost, Fixed Cost, Total cost and Profit at three Capacity Levels**

Output Capacity		50%	60%	70%
Sales	(A)	20,00,000	23,52,000	30,40,000
<b>Marginal Cost:</b>				
Material Cost		10,00,000	12,24,000	16,80,000
Wages		3,00,000	3,60,000	4,80,000
Factory Overheads		1,80,000	2,16,000	2,88,000
Administrative Overheads		1,00,000	1,20,000	1,60,000
Total Marginal Cost	(B)	15,80,000	19,20,000	26,08,000
Contribution (A-B)	(C)	4,20,000	4,32,000	4,32,000
<b>Less: Fixed Expenses:</b>				
Factory Overheads		1,20,000	1,20,000	1,20,000
Administrative Overheads		1,00,000	1,00,000	1,00,000
Total Fixed Expenses	(D)	2,20,000	2,20,000	2,20,000
Total Cost (B+D)	(E)	18,00,000	21,40,000	28,28,000
Profit/Loss (C-D)	(F)	2,00,000	2,12,000	2,12,000

**Note:** Statement showing material cost, fixed cost, total cost; and profit per unit at three capacity levels.

Output Capacity		50%	60%	70%
Selling Price	(A)	200	196	190
<b>Marginal Cost:</b>				
Materials		100	102	105
Wages		30	30	30
Factory Overheads		18	18	18
Administrative Overheads		10	10	10
Total Marginal Cost	(B)	158	160	163
Contribution (A-B)	(C)	42	36	27
<b>Less: Fixed Expenses:</b>				
Factory Overheads		12	10	7.50
Administrative Overheads		10	8.33	6.25
Total Fixed Expenses	(D)	22	18.33	13.75
Profit/Loss (C-D)	(E)	20	17.67	13.25

**Illu.4: Two companies which have the following operating details decide to merge:**

	Company I	Company II
Capacity utilisation	90%	60%
Sales (Rs.Lakhs)	540	300
Variables cost (Rs.Lakhs)	396	225
Fixed cost (Rs.Lakhs)	80	50

Assuming proposal is implemented, calculate:

- Break-even sales of the merged plant and the capacity utilisation at that stage.
- Profitability of the merged plant at 80% capacity utilisation.
- Sales turnover of the merged plant to earn a profit of Rs.75 lakhs.

**Solution:**

**Statement of the merged company at 100% and 80% Capacity**

Capacity	Company A		Company B		Merged Company	
	90%	100%	90%	100%	100%	80%
Sales	540	600	300	500	1,100	880
Variable Cost	396	440	225	375	815	652
Contribution (S-V)	144	160	75	125	285	228
Fixed Cost	80	80	50	50	130	130
Profit	64	80	25	75	155	98

**a. BEP of merged Plant:**

$$\text{P.V. Ratio} = \frac{C}{S} \times 100; \frac{285}{1,100} \times 100 = 25.91\%$$

$$\text{BEP Sales} = \frac{F}{\text{P.V. Ratio}} = \frac{130}{25.91\%} = \text{Rs.501.75 lakhs.}$$

$$\text{Capacity Utilisation} = \frac{100}{1,100} \times \text{Rs.501.75 lakhs} = 45.6\%$$

**b. Profitability of the merged company at 80% capacity utilisation.**

$$= \frac{\text{Profit}}{\text{Sales}} \times 100; = \frac{98}{880} \times 100 = 11.14\%$$

**c. Sales required to earn a profit of Rs.75 lakhs.**

Desired Profit = Rs.75 lakhs. Fixed Cost of merged Co. = Rs.130 lakhs

Desired Contribution = 75 + 130 = Rs.205 lakhs.

$$\text{Sales to earn Rs.205 lakhs contribution} = \frac{205}{25.91\%} = \text{Rs.791.23 lakhs.}$$

**16.1.4 Key Factor:**

A concern would produce and sell only those products which offer maximum profit. This is based on the assumption that it is possible to produce any quantity without any difficulty and sell like wise. However, in actual practice, this seems to be unrealistic as several constraints come in the way of manufacturing as well as selling. Such constraints that come in the way of management's efforts to produce and sell in unlimited quantities are called 'Key factors' or 'limiting factors'.

The limiting factors may be materials, labour, plant capacity, or demand. Management must as certain the extent of influence of the key factor for ensuring maximisation of profit. Normally, when contribution and key factors are known, the relative profitability of different products or processes can be measured with the help of the following formula.

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

**Illu.5: From the following data, which product would you recommend to be manufactured in a factory, time being the key factor?**

	Per unit of product X Rs.	Per unit of product Y Rs.
<b>Direct material</b>	<b>24</b>	<b>14</b>
<b>Direct labour at Re.1 per hour</b>	<b>2</b>	<b>3</b>
<b>Variable overhead at Rs.2 per hour</b>	<b>4</b>	<b>6</b>
<b>Selling price</b>	<b>100</b>	<b>110</b>
<b>Standard time to produce</b>	<b>2 hours</b>	<b>3 hours</b>

**Solution:**

		Product X Per unit		Product Y Per unit
	Rs.	Rs.	Rs.	Rs.
Selling price		100		110
Less: Marginal cost:				
Direct materials	24		14	
Direct labour	2		3	
Variable overhead	4	30	6	23
Contribution		70		87
Standard time to produce		2 hours		3 hours
<b>Contribution per hour</b>		$\frac{70}{2} =$ <b>Rs.35</b>		$\frac{87}{3} =$ <b>Rs.29</b>

Contribution per hour of product X is more than that of product Y by Rs.6. Therefore, product X is more profitable and is recommended for manufacturing.

**16.1.5 Suitable Product Mix:**

Normally, a business concern will select the product mix which gives maximum profit. Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps management in taking appropriate decisions regarding the produce mix, i.e., in changing the ratio of product mix so as to maximise profits. The technique not only helps in dropping unprofitable products from the mix but also helps in dropping unprofitable departments, activities etc.,

**Illu.6: Present the following information to show to the management: a) the marginal product cost and the contribution per unit; b) the total contribution and profits resulting from each of the following sales mixtures:**

	Product	Per Unit
		Rs.
Direct materials	A	10
	B	9
Direct wages	A	3
	B	2
Fixed expenses Rs.800		

Variable expenses are allocated to products as 100% of direct wages.

		Rs.
Sales Price	A	20
	B	15

**Sales mixtures:**

- i) 1000 units of product A and 2000 units of B
- ii) 1500 units of product A and 1500 units of B
- iii) 2000 units of product A and 1000 units of B

**Solution:**

a) Marginal Cost Statement	A	B
	Rs.	Rs.
Direct materials	10	9
Direct wages	3	2
Variable overheads (100%)	3	2
Marginal Cost	16	13
Sales Price	20	15
Contribution	4	2

(b) Product mix choice	1000 A + 2000 B (i)	1500 A + 1500 B (ii)	2000 A + 1000 B (iii)
	Rs.	Rs.	Rs.
Total Sales	$(1000 \times 20 + 2000 \times 15)$ = 50,000	$(1500 \times 20 + 1500 \times 15)$ = 52,500	$(2000 \times 20 + 1000 \times 15)$ = 55,000
	$(1000 \times 16 + 2000 \times 13)$ = 42,000	$(1500 \times 16 + 1500 \times 13)$ = 43,500	$(2000 \times 16 + 1000 \times 13)$ = 45,000
Less: Marginal Cost			
Contribution	8,000	9,000	10,000
Less: Fixed Costs	800	800	800
Profit	7,200	8,200	9,200

Therefore, sales mixture (iii) will give the highest profit; and as such mixture (iii) can be adopted.

### 16.1.6 Pricing Decisions:

Marginal costing techniques helps a firm to decide about the prices of various products in a fairly easy manner. Let's examine the following cases.

#### (i) Fixation of Selling Price.

**Illu.7: P/V ratio is 60% and the marginal cost of the product is Rs.50. What will be the selling price?**

$$\text{Solution: P/V Ratio} = \frac{S - V}{S} = 1 - \frac{V}{S} = \frac{C}{S}$$

$$\frac{\text{Variable cost}}{\text{Sales}} = 40\% \text{ or } \frac{40}{100}$$

$$\text{Selling price} = \frac{50}{40\%} = \frac{50 \times 100}{40} = \text{Rs.125}$$

#### ii. Pricing during Recession:

**Illu.8: Hindustan Engineering Company is working well below normal capacity due to recession. The directors of the company have been approached with an enquiry for special job. The costing department estimated the following in respect of the job.**

**Direct materials – Rs.10,000**

**Direct labour – 500 Hours @ Rs.2 per hour.**

**Overhead costs : Normal recovery rates.**

**Variable – Re. 0.50 per hour**

**Fixed – Rs.1.00 per hour.**

**The directors ask you to advise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.**

**Solution:**

**Calculation of Marginal Cost:**

	Rs.
Direct materials	10,000
Direct labour	1,000
Variable overhead @ Re.0.50 per hour	250
<b>Marginal cost</b>	<b>Rs.11,250</b>

**Commentary:** Here the minimum price to be quoted is Rs.11,250, which is the marginal cost. By quoting so, the company is sacrificing the recovery of the profit and the fixed costs. The fixed costs will continue to be incurred even if the company does not accept the offer. So any price above Rs.11,250 is welcome.

**(iii) Selling below marginal cost:**

Selling below marginal cost, normally, is not feasible. However, under the following circumstances this can be practised.

1. when a new product is introduced.
2. when competitors have to be edged out of the market.
3. when company deals with perishable products.,
4. when the product is used as a loss leader.
5. when labour engaged cannot be retrenched.
6. when foreign market is to be explored to earn foreign exchange.
7. when there is cut-throat competition.
8. when the plant has to be kept in a running condition.

**16.1.7 Foreign Market Offer:**

The acceptance or rejection of an offer from a foreign market depends upon the incremental cost and incremental revenue.

**Illu.9: Chola Pen Co. Ltd. produces and markets Micro tipped pens. The selling price per pen is Rs.5.50 made up as follows:**

	Rs.
Direct materials	2.00
Direct labour	1.50
Variable overheads	0.50
Fixed overheads (Rs.90,000 ÷ 1,20,000)	0.75
<b>Total cost</b>	<b>4.75</b>
<b>Profit</b>	<b>0.75</b>
<b>Selling price</b>	<b>5.50</b>

The installed capacity is 1,50,000 pens per month. At present, it is producing and selling, on an average, 1,20,000 pens per month. The company has received an export order for 30,000 pens per month for two years but at a price of Rs.4.50. the management is hesitant to accept this order because it does not cover the total cost. There are no government subsidies to meet the deficit. It is unlikely that the domestic market will expand in the next two years. Advise them with necessary supporting data.



**Solution:****Marginal Cost per unit:**

	Rs.
Direct material	2.00
Direct labour	1.50
Variable overheads	0.50
<b>Total Variable Cost</b>	<b>4.00</b>

Selling price of the export order Rs.4.50

If the foreign order is accepted for each unit the firm gets a profit. of Rs.0.50 (Rs.4.50 – 4.00). The total profit if the foreign order is accepted = Rs.15,000 (30,000 × 0.50). So it is better to accept foreign order.

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## 16.2 MAKE OR BUY DECISIONS

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A company might be having unused capacity which may be utilised for making component parts or similar items instead of buying them from the market. In arriving at such a 'make or buy' decision, the cost of manufacturing component parts should be compared with price quoted in the market. If the variable costs are lower than the purchase price, the component parts should be manufactured in the factory itself.

Fixed costs are excluded on the assumption that they have been already incurred, and the manufacturing of components involves only variable cost. However, if there is an increase in fixed costs and any limiting factor is operating they should also be taken into account. Consider the following illustration, throwing light on these aspects.

**Illu.10: A manufacturing company finds that while the cost of making a component part is Rs.10, the same is available in the market at Rs.9 with an assurance of continuous supply. Give your suggestion whether to make or buy this part. Give also your views in case the supplier reduces price from Rs.9 to Rs.8.**

**The cost information is as follows:**

	Particulars	Rs.
1.	<b>Material</b>	<b>3.50</b>
2.	<b>Direct Labour</b>	<b>4.00</b>
3.	<b>Other Variable expenses</b>	<b>1.00</b>
4.	<b>Fixed expenses</b>	<b>1.50</b>
		<b>10.00</b>

**Solution:**

<b>Make or Buy Decision Statement</b>		
Purchasing Price	(A)	9
<b>Manufacturing Cost:</b>		
Material		3.50
Direct Labour		4.00
Variable Expenses		1.00
Total Manufacturing Cost	(B)	8.50
Saving in Manufacturing (A-B)	(C)	0.50

**Advise:**

1. It is better to manufacture rather than buying from outside Market.
2. If the component is supplied at Rs.8 it is better to purchase it rather than manufacturing it. By purchasing, the profit will increase by Rs.0.50 (Rs.8.50 – 8.00) per unit.

**Illu.11: A company engaged in the manufacturing radios incurs Rs.6.25 per piece for producing part A. But the same part is available for at Rs.5.75 only per piece in the market. Its supply will also be alright. Particulars of expenses are as follows:**

	Rs.
<b>Material per piece</b>	<b>2.75</b>
<b>Labour per piece</b>	<b>1.75</b>
<b>Other variable expenses per piece</b>	<b>0.50</b>
<b>Depreciation and fixed overheads per piece</b>	<b>1.25</b>
	<b>6.25</b>

- (a) Do you manufacture that part or purchase it in the market?
- (b) In case the supplier offers the same at Rs.4.85 only per piece, what is your decision?

**Solution:****Make or Buy Statement for Part A**

		Rs.
Buying Price	(A)	5.75
<b>Manufacturing Cost:</b>		
Material		2.75
Labour		1.75
Variable Expenses		0.50
Total Manufacturing Cost	(B)	5.00
Saving in Manufacture (A-B)	(C)	0.75

**Advise:**

- a. It is better to manufacture rather than buying this. It is because the buying price per unit is Rs.5.75 and manufacturing price is Rs.5.00. In manufacturing the product the firm has a saving of Rs.0.75 per product.
- b. If the computer supply price is Rs.4.85 then it is better to purchase it rather than manufacturing it due to a saving of Rs.0.15 per unit.

**Illu.12: ABC company has just been formed. A company has a special process which will enable it to produce a unique product, the demand for which is uncertain. Their estimated costs are:**

**Material per unit Rs.2**

**Labour per unit Rs.6**

**Variable manufacturing expenses per unit Rs.3**

**Variable selling expenses per unit Re.1**

**Fixed manufacturing expenses Rs.24,000**

**Fixed Administrative and selling expenses Rs.72,000.**

**(a) If the selling price is Rs.20, how many units they have to sell to (i) break even (ii) make a profit of Rs.32,000 (iii) make a profit of 20 per cent of sale?**

**(b) If the demand for the product is 10,000 units, what price must they charge in order to (i) break-even (ii) make a profit of Rs.24,000 (iii) make a profit of 20 per cent of sales?**

**Solution:**

Total variable Expenses = 2 + 3 + 6 + 1 = Rs.12

Total Fixed Expenses = Rs.24,000 + Rs.72,000 = Rs.96,000

Sales Price Rs.20

$$(a) (i) \text{ B.E.P.} = \frac{F}{S - V} = \frac{96,000}{20 - 12} = \frac{96,000}{8} = 12,000 \text{ units.}$$

(ii) Sales required to get a profit of Rs.32,000

$$\frac{F + P}{S - V} = \frac{96,000 + 32,000}{20 - 12} = \frac{1,28,000}{8} = 16,000 \text{ units}$$

(iii) Required sales amount to get a profit of 20% on Sales. Sales units is assumed as S.

$$\text{Total Sales} = 20S; \text{ Estimated profit } 20\% S; 20S \times \frac{20}{100} = 4S$$

$$S = \frac{F + P}{S - V} = \frac{96,000 + 4S}{20 - 12} = 8S = 96,000 + 4S = 8S - 4S = 96,000$$

$$4S = 96,000S = \frac{96,000}{4} = 24,000 \text{ Units}$$

(b) (i) B.E.P. 10,000 units. Selling Price is assumed as S.

$$10,000 = \frac{96,000}{S-12} = 10,000S - 1,20,000 = 96,000;$$

$$10,000S = 96,000 + 1,20,000 ; 10,000S = 2,16,000;$$

$$S = \frac{2,16,000}{10,000} = 21.60; S = \text{Rs.}21.60.$$

(ii) Selling price to get a profit of Rs.24,000

$$10,000 = \frac{96,000 + 24,000}{S-12} = 10,000S - 1,20,000 = 1,20,000$$

$$10,000S = 1,20,000 + 1,20,000 = 10,000S = 2,40,000; S = \frac{2,40,000}{10,000} = S = \text{Rs.}24$$

(iii) Selling Price to get profit of 20% on Sales.

$$\text{Total Sales amount for 10,000 Units} = 10,000S$$

$$\text{On 10,000S; 20\% Profit} = 10,000S \times \frac{20}{100} = 2,000S$$

$$10,000 = \frac{96,000 + 2,000S}{S-12} = 10,000S - 1,20,000 = 96,000 + 2,000S \text{ or}$$

$$8,000S = 2,16,000; S = \text{Rs.}27.$$

**Illu.13: A firm is selling X product, whose variable cost per unit is Rs.10 and fixed cost is Rs.6,000. It has sold 1,000 articles during one month at Rs.20 per unit. Market research shows that there is a great demand for the product if the price can be reduced. If the price can be reduced to Rs.12.50 per unit, it is expected that 5,000 articles can be sold in the expanded market. The firm has to take a decision whether to produce and sell 1,000 units at the rate of Rs.20 or to produce and sell for the growing demand of 5,000 units at the rate of Rs.12.50. Give your advice to the management in taking the decision.**

**Solution:**

		1,000 units	5,000 units
Selling Price	(A)	20	12.50
<b>Less:</b> Variable cost	(B)	10	10.00
Contribution per unit (A-B)	(C)	10	2.50
Total Contribution		10,000	12,500
<b>Less:</b> Fixed Cost		6,000	6,000
Profit		4,000	6,500

The management may be advised to reduce the selling price to Rs.12.50. It is also advised

to produce and sell, 5,000 units because it gives an additional profit of Rs.2,500 (Rs.6,500 - 4,000)

**Illu.14: A Toy manufacturer earns an average net profit of Rs.3 per piece in a selling price of Rs.15 by producing and selling 60,000 pieces at 60% of the potential capacity. Composition of cost of sales is as follows:**

	Rs.
<b>Direct Materials</b>	<b>4.00</b>
<b>Direct Wages</b>	<b>1.00</b>
<b>Factory overhead</b>	<b>6.00</b>
	<b>(50% Fixed)</b>
<b>Sales overhead</b>	<b>1.00</b>
	<b>(25% varying)</b>

During the current year, he intends to produce the same number of toys but anticipates that:

- (a) His fixed charges will go up by 10%.
- (b) Rates of Direct labour will increase by 20%
- (c) Rates of Direct Material will increase by 5%
- (d) Selling price cannot be increased.

Under these circumstances, he obtains an order for a further 20% of his capacity. What minimum price will you recommend for accepting the order to ensure the manufacturer an overall profit of Rs.1,80,500.

**Solution:**

**Calculation of Current year Marginal Cost Statement:**

	Rs.
Selling Price (A)	15.00
<b>Less: Marginal Cost:</b>	
Direct Material $[4 + (4 \times \frac{5}{100})]$	4.20
Direct Wages $[1 + (1 \times \frac{20}{100})]$	1.20
Factory Overheads $(6 \times \frac{50}{100})$	3.00
Sales Overheads $(1 \times \frac{25}{100})$	0.25
Total Marginal Cost (B)	8.65
Contribution per unit (A-B) (C)	6.35

Total Contribution for 60,000 units = 60,000 × 6.35 = Rs.3,81,000

**Calculation of Total Fixed Cost:**

	Rs.
Fixed factory overheads per unit	3.00
Fixed sales overheads per unit	0.75
Total fixed cost per unit	3.75

Total fixed cost for 60,000 units = 60,000 units × 3.75 = Rs.2,25,000

Current year total fixed cost = 2,25,000 ×  $\frac{10}{100}$  + 2,25,000 = Rs.2,47,500

Current year profit for 60,000 units = Total contribution – Fixed expenses  
= 3,81,000 – 2,47,500 = Rs.1,33,500

**Calculation of New Selling Price for 20% Capacity:**

	Rs.
Given required Profit	1,80,500
Less: Profit earned for 60,000 units	1,33,500
Profit to be acquired for 20% capacity	47,000

When the firm is at 60% capacity the output is 60,000 units.

For additional 20% capacity the required units 20,000

New Selling Price is assumed at 'S' per unit.

For 20,000 units sales amount = 20,000 units × S = 20,000 S

Variable Cost per unit = 8 – 65

Total Variable Cost = 20,000 units × Rs.8-65 = Rs.1,73,000

$$S - V = F + P$$

20,000S – 1,73,000 = Nil + 47,000

20,000S – 1,73,000 + 47,000

20,000S = 2,20,000

$$S = \frac{2,20,000}{20,000} = \text{Rs.11}$$

The minimum recommended Selling Price to the company to accept the order is Rs.11.

**Illu.15: Budgeted Results to X Ltd. include the following.**

Sales	Amount (Rs. Lakhs)	Variable cost as % of sales value
A	5.0	60%
B	4.0	50%
C	8.0	65%
D	3.0	80%
E	6.0	75%
	26.0	65.17%

Fixed cost for the period are Rs.9.1 lakhs. You are required to (a) Produce a statement showing the amount of loss expected and (b) Recommend a change in sales volume of each product which will eliminate the expected loss that sales of only one product can be increased at a time.

**Solution:**

(a) **Statement of Profit/Loss Expected**

(Amount in lakhs)					
Product	Sales	Variable Cost Ratio	Variable Cost	P.V. Ratio (or) C%	Contribution
A	5	60	3.0	40	2.0
B	4	50	2.0	50	2.0
C	8	65	5.2	35	2.8
D	3	80	2.4	20	0.6
E	6	75	4.5	25	1.5
			17.1		8.9

**Calculation of Expected loss:**

Total Contribution	8.9
Less: Fixed Expenses	9.1
Expected loss	0.2

b. Assume only one product can be increased at a time. The amount of sales of each product to be increased as follows.

Sales required =  $\frac{\text{Under recovery of fixed costs}}{\text{P.V. Ratio}}$

			Rs.
Product A	$\frac{20,000}{40\%}$	$20,000 \times \frac{100}{40}$	50,000
Product B	$\frac{20,000}{50\%}$	$20,000 \times \frac{100}{50}$	40,000
Product C	$\frac{20,000}{35\%}$	$20,000 \times \frac{100}{35}$	57,143
Product D	$\frac{20,000}{20\%}$	$20,000 \times \frac{100}{20}$	1,00,000
Product E	$\frac{20,000}{25\%}$	$20,000 \times \frac{100}{25}$	80,000

**Note: For (a)**

- i. Variable cost = Sales  $\times \frac{\text{Variable Cost Ratio}}{100} = 5 \times \frac{60}{100} = \text{Rs.3}$
- ii. P.V. ratio = 100 – Variable Cost Ratio = 100 – 60 = 40
- iii. Contribution = Sales  $\times \text{P.V. Ratio} = 5 \times \frac{40}{100} = 2$

**Note: For (b)**

Under recovery of fixed expenses = Expected loss = Rs.20,000

**Illu.16: The following figures are extracted from the records of a company.**

	Departments				Total
	A	B	C	D	
	Rs.	Rs.	Rs.	Rs.	Rs.
<b>Sales</b>	<b>200</b>	<b>400</b>	<b>600</b>	<b>800</b>	<b>2,000</b>
<b>Costs:</b>					
<b>Direct Material</b>	<b>80</b>	<b>200</b>	<b>360</b>	<b>580</b>	<b>1,220</b>
<b>Direct Labour</b>	<b>40</b>	<b>150</b>	<b>180</b>	<b>140</b>	<b>510</b>
<b>Direct Expenses</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>28</b>
<b>Prime Cost</b>	<b>124</b>	<b>356</b>	<b>548</b>	<b>730</b>	<b>1,758</b>
<b>Overheads:</b>					
<b>Variable</b>	<b>20</b>	<b>30</b>	<b>24</b>	<b>20</b>	<b>94</b>
<b>Fixed</b>	<b>10</b>	<b>20</b>	<b>10</b>	<b>8</b>	<b>48</b>
	<b>30</b>	<b>50</b>	<b>34</b>	<b>28</b>	<b>142</b>
<b>Total cost</b>	<b>154</b>	<b>406</b>	<b>582</b>	<b>758</b>	<b>1,900</b>
<b>Profit/Loss</b>	<b>46</b>	<b>(-) 6</b>	<b>18</b>	<b>42</b>	<b>100</b>

On the basis of the above information, the management is inclined to discontinue department B. What will be your advice to management?

**Solution:**

**Comparative Statement of Profitability**

	With Dept. B Total Rs.	Without Dept. B Total Rs.
Sales	2,000	1,600
Less: Variable cost	1,852	1,466
Contribution	148	134
Less: Fixed expenses	48	48
Profit	100	86

**Advise:** If Department B is discontinued we have a total profit of Rs.86. If it is continued the total profit is Rs.100. Hence it is better to continue will be Department B.

**Note:** It is assumed that the total fixed costs remains the same.

**Illu.17: Hindustan Limited is engaged in manufacturing and selling industrial boxes. It is proposed to reduce the prices due to heavy competition. By decreasing the selling**



price by 10% and 15%, how many units are to be sold to maintain the current level of profit?

	Rs.	Rs.
Current Sales (15,000 units)		1,50,000
Variable Cost (15,000 units)	90,000	
Fixed Costs	35,000	1,25,000
Net Profit		25,000

**Solution:**

**Calculation of Selling Price per unit, Variable Cost per unit  
and Contribution Per unit**

	Total	Per unit
Current Sales (15,000 units)	1,50,000	Rs.10
Variable Cost (15,000 units)	90,000	Rs.6
Contribution per unit	60,000	Rs.4

**Calculation of required sales in units to earn a profit of Rs.25,000 when selling price is reduced by 10% and 15%.**

		10% Decrease		15% Decrease
New Selling Price per unit	$(10 \times \frac{9}{100})$	Rs.9	$(10 \times \frac{15}{100})$	8.50
Variable Cost Per unit		6		6
Contribution per unit		3		2.50
Required sales to earn profit of Rs.25,000 $\frac{(F + \text{Desired Profit})}{\text{Contribution per unit}}$	$(\frac{35,000 + 25,000}{3})$	20,000	$(\frac{25,000 + 30,000}{2.50})$	24,000
		Units		Units

**Illu.18: Assume you are the Management Consultant of XYZ Co. Ltd. The Managing Director of the company seeks your advice on the following problem:**

The XYZ Ltd., produces a variety of products each having a number of component parts. Product "B" takes 5 hours to produce on machine No.99 working at full capacity. "B" has a selling price of Rs.50 and a marginal costs of Rs.30 per unit. "A-10" a component part could be made on the same machine in 2 hrs. for marginal cost of Rs.5 per unit. The supplier's price is Rs.12.50 per unit. Should the company make or buy "A-10"?

**Assume that machine hour is the limiting factor.**

**Solution:**

In this problem the cost of new product plus contribution lost during the time for manufacturing "A-10" should be compared with the supplier's price to arrive at a decision.

	Rs.
B- Selling Price	50.00
Less: Marginal Cost	30.00
Contribution	20.00

It takes 5 hours to produce one unit of "B"

Contribution earned per hour on Machine No.99 is Rs.  $\frac{20}{5} = \text{Rs.}4$

"A-10" takes two hours to be manufactured on machine which is producing "B".

If "A-10" is produced, contribution lost will be = 2 hours  $\times$  Rs.4 = Rs.8

Real cost of "A-10" to the company = Marginal cost of "A-10" plus contribution lost for using the machine for "A-10".

$$\text{Rs.}5 + \text{Rs.}8 = \text{Rs.}13$$

This is more than the seller's price of Rs.12.50 and so it is advisable for the company to buy the product from outside.

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### 16.3 SELF ASSESSMENT QUESTIONS

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1. Explain the specific decision-making areas where the principles of marginal costing could be applied.
  2. What is the signification of Contribution of marginal costing? State its uses in managerial decision making.
  3. What is Marginal Costing? How is it useful to the manufacturing organization?
  4. Bring out the significance of imputed costs and out pocket costs for managerial decision making.
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### 16.4 EXERCISES

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1. A company is considering expansion. Fixed costs amount to Rs.4,20,000 and are expected to increase by Rs.1,25,000 when plant expansion is completed. The present plant capacity is 80,000 units a year. Capacity will increase by 50 per cent with the expansion. Variable costs are currently Rs.6.80 per unit and are expected to go down by Rs.0.40 per unit with the expansion. The current selling price is Rs.16 per unit and is expected to remain same under either alternative. What are the break-even points under either alternative? Which alternative is better and why?

**[Ans.: It is better to go for expansion because the profit will double]**

2. Arjun Electronic decided to effect a 10% reduction in the price of its product because it is felt that such a step may lead to a greater volume of sales. It is anticipated that there are no prospects of a change in total fixed costs and variable cost per unit. The director wish to maintain net profits at the present level.

The following information has been obtained from its books.

Sales : 10,000 units Rs.2,00,000

Variable Costs: Rs.15 per unit

Fixed Costs Rs.40,000

How would management proceed to implement this decision?

**[Ans.: Sales Rs.3,00,000]**

3. Vimala Company produced and sold 10,000 units under the following Cost structure during the year 2006:

- (a) Prime Cost Rs.80 per unit.
- (b) Variable Overheads Rs.10 per unit.
- (c) Fixed expenses Rs.1,50,000.
- (d) Advertising Rs.25,000.
- (e) Selling Price Rs.150 per unit.

For the year 2007 the following changes are proposed to be made:

- (i) Advertising to be discontinued.
- (ii) Reduction in direct labour cost by Rs.3 per unit.
- (iii) Reduction in variable administration expenses by Rs.3 per unit.
- (iv) New selling price: Rs.120 per unit.
- (v) Increase in production and sales by 100%.

You are required to find out (1) The P/V ratio (2) The Break-even point and (3) The amount of profit for the year 2007, taking into account the proposed changes.

**[Ans.: (1) 30% (2) Rs.5,00,000 (3) Rs.5,70,000]**

4. The cost of manufacturing of 8,000 units of 'X' product is given below:

Direct materials Rs.8,000; labour Rs.64,000; Variable overheads Rs.32,000; Fixed overheads Rs.40,000; Fixed overhead is included Rs.24,000, that continues regardless of the decision. The same product is available in the market for Rs.16 per unit. Should the company make or buy the product?

**[Ans.: Manufacturing is more profitable than purchase because due to manufacture the profit is more by Rs.32,000]**

5. The management of Pioneer Products Corporation Limited requests assistance from you in arriving at a decision whether to continue manufacturing a certain part of an assembly or to buy it from an outside supplier who had been quoting a price of Rs.8 per unit.

The Corporation's annual requirements is 5,000 units and the costs accumulated for their special manufacture are:

	Rs.
Direct Materials	17,500
Direct labour	28,000
Indirect Labour	6,000
Power (Electricity)	300
Others	640

If the parts are purchased from outside, the present machinery used to make the parts could be sold and its value would be realised. This step would reduce the total machinery depreciation by Rs.2,000 and property taxes and insurance by Rs.1,000.

If the parts are purchased from the outside supplier, the following additional costs would be incurred:

Freight Rs.0.50 per unit and material received charges @ Rs.1 per unit.

From the above information you are required to prepare a statement comparing the costs of manufacturing the parts, with the costs of purchasing them from the outside supplier and guide management for a make or buy decision.

**[Ans.: It is better to purchase 5,000 units instead of manufacturing it due to the saving of Rs.7,440]**

6. A company produces variety of products and components. Following components with relevant manufacturing costs are under consideration for purchase outside:

Component	Direct Material Rs.	Direct Labour Rs.	Variable overheads Rs.	Fixed Costs Rs.	Bought out price Rs.
XY	600	200	100	300	800
PR	200	800	200	1,000	2,300
MN	100	300	200	500	1,200

Select the components which should be bought from outside, indicating the reasons for choice.

**[Ans.: (a) It is better to purchase XY Product (b) It is better to manufacture PR product (c) It is better to manufacture MN Product.]**

7. A manufacturer has planned his level of operation at 50% of his plant capacity of 30,000 units. His expenses are estimated as follows, if 50% of the plant capacity is utilised.

	Rs.
(i) Direct materials	8,280
(ii) Direct wages	11,160
(iii) Variable and other manufacturing expenses	3,960
(iv) Total fixed expenses irrespective of capacity utilisation	6,000

The expected selling price in the domestic market is Rs.2 per unit. Recently the manufacturer has received a trade enquiry from an overseas organisation interested in purchasing 6,000 units at a price of Rs.1.45 per unit.

As a professional management accountant, what would be your suggestion regarding acceptance or rejection of the offer? Support your suggestion with suitable quantitative information.

**[Ans.: 15,000 units: Profit Rs.600; 6,000 units : Loss Rs.660; Total 21,000 units : Loss Rs.60; It is not profitable to accept the foreign offer.]**

8. A company currently operating at 80% capacity has the following particulars.

	Rs.
Sales	32,00,000
Direct materials	10,00,000
Direct labour	4,00,000
Variable overheads	2,00,000
Fixed overheads	13,00,000

An export order has received that would utilise half the capacity of the factory. The order cannot be split, i.e., it has either to be taken in full and executed at 10% below the normal domestic prices are rejected totally.

The alternative available to the management are:

1. Reject the order and continue with the domestic sales only; (at as present); or
2. Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand; or
3. Increase capacity to accept the export order and maintain the present domestic sales by:

- (a) buying an equipment that will increase capacity by 10%. This will result in an increase of Rs.1,00,000 in fixed costs; and
- (b) Work overtime to meet balance of required capacity. In that case, labour will be paid at one and half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.

**[Ans.: Profit I Rs.3,00,000; II Rs.5,00,000; III Rs.9,50,000. Alternative III is the best because it results in the highest amount of profit.]**

9. Prestige company private limited, manufacturing pressure cookers has drawn up the following budget for the year 2006-07.

	Rs.
Raw materials	20,00,000
Labour, stores, power and other variable costs	6,00,000
Manufacturing overheads	7,00,000
Variable distribution costs	4,00,000
General overheads including selling	3,00,000
Total	40,00,000
Income from sales	50,00,000
Budgeted profits	10,00,000

The General Manager suggests to reduce selling price by 5% and expects to achieve an additional volume of 50%. There is sufficient manufacturing capacity. More intensive manufacturing programme will involve additional costs of Rs.50,000 for production planning. It will also be necessary to open an additional sales office at the cost of Rs.1,00,000 per annum.

The Sales Manager, on the other hand, suggests to increase selling price by 10%, which it is estimated will reduce sales volume by 10%. At the same time saving in manufacturing overheads and general overheads at Rs.50,000 and Rs.1,00,000 per annum respectively is expected on this reduced volume.

Which of these two proposals would you accept and why?

**[Ans.: Proposal I : Profit Rs.14,75,000; Proposal II Rs.14,00,000; Proposal I is acceptable as it gives higher profit.]**

10. The following production/sales mix are capable of achievement in a factory.

- i. 2,000 units of Product A and 2,000 units of product C.
- ii. 4,000 units of product B.
- iii. 1,000 units of product A, 2,000 units of product B and 1,600 units of product C.

**Cost per unit is as follows.**

	A Rs.	B Rs.	C Rs.
Direct material	20	16	40
Direct wages	8	10	20

Fixed cost is Rs.20,000 and variable overheads per unit of A, B and C are Rs.2, Rs.4 and Rs.4 and Rs.8 respectively. Selling prices of A, B and C are Rs.36, Rs.40 and Rs.100 per unit respectively. Determine the marginal contribution per unit of A, B and C and the profits resulting from product mixed (i), (ii) and (iii).

**[Ans.: Marginal Contribution per unit; A Rs.6; B Rs.10; C Rs.32; Sales mix (iii) is profitable as it yields the highest amount of contribution and profit.]**

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**Chapter – 17****STANDARD COSTING****Objective :**

After reading this unit you should be able to :

- understand the meaning of standard costing
- Distinguish between Historical and standard cost, estimated and standard cost
- Explain the meaning of budgetary control and differences between budgetary control and standard costing.
- Study the steps in setting the standards
- Analyse the advantages and limitations of standard costing

**Structure :**

- 17.1 Introduction**
- 17.2 Standard Cost**
- 17.3 Setting standards**
- 17.4 Advantages of Standard Costing**
- 17.5 Limitations of Standard Costing**
- 17.6 Self Assessment Questions**
- 17.7 Reference Books**

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**17.1 INTRODUCTION**

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Historical Costing is the ascertainment of costs after they have been incurred. It is, thus, a post-mortem examination of the costs. It does not help in finding mistakes and locating inefficiencies that may ultimately affect the profit figure. These deficiencies of historical costing are sought to be corrected through the introduction of standard costing in modern business.

**17.1.1 Standard Costing – Meaning:**

Standard Costing is 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 such a technique wherein costs are fixed well in advance and compared to the actual costs. Then the reasons of variances will be taken into consideration to avoid further adverse cost variations.

Standard cost is a technique used for controlling cost and fixing responsibility of inefficient persons. In this technique costs are determined for various activities. These are compared to actual performances if adverse variations are found. Further, these are taken seriously for making corrective actions.



### 17.1.2 Definitions of Standard Costing:

The following are the main definitions of standard costing.

1. **H.J.Weldon:** "Standard costs are pre-determined or forecast estimates of cost to manufacture a single unit or a number of units of product, during a specific immediate future period.
2. **Bloker and Weltmer:** "Predetermined costs, based upon engineering specifications and representing highly efficient productions for quantity standard and forecast of future market trends and price standards, with a fixed amount expressed in dollars for material, labour and for an estimate quantity of production.
3. **ICMA, London:** "The preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence."

### 17.1.3 Steps in Standard Costing:

The important steps in standard costing are given below:

1. **Predetermination of standard costs:** The first step in the standard costing is the determination of standard costs of various elements of costs such as standard cost of direct material, direct labour and various overheads.
2. **Comparison of standard costs into actual costs:** The second step is the comparison of standard costs and the actual cost of production.
3. **Finding deviations:** Then deviations or variances will be found out between actual costs and standard costs. These variances may be favourable as well as unfavourable (adverse).
4. **Analysis of reasons for variances:** The next step is the analysis of the variances to find the causes of variances.
5. **Remedial Measures:** Based on deviations remedial measures will be taken so as to see that they do not repeat in future.
6. **Reporting to management:** The final step in the standard costing is reporting these variances to top management for remedial action.

## 17.2. STANDARD COST

Standard cost is a predetermined cost which is computed in advance of production on the basis of specification of all the factors affecting costs. It is a figure that represents an amount that can be taken as typical of the cost of an article. According to Blocker and Welter, it is a common sense cost, reflecting the best judgement of management as to what costs ought to be if the plant is operating with the highest degree of efficiency.

The standard cost may be (i) ideal, (ii) normal/attainable and (iii) expected. Standard cost refers to the estimate of cost under ideal conditions. It is computed on the basis that there is no scrap, no idling of machinery, break-down and so on. Generally, it is not possible to attain such standard in actual practice.

### 17.2.1 Normal standard cost:

It is based on the currently attainable standards. It is a desired attainable objective, a performance, a goal, a model. It is reflective of normal conditions, normal wastages, normal break- down and normal mistakes. The term standard cost refers to the normal standard cost only.

### 17.2.2 Historical Cost:

Historical cost, on the other hand, is computed after the completion of production of goods and it has value only from a historical point of view. It will help in rectifying the past mistakes, and mending the ways of doing things at least in future. However, all such rectificational measures can be initiated only after the damage has been done.

#### Distinction between Historical and Standard Cost

Basis of Difference	Historical Cost	Standard Cost
<b>1. Analysis of Costs</b>	Post-mortem examination of costs that have been incurred	Predetermination of costs reflecting scientific analysis of all relevant factors influencing costs.
<b>2. Scope for Controlling</b>	Does not give scope for controlling costs	Offers ample scope to control costs against pre-determined standards.
<b>3. Objective</b>	Ascertaining profit or loss incurred during a period	Measuring the operational efficiency of the enterprises

### 17.2.3 Estimated Cost:

Estimated costs are products of past experience or personal opinion. They are approximations aimed at revealing what the costs will be in future. They are used as statistical data and involve lot of guesswork. They are less accurate when compared to standard cost, which depends on a scientific analysis of all relevant factors. The objective of estimated costing is to anticipate correctly the future whereas the object of standard costs is to ensure cost control. Standard Costs are more specific and reveal what the costs should be.

<b>Basis of Difference</b>	<b>Estimated Cost</b>	<b>Standard Cost</b>
<b>1. Basis</b>	Estimated costs are based on historical costing.	Standard costs are based on Scientific analysis and Engineering Studies.
<b>2. Involves</b>	It involves guess work. It is based on past experience and future anticipation	It involves scientific analysis. It determines what the costs should be on the basis of analysis.
<b>3. Focus</b>	Its main focus is cost control	Its main attention is cost ascertainment
<b>4. Accuracy</b>	The estimated costs are less accurate	The standard costs are more accurate.

### 17.2.4 Budgetary Control:

Budgetary control is a system of planning and controlling costs. It involves the establishment of budgets, measurement of actual performance, comparison of actual performance with budgeted performance to develop the deviations and the analysis of the causes of variations for taking appropriate remedial steps. Thus, standard costing and budgetary control have the same principles: setting targets, comparing actual performance with present targets, analysing and reporting of variances.

According to Henrici, "both budget and standard costs consider department expenses according to accounts. Both assume that costs are controllable along fixed lines of supervision and responsibility. Both require measurement of costs as related some other variable, such as pieces, standard hours etc. Both are highly inter-related and aim at maximising efficiency at various levels. However, they differ in respect of the following points.

<b>Basis of Difference</b>	<b>Budgetary Control</b>	<b>Standard Costing</b>
<b>1. Scope</b>	Deals with the operations of the business as a whole and hence more extensive	Deals with control of expenses and hence more intensive.
<b>2. Reflects</b>	A projection of financial accounts	A projection of cost accounts
<b>3. Application</b>	Can be applied in parts	Cannot be applied in parts.
<b>4. Boundaries</b>	Can be operated without standards	Cannot be operated without budgets.
<b>5. Cost</b>	More expensive as it relates to production, Sales, finance etc.	Not expensive as it relates to only elements of cost.

### 17.3. SETTING STANDARDS

The following preliminary steps must be taken before a standard costing system is established:

#### 17.3.1 Establishment of Cost Centres:

A cost centre is a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control. Thus, cost centres may be Personal (those relating to persons) and Impersonal (relating to location, item of equipment or group of these). Cost Centres have to be established in order to fix responsibility and define lines of authority in a clear manner.

#### 17.3.2 Classification and Codification of Accounts:

Accounts have to be classified with a view to facilitate collection and analysis. All items of expenses are classified under appropriate account headings. Each such accounting head is to be assigned a suitable code number. This helps in speedy collection and analysis of cost information.

#### 17.3.3 Types of Standards:

The following types of standards are generally considered while establishing the standard costing system.

- (a) **Basic Standard:** This is a standard which is established for use, unaltered over a long period of time. It is good for industries where the product costs and product prices continue to be unchanged, or where minor changes take place.

- (b) **Current Standard:** This is a standard which is established for use over a short period of time and is related to current conditions. Unlike basic standard, which is idealistic, a current standard is more realistic. Most companies, therefore, use current standards.
- (c) **Ideal Standard:** An ideal standard is that standard which can be attained under the most favourable conditions possible. This is fixed with a very high degree of efficiency which is impossible to attain. As a result, when costs are compared with this standard, large variances are bound to arise which will not reveal a true and fair picture of business operations.
- (d) **Expected Standard:** This is a standard which is anticipated to be attained during a future specified budget period. While fixing this standard, conditions and circumstances in force within a particular industry are taken into account. Future changes that are likely to hit the industry are also given due weightage. This standard is, therefore, more realistic than the ideal standard.
- (e) **Normal Standard:** It is an average standard and is based on normal conditions which prevail over a long period of a trade cycle. For example, a period of say 3 years is taken and a forecast made of expected production and sales for three years. The standard costs are then assessed on an average basis and used during the above period. The whole exercise seems to be easy enough but in actual practice it is not possible to forecast future conditions with a reasonable degree of accuracy for a long period of time. Hence, normal standards are not generally used where cost control is the main purpose.

#### 17.3.4 Setting the Standards:

After selecting the standard the task of setting standards is to be given to a Standards Committee. The Standards Committee will generally consist of production manager, purchasing manager, personnel manager, production engineer, sales manager, cost accountant and other functional heads, if any. Among these functional heads, the cost accountant is expected to play a major role, as he provides cost figures and coordinates the activities of the committee in an attempt to set the standards as accurately as possible. In the next step, the standard cost is determined for each and every element of cost separately. The term standard cost here refers to cost that should reasonably be incurred in the manufacture of a product.

#### 17.3.5 Standards for Direct Material Cost

Standard material cost is equal to the standard quantity multiplied by the standard price. Thus the setting of standard costs for direct material includes two things: (i) standard material quantity and (ii) standard material price.

- (a) **Standard Material Quantity:** The standard material quantity is determined on the basis of two important factors: (i) the input-output relationship between raw materials and finished products based on past experience and (ii) the inherent loss of materials in the production process (shrinkage, evaporation, weight loss due to scrapping etc.). Once the standard quantity of material is determined, it becomes easy to set the standard cost of material.
- (b) **Standard Material Price:** Since material prices change very often, it is not easy to determine the standard material price. It has to be done by the cost accountant and the purchasing manager in a careful manner taking the following factors into account: (i) price of materials in stock, (ii) materials already contracted for, (iii) future price trends, and (iv) discounts and rebates to be received, if any.

### 17.3.7 Standards for Direct Labour Cost:

Determination of standard direct labour cost involves determination of standard time and standard rate. The standard time is fixed by undertaking time and motion studies by relying on past records, by having test runs or by preparing estimates. While fixing the standard time, due allowance must be given to fatigue, personal habits, inherent delay or other contingencies.

The standard rate is usually determined by the accountant after consulting the personnel manager. The standard labour rate is determined by taking the following factors into consideration: (i) influence of unions, (ii) demand for labour in the market, (iii) competitive policies, (iv) the skill requirements of the jobs under consideration, (v) legal provisions etc.

The standard labour hours multiplied by the standard labour rate give the standard labour cost.

### 17.3.8 Standards for Overheads:

The fixation of standards for overheads involves three steps: (i) determination of standard overhead costs, (ii) estimating production, and (iii) calculation of the standard overhead rate.

In order to determine the overhead cost, all expenses have to be classified into fixed, variable and semi-variable categories. The standard overhead rate is then determined for these on the basis of past records and future trend of prices. It is calculated for a unit or for an hour with reference to a particular level of activity.

$$\text{Standard Overhead Rate} = \frac{\text{Standard Overhead}}{\text{Budgeted production units}}$$

### 17.3.9 Standard Hour:

In standard costing, output is generally expressed in term of standard hour. The standard hour is a hypothetical hour which represents the amount of work which should be performed in one hour under standard conditions, For example, if 20 units of X can be produced in 5 hours, a standard hour represents 5 units of X. Time being a common factor, this standard hour can be used to measure all types of work, involving different physical units (such as kilogram, tonne, gallon, dozen). When production is expressed in such physical units, it may be difficult to measure them through a common yard-stick. In such cases, standard hour can be used to measure various types of work. Standard hour, thus, is a unit of work and not a unit of time.

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## 17.4. ADVANTAGES OF STANDARD COSTING

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Standard costing is a dynamic instrument of measurement of performance, comparison and control. According to National Association of Accountants, U.S.A. "Standard costs are the conclusions of managers and accountants as to what something should cost. It is used to motivate employees to work efficiently because variances and responsibility can be identified more easily. The advantages of standard costing may be stated as follows:

1. **Cost Consciousness:** Standard Costing infuses a strong sense of cost consciousness among executives, employees working at various levels. It forces them to keep activities along right tracks and check deviations as far as possible.
2. **Valuable Managerial Tool:** Standard Costing helps management in fixing prices, determining policies, ensuring cost control and effecting cost reduction. Comparison of actual performance with standards provides useful information for cost control and cost reduction.
3. **Motivation for Better Performance:** Standard costing compels people, employees to direct efforts in the right way, leading to realisation of predetermined targets. They are aware of the fact that they will be held responsible for results. As a result, they are forced to work with diligence, care and caution and deploy resources in the most effective way. The presence of standards which are within their reach, and other follow-up activities compel them to be goal-oriented. In short, they are motivated to perform to perform well and earn rewards.
4. **Management by Exception:** Standard costing helps in applying the principle of management by exception. Management need not trouble itself with respect to those activities that proceed according to predetermined plans. They do not have to bury themselves with routine checking, and wrestle with negligible deviation. They have to concentrate only on exceptional matters which may require their attention and remedial action.

5. **Optimal Use of Resources:** Standard costing helps in committing funds to the best possible advantage. Men, materials, machines are marshalled in an appropriate manner, with a view to achieve the predetermined targets. Costing procedures are simplified to a large extent and this, in turn, contributes to saving in costs. Operations are scrutinized regularly so as to locate inefficiencies and initiate rectification steps. All these things go a long way in making use of scarce inputs in an efficient and effective way.
6. **Inventory Valuation:** Inventories of raw materials, work in progress and finished goods can be valued at standard cost and this will in turn, reduce fluctuation of profits due to adoption of different methods for valuing inventory.
7. **Future-Oriented:** Standard costing involves careful setting of targets, regular monitoring of performance, prompt detection of deviations, and adoption of remedial measures. The data generated in the process can be used to plan ahead with confidence. Tighter and more accurate budgets can be prepared in the coming years.

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## 17.5 LIMITATIONS OF STANDARD COSTING

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Standard costing is always that much advantageous. It is plagued by several troubling limitations, as listed below:

1. **Difficulty in Fixing Standards:** It is not easy to set standards. Tight standards stifle executive freedom and loose standards do not motivate people to realise targets. This problem, however, could be solved by fixing standards on the basis of a careful evaluation of all relevant factors influencing current as well as future performance.
2. **Outdated Standards:** Keeping of up-to-date standards is a vexing problem. They become outdated in the face of continual changes in technology, production methods, competitive conditions etc. This problem could be solved by undertaking revisions after an optimum period. This, however, does not mean that standards have to be revised and modified continually, which is a costly and inconvenient proposition.
3. **Unsuitable for Small Firms:** Fixing of standards is a demanding task. It requires a high degree of technical skill and competence. Small firms may, therefore, find it difficult to establish standard costing.



4. **Unsuitable for Non-standard Product Industries:** Standard costing may be found unsuitable and even costly in the case of industries dealing with non-standard products which keep on changing in accordance with customers' specifications.
5. **Variances can not be Explained Properly:** The executives can only be held responsible for variances if such variances arise from actions which can be controlled by them. This means that, for fixing responsibilities, variances have to be split into two portions: controllable and uncontrollable. This, however, is easier said than done.
6. **Operational Problems:** The success of standard costing is critically dependent on continued blessings and consistent support from top management. Any reluctance on the part of top management to set the system in motion anywhere in-between, would mean failure on various fronts. More importantly, staff may begin to look at the whole system, as an impersonal policeman, zealously guarding their territories. It means loss of freedom, rigid observance of rules and regulations, dictation from 'upstairs' and a nauseating feeling of being 'cornered'

These problems could be solved through persuasion and education. Every attempt must be made to 'sell' the system to employees, clarifying their doubts and emotional objections in a proper manner.

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## 17.6 SELF ASSESSMENT QUESTIONS

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1. What is meant by Standard Costing? State its main objectives.
2. "Standard Costing is always accompanied by a system of Budgetary Control". Explain this statement and bring out clearly advantages of standard costing.
3. Distinguish between: (a) Budgetary Control and Standard Costing (b) Normal Standard and Historical Standard (c) Estimated Cost and Standard Cost
4. State the advantages of standard costing.
5. Define standard costing? Explain its merits and demerits.
6. What are the motivational aspects of Standard Costing
7. Explain the steps involved in Standard Costing

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## 17.7 REFERENCE BOOKS

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**Chapter – 18**

# VARIANCE ANALYSIS (MATERIAL VARIANCE)

**Objective :**

After studying this unit you should be able to :

- understand the meaning of variance analysis
- find out various types of variances
- analyse the material cost variance in terms of material price variance, usage variance and mixed variance in addition to yield variance

**Structure :**

- 18.1 Variance Analysis**
- 18.2 Types of Variances**
- 18.3 Material Cost Variance**
- 18.4 Self Assessment Questions**
- 18.5 Exercises**
- 18.6 Reference Books**

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## 18.1 VARIANCE ANALYSIS

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The difference between the standard cost and the actual cost is known as 'cost variance'. If actual cost is less than the standard cost, the variance is favourable. If the actual cost is more than the standard cost, the variance is unfavourable. A favourable variance indicates efficiency while an unfavourable one denotes in efficiency. However, mere knowledge of these variances would not be useful for ensuring cost control. These variances have to be thoroughly analysed so as to find out the contributory factors.

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## 18.2 TYPES OF VARIANCES

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The term variance analysis may be defined as 'the resolution into constituent parts and the explanation of variances'. In other words, the total cost variance should be split into its component on the basis of elements that go to make up the total cost, the following chart presents different types of variances.

### Types of Variances



## 18.3. MATERIAL COST VARIANCE

It is the difference between the standard cost of material specified for the output achieved and the actual cost of materials used. The standard cost of materials is computed by multiplying the standard price with the standard quantity for actual output and the actual cost is obtained by multiplying the actual price with actual quantity. The formula is:

$$\text{Material Cost variance (MCV)} = (\text{SQ} \times \text{SP} - \text{AQ} \times \text{AP})$$

Where

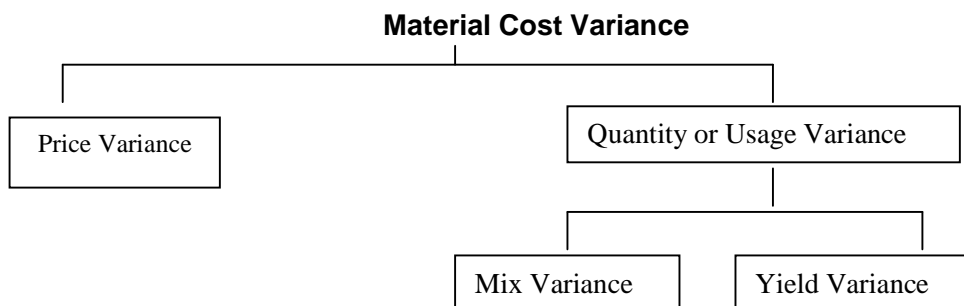
SQ = Standard Quantity (for actual output)

SP = Standard Price

AQ = Actual Quantity

AP = Actual Price

Material cost variance may be analysed according to causes as shown below:



**Illu.1: The standard cost of material for manufacturing a unit of a particular products estimated as follows:**

16 kg. of raw materials @ Re.1 per kg.

On completion of the unit, it was found that 20 kg. of raw material costing Rs.1.50 per kg. has been consumed.

**Compute material variances.**

**Solution:** Calculation of Material Cost Variance:

$$\begin{aligned}\text{Material Cost Variance} &= (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP}) \\ &= (16 \times 1) - (20 \times 1.50) \\ &= 16 - 30 = \text{Rs.14 (Adverse)}\end{aligned}$$

### 18.3.1 Material Price Variance:

It is the portion of the material cost variance which is due to the difference between the standard price specified and the actual price paid. This variance may be due to a number of reasons: (i) change in price, (ii) inefficient buying, (iii) inferior quality of materials, (iv) favourable discounts not obtained, (v) high transport, storage and handling costs, (vi) emergency purchases leading to higher prices etc. The formula is:

$$\text{Material Price Variance (MPV)} = \text{AQ} (\text{SP} - \text{AP})$$

Where

AQ = Actual Quantity

SP = Standard Price

AP = Actual Price

If the actual price is more than the standard price, the variance would be adverse and in case the standard price is more than the actual price, it would result in a favourable variance.

### 18.3.2 Material Usage Variance:

This is also known as material Quantity Variance. It is the difference between the standard quantity specified and the actual quantity used. This variance may arise because of the following reasons: (i) careless handling of materials, (ii) wastage, spoilage, scrap, theft, pilferage etc. (iii) changes in product design, labour performance etc. (iv) use of inferior materials, (v) defective tools and equipment, (vi) setting of improper standards, (vii) change in product mix or composition used in the process. The formula is:

$$\text{Material Usage Variance (MUV)} = \text{SP} (\text{SQ} - \text{AQ})$$

Where

SP = Standard Price

SQ = Standard Quantity

AQ = Actual Quantity

**Illu.1: From the following details calculate (a) Material cost variance (b) Material Price variance.**

**Standard quantity material required for manufacturing of a product 10,500 kgs. Cost of Material Rs.2 per kg. Actual quantity used for manufacturing of a product is 11,000 kgs. Amount paid for materials consumed Rs.24,750.**

**Solution:**

- a.  $MCV = (SQ \times SP) - (AQ \times AP)$   
 $= (10,500 \times 2) - (11,000 \times 2.25)$   
 $= (21,000 - 24,750) = 3,750 (A)$
- b.  $MPV = AQ (SP - AP)$   
 $11,000 (2 - 2.25); 11,000 (-0.25)$   
 $= 2,750 (A)$

**Illu.2: From the following data compute (i) Material Cost Variance and (ii) Material Price Variance.**

	Standard	Actual
Cost per unit (Rs.)	5	6
Quantity (units)	50	45

**Solution:**

- a.  $MCV = (SQ \times SP) - (AQ \times AP)$   
 $= (50 \times 5) - (45 \times 6)$   
 $= (250 - 270) = 30 (A)$
- b.  $MPV = AQ (SP - AP)$   
 $45 (5 - 6); 45 (-1)$   
 $= 45 (A)$

**Illu.3: A manufacturing concern which had adopted standard costing furnishes the following information.**

<b>Standard</b>		
Material for 70 kgs. finished products		100kgs.
Price of material	Re.1 per kg.	
<b>Actual:</b>		
Output	2,10,000 kgs.	
Materials used	2,80,000 kgs.	
Cost of materials	2,52,000	

**Calculate:**

- (a) Material Usage Variance**
- (b) Material Price Variance**
- (c) Material Cost Variance**

**Solution:**

For an output of 70 kgs. of finished products, standard quantity of material input is 100 kgs. Therefore for the output of 2,10,000 kgs., standard quantity of material input should be =  $\frac{100}{70} \times 2,10,000 = 3,00,000 \text{ kgs.}$

$$\text{Actual Price per kg.} = \frac{2,52,000}{2,80,000} = \text{Rs.}0.90$$

- (a) Material Usage Variance:**  $\text{SP} (\text{SQ} - \text{AQ})$   
 $= \text{Rs.}1 (3,00,000 - 2,80,000) = \text{Rs.}20,000 \text{ (Favourable)}$
- (b) Material Price Variance:**  $\text{AQ} (\text{SP} - \text{AP})$   
 $= 2,80,000 (1 - 0.90) = 28,000 \text{ (Favourable)}$
- (c) Material Cost Variance:**  $(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})$   
 $= (3,00,000 \text{ kgs.} \times 1 - 2,80,000 \text{ kgs.} \times \text{Rs.}0.90) = 2,52,000 = \text{Rs.}48,000 \text{ (Favourable).}$

**Verification:**

Material Cost Variance = Material Price Variance + Material Usage Variance. Rs.48,000 (Favourable) = Rs.28,000 (Favourable) + Rs.20,000 (Favourable).

Whenever more than one type of material is used in the manufacture of products in a factory, MUV can be further subdivided into Material Mix Variance and Material Yield Variance.

**18.3.3 Material Mix Variance (MMV):**

It is that portion of the direct material usage variance which is due to the difference between the standard and the actual composition of a mixture. The MMV occurs only when more than one type/grade of raw materials or combination of materials are used and when quantities issued to production differ from pre-determined standard mix. It may also be a result of temporary shortages or rising costs, etc., of a particular material. The formula is:

Material Mix Variance = Standard Price (Revised Standard Quantity – Actual Quantity)

$$\text{Revised Standard Quantity} = \frac{\text{Total weight of actual mix}}{\text{Total weight of standard mix}} \times \text{Standard Quantity}$$

When the actual quantity is less than the revised one, there is a favourable variance and vice versa.

**Illu.4: From the given data calculate.**

- a. **Material Price Variance**
- b. **Material Usage Variance**
- c. **Material cost Variance.**

**Standard:**

1. **250 kg. of raw material is required for producing 175 kgs. of finished products.**
2. **Price of material per kg. Rs.4**

**Actuals:**

1. **Production Rs.52,500 kg.**
2. **Material consumed 70,000 kgs.**
3. **Cost of materials Rs.2,73,000**

**Solution:**

**Standard Quantity for actual production:**

For 175 kg. of finished products ... 250 kgs. of raw material  
 For 52,500 kg of finished products ... ?  
 $= \frac{52,500}{175} \times 250 = 75,000 \text{ kgs.}$

- a.  $MPV = AQ (SP - AP); 70,000 (4.00 - 3.90)$   
 $70,000 (0.10) = \text{Rs.}7,000 \text{ (F)}$
- b.  $MUV = SP (SQ - AQ); 4.00 (75,000 - 70,000);$   
 $= 4.00 (5,000) = \text{Rs.}20,000 \text{ (F)}$
- c.  $MCV = (SP \times SQ) - (AP \times AQ)$   
 $= (4.00 \times 75,000) - (3.90 \times 70,000)$   
 $= 3,00,000 - 2,73,000 = \text{Rs.}27,000 \text{ (F)}$

**Illu.5: Calculate the materials mix variance from the following:**

Material	Standard	Actual
A	90 units at Rs.12	100 units at Rs.12
B	60 units at Rs.15	50 units at Rs.16



**Solution:**

Materials	Standard Quantity	Standard Rate	Amount	Actual Quantity	Actual Rate	Amount
A	90	12	1,080	100	12	1,200
B	60	15	900	50	16	800
	150		1,980	150		2,000

$$\text{Material Mix Variance} = \text{SP} \times (\text{RSQ} - \text{AQ})$$

Since the total actual mix and the total standard mix are the same the standard quantity and revised standard quantity will also be the same.

$$A = \text{Rs.}12 \times (90 - 100) = 12 \times 10 = \text{Rs.}120 \text{ (Adverse)}$$

$$B = \text{Rs.}15 \times (60 - 50) = 15 \times 10 = \text{Rs.}150 \text{ (Favourable)}$$

$$\text{Total} = \text{Rs.}30 \text{ (Favourable)}$$

**18.3.4 Material Yield Variance (MYV):**

In all process industries, loss is almost inevitable. This loss may be of two types: normal loss and abnormal loss. The normal loss is taken into account while determining the standard for normal expected. Quite frequently, the actual yield differs from the standard yield due to abnormal loss sustained in different processes of production. This difference is called 'Yield Variance'. Yield Variance, thus, represents the portion of usage variance which is due to the difference between the standard yield specified and the actual yield obtained. Yield variance may arise out of two situations:

- (i) When the standard mix and the actual mix do not differ.

The formula in this case is:

**Material Yield Variance (MYV) : = Standard Rate (Std. Yield for actual output –Actual Yield)**

= Standard Rate (Std. Yield for actual mix-Actual Yield)

Standard Rate (Standard Cost) per Unit means:  $\frac{\text{Total Cost of Standard Mix}}{\text{Net Standard Output}}$

- (ii) **When Actual mix differs from Standard mix:** Since the weight of actual mix differs from that of the standard in this case, a revised standard mix, the standard rate or standard cost per unit has to be calculated.

**Illu.7: Asian Paints Ltd. is engaged in producing a 'standard mix' using 60 kgs. of chemical X and 40 kgs. of chemical Y. The standard loss of production is 30%. The standard price of X is Rs.5 per kg. and of Y is Rs.10 per kg.**

The actual mixture and yield were as follows:

X 80 kgs. @ Rs.4.50 per kg., and

Y 70 kgs. @ Rs.8.00 per kg.

Actual yield 115 kgs.

Calculate Material Variances (cost, price, usage, yield and mix).

**Solution:**

$$\text{Revised standard mix : } X = \frac{60}{100} \times 150 = 90 \text{ kgs.}$$

$$Y = \frac{40}{100} \times 150 = 60 \text{ kgs.}$$

$$\text{Standard Quantity for Actual Output : } X = 115 \times \frac{60}{70} = \frac{690}{7} = 98.57 \text{ Kgs.}$$

$$Y = 115 \times \frac{60}{105} = \frac{460}{7} = 65.71 \text{ Kgs.}$$

#### Calculation of Standard Cost

Material	Actual Mix			Revised Standard Mix		
	Qty. Kgs.	Rate Rs.	Amount Rs.	Qty. Kgs.	Rate Rs.	Amount Rs.
X	80	4.50	360	90	5.00	450
Y	70	8.00	560	60	10.00	600
	150		920	150		1,050
Less Actual standard loss of production 30%	35			45		--
	115		920	105		1,050

$$\text{Standard cost per unit} = \text{Rs. } \frac{1,050}{105} = \text{Rs. } 10; \text{ Actual cost per unit} = \text{Rs. } \frac{920}{115} = \text{Rs. } 8$$

(a) **Material Cost Variance** = (Std. Cost per unit – Actual Cost per unit) × Actual Output.  
= (Rs.10 – Rs.8) × 115 = Rs.230 (F)

(b) **Material Price Variance** = AQ(SP-AP)

$$X : (5-4.50) \times 80 = 40 \text{ (F)}$$

$$Y : (10-8) \times 70 = 140 \text{ (F)}$$

$$180 \text{ (F)}$$

(c) **Material Usage Variance** = SP(SQ-AQ)

$$X : \left( \frac{690}{7} - 80 \right) \times 5 = \frac{650}{7} \text{ (F)}; Y : \left( \frac{460}{7} - 70 \right) \times 10 = \frac{300}{7} \text{ (A)}$$

$$50 \text{ (F)}$$

(d) **Material Yield Variance** = (AY – SY) × SC = (115-105) × 10 = 100(F)

$$100 \text{ (F)}$$

(e) **Material Mix Variance** = SP (RSQ-AQ)

$$X = \text{Rs.}5 (90-80) = \text{Rs.}50(\text{F}); Y = \text{Rs.}10 (60-70) = \text{Rs.}100(\text{A}) \quad 50(\text{A})$$

**Illu.7: From the following information compute the material variances:**

Material	Standard			Actual		
	Qty. (kg.)	Unit price Rs.	Total Rs.	Qty. (kg.)	Unit price Rs.	Total Rs.
A	40	10	400	20	35	700
B	20	20	400	10	20	200
C	20	40	800	30	30	900

Standard output : 80 units; Actual output = 80 units.

**Solution:**

**Material Cost Variance = Standard Material Cost – Actual Material Cost**

						Rs.
Material A	=	(10×40) – (35×20)	=	400-700	=	(-) 300 (A)
Material B	=	(20×20) – (20×10)	=	400-200	=	200 (F)
Material C	=	(40×20) – (30×30)	=	800-900	=	(-) 100 (A)
						<u>(-) 200 (A)</u>

**Material Price Variance = AQ (SP – AP)**

						Rs.
Material A	=	20 (10-35)	=	20(-25)	=	-500 (A)
Material B	=	10 (20-20)	=	10 × 0	=	0
Material C	=	30 (40-30)	=	30(10)	=	300 (F)
						<u>(-) 200 (A)</u>

**Material Usage Variance = SP (SQ – AQ)**

						Rs.
Material A	=	10 (40-20)	=	10 (20)	=	200 (F)
Material B	=	20 (20-10)	=	20 (10)	=	200 (F)
Material C	=	40 (20-30)	=	40 (-10)	=	(-) 400 (A)
						<u>Nil</u>

**Material Mix Variance: (MMV)**

$$RSQ = \frac{SQ \times TAQ}{TSQ}$$

$$\text{Material A} = \frac{40 \times 60}{80} = 30 \text{ kgs}$$

$$\text{Material B} = \frac{20 \times 60}{80} = 15 \text{ kgs}$$

$$\text{Material C} = \frac{20 \times 60}{80} = 15 \text{ kgs}$$

$$MMV = SP (RSQ - AQ)$$

				Rs.
Material A	=	10 (30-20)	=	10 (10) = 100 (F)
Material B	=	20 (15-10)	=	20 (5) = 100 (F)
Material C	=	40 (15-30)	=	40 (-15) = (-) 600 (A)
				400 (A)

$$\text{Material Sub usage variance} = SP (SQ - RSQ)$$

				Rs.
Material A	=	10 (40-30)	=	10 (10) = 100 (F)
Material B	=	20 (20-15)	=	20 (5) = 100 (F)
Material C	=	40 (20-15)	=	40 (5) = 200 (F)
				400 (F)

Where

TAQ = Total Actual quantity;

TSQ = Total standard quantity;

RSQ = Revised Standard quantity.

**Illu.8: It is estimated that in the manufacture of a product, for each ton of materials consumed, 100 articles should be produced. The standard price per ton of material is P.10. During the first week of January, 100 tons of materials were issued to the production department, the purchase price of which was Rs.10.50 per ton. The actual output for the period was 10,250 units. Calculate the material variances.**

**Solution:**

Material Price Variance (MPV)	=	A Q (SP - AP)
	=	100 (10 - 10.50) = 100 (0.50) = Rs.50 (A)
Material Yield Variance (MXV)	=	SR per unit (AP - SP) = 0.10 (10,250 - 10,000)
=		0.10(250) = Rs.25 (F)
SR of Material per unit	=	$\frac{10}{100} = 0.10P$



MUV = SP (SQ – AQ)

Material A	=	6.00 (500-400)	=	6.00 (100)	=	600 (F)
Material B	=	3.75 (400-500)	=	3.75 (100)	=	375 (A)
Material C	=	3.00 (300-400)	=	3.00 (-100)	=	300 (A)
						<u>75 (A)</u>

Calculation of RSQ:  $\frac{SQ \times TAQ}{TSQ}$

$$\text{Material A} = \frac{500 \times 1,300}{1,200} = 541.67$$

$$\text{Material B} = \frac{400 \times 1,300}{1,200} = 433.33$$

$$\text{Material C} = \frac{300 \times 1,300}{1,200} = 325.$$

MMV = SP (RSQ – AQ)

Material A	=	6.00 (541.67-400)	=	6.00 (141.67)	=	850.00 (F)
Material B	=	3.75 (433.33-500)	=	3.75 (-66.67)	=	250.00 (A)
Material C	=	3.00 (325-400)	=	3.00 (-75)	=	225.00 (A)
						<u>375 (F)</u>

MYV = SR(SLAI – ALAI)

$$SR = \frac{5,400}{1,080} = \text{Rs.5;}$$

$$\begin{aligned} \text{SLAI} &= 130, \text{ALAI} = 220 \\ &= 5(130-220) = 5(90) = 450 \text{ (A)} \end{aligned}$$

**Note:** SLAI = Standard Loss in Actual Input; ALAI = Actual loss in Actual Input

**Illu.10: The standard cost of a chemical mixture is as under.**

**40% of material A at Rs.20 per kg.**

**60% of material B at Rs.30 per kg.**

**Standard loss is 10%.**

**Cost records showed the following.**

**90 Kg. of material A at a cost of Rs.18 per kg.**

**110 Kg. of material B at a cost of Rs.34 per kg.**

**The output produced was 182 kg. Calculate material variance.**

**Solution:**

There is a standard loss of 10% in production, so standard output will be 90% of standard input. Standard output for 182 kg (actual) will be:

$$182 \times \frac{100}{90} = 202 \text{ Kgs.}$$

Standard input of material A = 40% of 202 = 80.8 Kg.

Standard input of material B = 60% of 202 = 121.1 Kg.

**a. Material Price Variance:**

Actual Quantity (Standard Price – Actual Price)

Material A : 90 (20-18) = Rs.180 favourable

Material B : 110 (30-34) = Rs.440 Adverse

Total Price Variance = Rs.260 Adverse.

**b. Material Mix Variance:**

Standard Price (Standard Mix – Actual Mix)

Standard Mix:

Material A = 40% of 200 = 80

Material B = 60% of 200 = 120

Material Mix Variance:

Material A = 20 (80-90) = Rs.200 Adverse

Material B = 30 (120-110) = Rs.300 Favourable.

Total Material Mix Variable = Rs.100 favourable.

**c. Material Yield Variance:**

MYV = SP (SLAI – ALAI)

$$SP = \frac{80 \times 20 + 120 \times 30}{200} = \text{Rs.}26$$

SLAI = 20 units

ALAI = 18 units

$$26 (20 - 18) = 26(2) = 52 (F)$$

**d. Material Cost Variance:**

Standard Material cost – Actual Material Cost

Material A : (80.8 × 20) – (90 × 18) = 1,616 – 1,620 = Rs.4 adverse

Material B : 121.2 × 30 – 110 × 34 = 3,636 – 3,740 = Rs.104 (A).

Total Material Cost Variance = Rs.108 (A).

**Note:** SLAI = Standard Loss in Actual Input; ALAI = Actual Loss in Actual Input

## 18.4 QUESTIONS

1. What is 'Variance'? Indicate its significance to the Management?
2. Define and explain briefly the following terms:
  - a. Material Price Variance
  - b. Material Usage Variance
  - c. Material Mix Variance
  - d. Material Yield variance
3. Explain the different methods of disposal of variances, stating the suitability of each.
4. Explain Variance Analysis

## 18.5 EXERCISES

1. Gemini Chemical Industries provide the following information from their records:  
For making 10Kg. of GEMCO the standard material requirement is:

Material	Quantity(Kg)	Rate per Kg(Rs)
A	8	6.00
B	4	4.00

During April 1988, 1000 Kg of GEMCO was produced. The actual consumption of materials is as under:

Material	Quantity(Kg)	Rate per Kg(Rs)
A	750	7.00
B	500	5.00

**Calculate:**

- (a) Material cost variance
- (b) Material price variance
- (c) Material usage variance

**[Ans.: (a) Rs.1,350 (A); (b) Rs.1,250 (A); (c) Rs.100 (A)]**

2. From the data given below, calculate the material price variance, the material usage variance, material cost variance and material mixture variance consumption per 100 units of product.

	Raw material standard	Actual
A	40 Units @ Rs.50 per unit	50 units @ Rs.50 per unit
B	60 units @ Rs.40 per unit	60 units @ Rs.45 per unit



**[Ans.: Material price variance Rs.300 (A); Material Usage Variance Rs.500 (A);  
Material Cost Variance Rs.800 (A); Material Mix Variance Rs.60 (A)]**

3. Calculate material price variance of products A and B.

	A	B
Standard Price(per unit)	Rs.20	Rs.32
Actual price(per unit)	Rs.24	Rs.30
Units produced	300 units	250 units

**[Ans.: Material Price Variance A Rs.1,200 (A); B = 500 (F)]**

4. The Standard quantity and Standard price of materials required for one unit of product A are given as follows:

	Quantity Kgs.	Standard price Rs.
Material X	2	3
Material Y	4	2
	<b>6</b>	

The actual production is 500 units and the relevant data are as follows.

Material	Total Quantity for 500 units Kgs.	Total cost Rs.
X	1,100	3,410
Y	1,800	3,960

Calculate,

- Material cost variance
- Material usage variance
- Material price variance.

**[Ans.: (a) Rs.370 (A); (b) Rs.100 (F); (c) Rs.470 (A)]**

5. From the following particulars calculate the following material variances.

Material	Standard		Actual	
	Quantity (Units)	Unit rate Rs.	Quantity (Units)	Unit rate Rs.
A	80	8.00	90	7.50
B	70	3.00	80	4.00
	150		170	

- Material Cost Variance
- Material Price Variance
- Material usage variance
- Material mixture variance

**[Ans.: (a) Rs.145 (A); (b) Rs.35 (A); (c) Rs.110 (A); (d) Rs.3.3 (F)]**

- From the following information calculate:
  - Material Cost Variance
  - Material Usage Variance
  - Material Price variance separately for X and Y.

Material	Standard Quality Kgs.	Price (standard) Rs.	Actual Quantity Kgs.	Actual Price Rs.
X	10	4	12	3.75
Y	15	5	18	4.50
	25		30	

**[Ans.: (a) X = 5(a); Y = Rs.6(A); (b) X = Rs.8; Y = Rs.15; (c) X = Rs.3(F); Y = Rs.9(F)]**

- From the following particulars, compute the following.
  - Material cost variance
  - Material usage variance
  - Material price variance
  - Material mix variance
  - Material yield variance.

Materials	Standards		Actuals	
	Quantity Kgs.	Price Rs.	Quantity Kgs.	Price Rs.
A	10	8	10	7
B	8	6	9	7
C	4	12	5	11
	22		24	

**[Ans.: (a) Rs.12 (A); (b) Rs.10 (A); (c) Rs.6 (F); (d) Rs.2 (A); (e) Rs.15.84 (F)]**

8. The standard material cost to prepare a tone of Chemical R is:

200 Kg. of material 'A' at Rs.10 per Kg.

300 Kg. of material 'B' at Rs.5 per Kg.

400 Kg. of material 'C' at Rs.7 per Kg.

During the period, 100 tonnes of mixture 'R' was produced from the usage of:

300 Kg. of material 'A' at Rs.9.00 per Kg.

400 Kg. of material 'B' at Rs.6.00 per Kg.

500 Kg. of material 'C' at Rs.7.00 per Kg.

Calculate:

- a. Material Cost Variance
- b. Material Price Variance
- c. Material Usage Variance

**[Ans.: (a) Rs.2,30,000 (A); (b) Rs.10,000 (A); (c) Rs.2,20,000 (A)]**

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## 18.6 REFERENCE BOOKS

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2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
7. Manmohan & Goyal, Management Accounting
8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

## Chapter – 19

## VARIANCE ANALYSIS (Labour, Overhead & Sales Variances)

**Objective :**

After studying this lesson you should be able to :

- study labour variance in terms of labour rate variance, efficiency variance and idle time variance
- understand the different types of overhead variance
- Go through different types of sales variance

**Structure :**

- 19.1 Labour Variance
- 19.2 Overhead Variance
- 19.3 Sales Variance
- 19.4 Self Assessment Questions
- 19.5 Exercises
- 19.6 Reference Books

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### 19.1. LABOUR VARIANCE

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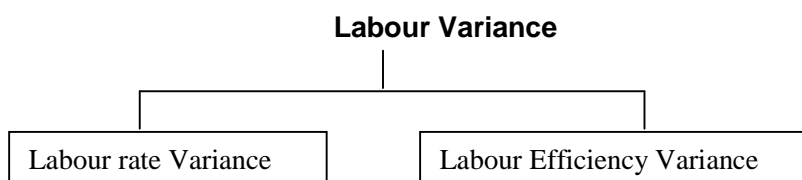
Labour variance, called as labour cost variance or direct wage variance, is computed like material cost variance. It can be calculated easily by applying the same techniques as used in the calculation of material variance. The formula for labour cost variance, representing the difference between the standard labour cost and the actual labour cost.

Labour Cost Variance = (Std.cost for actual output-Actual Cost)

Or

Standard Rate x Standard time for actual output – Actual Rate x Actual Output

$$LCV = (SR \times ST) - (AR \times AT)$$



The labour cost variance may arise on account of difference in either rates of wages or time. Thus, it may be analysed further as (i) labour rate variance, and (ii) labour time or efficiency variance.

### 19.1.1 Labour Rate Variance(LRV)

It is the difference between the standard rate specified and the actual rate paid. It is also called 'Rate of Pay Variance or Wage Rate Variance'. This would arise, usually, because of: (i) excessive overtime, (ii) employment of wrong type of labour (employing skilled person in place of an unskilled one), (iii) overtime workers engaged more or less than the standard, (iv) employment of labour at higher rates due to shortage of workers etc. The formula for calculating labour rate variance is as under:

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

$$LRV = AT(SR - AR)$$

### 19.1.2 Labour Time or Efficiency Variance (LEV):

It is the difference between the standard labour hours specified and the actual hours spent on the works. This variance is primarily concerned with the standard wage rate. As such, where piece wage payment is in force, there will be no labour efficiency variance. Labour Efficiency Variance arises on account of any one or combination of factors such as: (i) lack of supervision, (ii) poor working conditions in the factory, (iii) use of sub-standard or higher standard materials, (iv) inefficiency of workers due to inadequate training, (v) lack of proper tools, equipment and machinery, (vi) higher labour turnover etc. Symbolically

Labour Efficiency variance = Standard Rate (Standard Time – Actual Time)

$$LEV = SR(ST - AT)$$

### 19.1.3 Idle Time Variance (ITV):

Idle Time Variance, a component of Labour Efficiency Variance, is represented by the standard cost of the actual hours for which the workers remain idle due to abnormal circumstances, like non-availability of raw materials, power cut, breakdown of machinery, etc. Symbolically:

**Idle Time Variance = Standard Hourly Rate × Idle Time = SR × IT**

This Variance is always adverse. The total of labour rate, idle time, and efficiency variances would be equal to labour cost variance, as shown below:

**Illu.1 : Calculate labour cost variance from the following information.**

**Standard cost specification for a product.**

- a. Time 15 hours per unit
- b. Cost Rs.3 per hour

**Actual performance in a cost period.**

- a. Production 500 units.
- b. Hours taken.

Production	7,800 hours
Idle time	200 hours
	_____
Total time	8,000 hours
	_____

**Payment made Rs.24,800 (average per hour Rs.3.10)**

**Solution:**

$$ST = 15 \text{ hours}; SR = Rs.3; AR = 3.10$$

- a. **LCV = Standard Cost for actual output (-) Actual Cost.**  
 $= (3 \times 15 \times 500 \text{ units}) - 24,800$   
 $= 22,500 - 24,800 = 2,300 \text{ (A)}$
- b. **LEV = SR (ST for actual output – Actual hours taken)**  
 $= 3 (15 \text{ hours} \times 500 \text{ units}) - 7,800 \text{ hours.}$   
 $= 3 (7,500 - 7,800)$   
 $= 3 (-300) = 900 \text{ (A)}$
- c. **LRV = Actual hours paid (SR – AR)**  
 $= 8,000 \text{ hours} (3 - 3.10)$   
 $= 8,000 (-0.10) = 800 \text{ (A)}$
- d. **Ideal Time Variance = Ideal hours x SR**  
 $= (200 \times Rs.3) = 600 \text{ (A)}$

**Illu.2: 100 workers are working in a factory at a standard wage of Rs.4.80 per hour. During a month there are four weeks of 40 hours each. The standard performance is set at 360 units per hour. The following is the summary of the wages paid during the month:**

91 workers were paid @ Rs.4.80 per hour  
 5 workers were paid @ Rs.5.00 per hour  
 The remaining were paid @ Rs.4.60 per hour

**Power failure stopped production for 2 hours. Actual production was 57,960 units. Calculate Labour Variances.**

**Solution:****1. Labour Cost Variance : Standard Cost – Actual Cost**

$$= \text{Rs.}77,280 - \text{Rs.}76,832 = \text{Rs.}448 \text{ (F.)}$$

$$(i) \text{ Standard Cost} = \text{Std. Rate per hour} \times 100 \times \frac{\text{Units produced}}{\text{Std. production per hour}}$$

$$= 4.80 \times 100 \times \frac{57,960}{360} = \text{Rs.}77,280$$

$$(ii) \text{ Actual Cost for the month (or } 40 \times 4 = 160 \text{ hrs.)} = \text{No. of workers} \times \text{hrs. during the month} \times \text{Rate paid.}$$

		Rs.
$91 \times 160 \times 4.80$	=	69,888
$5 \times 160 \times 5.00$	=	4,000
$4 \times 160 \times 4.60$	=	2,944
		76,832

**2. Labour Rate Variance = Actual Hours (Std.Rate-Actual Rate)**

$$(a) \quad (5 \times 160)(\text{Rs.}4.80 - \text{Rs.}5.00) = \text{Rs.} -160 \text{ (Adv.)}$$

$$(b) \quad (4 \times 160)(\text{Rs.}4.80 - \text{Rs.}4.60) = \text{Rs.} +128 \text{ (Fav.)}$$

$$\underline{\text{Rs.} -32 \text{ (Adv.)}}$$

**Note:** For 91 workers rate variance is not calculated because they are paid at Std.Rate.

**3. Labour Efficiency Variance = Std.Rate (Standard Time – Actual Time)**

$$= \text{Rs.}4.80 (16,100 \text{ hours} - 15,800 \text{ hours}) = \text{Rs.}1,440 \text{ (Fav.)}$$

**Notes.:**

$$(i) \text{ Standard Time} = \text{No. of employees} \times \frac{\text{Quantity produced}}{\text{Std. Quantity per hour}}$$

$$= 100 \times \frac{57,960}{360} = 16,100 \text{ hours.}$$

$$(ii) \text{ Actual Time} = \text{Possible Hours} - \text{Idle Time}$$

$$= 100 \times 160 \text{ hours} - 100 \times 2 \text{ hours} = 15,800 \text{ hours}$$

**Idle time Variance = Std.Rate x Idle Time**

$$= \text{Rs.} 4.80 \times 200 \text{ hours} = 960 \text{ (A)}$$

Verification :  $\text{LCV} = \text{LRV} + \text{LEV} + \text{ITV}$

$$= \text{Rs.}32 \text{ (A)} + \text{Rs.}1,440 \text{ (F)} + 960 \text{ (A)}$$

$$= \text{Rs.}448 \text{ (F)}$$

**Illu.3: From the following data, calculate labour variance.**

**The budgeted labour force**

**20 unskilled workers @ 75 p.per hour for 50 hours.**

**10 skilled workers @ Rs.1.25 per hour for 50 hours.**

**The actual labour force**

**22 unskilled workers @ 80 p.per hour for 50 hours**

**8 skilled workers @ Rs.1.20 per hour for 50 hours.**

**Solution:**

**LCV = Standard Labour Cost – Actual Labour Cost.**

**Standard Labour Cost:**

Unskilled	20 × 0.75 × 50 hours	750
Skilled	10 × 1.25 × 50 hours	625
		<hr/>
Total		1,375
		<hr/>

**Actual Labour Cost:**

Unskilled	22 × 0.80 × 50 hours	880
Skilled	8 × 1.20 × 50 hours	480
		<hr/>
Total		1,360
		<hr/>

= 1,375 – 1,360 = 15 (F)

**LRV = A.H (SLR – ALR)**

Unskilled	22 (0.75 – 0.80);	22 (-0.05)	1.10	(A)
Skilled	8 (1.25 – 1.20);	8 (0.05)	0.40	(F)
			<hr/>	
			0.70	(A)
			<hr/>	

**LMV = Standard LR (SH – AH)**

Unskilled	0.75 (1,000 – 1,100);	0.75 (-100)	75	(A)
Skilled	1.25 (500 – 400);	1.25 (100)	125	(F)
			<hr/>	
			50	(F)
			<hr/>	



**Illu.4: The budgeted labour for producing 1,000 articles is as follows:**

	<b>Total Standard Hours</b>	<b>Total Standard Cost(Rs.)</b>
30 men @ 40 p.per hour for 50 hrs.	1,500	600.00
20 women @ 30 p.per hour for 30 hrs.	600	180.00
10 boys @ 20 p.per hour for 20 hrs.	200	40.00
	<u>2,300</u>	<u>820.00</u>

**The actual data for producing 1,000 articles is as follows:**

	<b>Total actual hours</b>	<b>Total Cost (Rs.)</b>
25 men @ 45 p.per hour for 50 hrs.	1,250	562.50
30 women @ 3w0.p. per hour for 30 hrs.	900	270.00
10 boys @ 20 p.per hour for 15 hrs.	150	30.00
	<u>2,300</u>	<u>862.50</u>

**Calculate:**

- (a) Labour cost variance
- (b) Labour rate variance
- (c) Labour mix variance and
- (d) Labour efficiency variance

**Solution:**

$$LCV = (S.R. \times S.H.) - (A.R. \times A.H.)$$

		Rs.		
Men	=	$(0.40 \times 1,500) - (0.45 \times 1,250)$	=	$(600 - 562.50)$ = 37.50 (F)
Women	=	$(0.30 \times 600) - (0.30 \times 900)$	=	$(180 - 270)$ = 90 (A)
Children	=	$(0.20 \times 200) - (0.20 \times 150)$	=	$(40 - 30)$ = 10 (F)
				<u>42.50 (A)</u>

$$LRV = A.H (S.R - A.R)$$

			Rs.	
Men	=	$1,250 (0.40 - 0.45)$	=	$1,250 (-.05)$ = 62.50 (A)
Women	=	$900 (0.30 - 0.30)$	=	900 (0) = 0
Children	=	$150 (0.20 - 0.20)$	=	150 (0) = 0
				<u>62.50 (A)</u>

$$\text{LEV} = \text{SR} (\text{SH} - \text{AH})$$

				Rs.
Men	=	0.40 (1,500-1,250)	=	0.40 (250) = 100 (F)
Women	=	0.30 (600-900)	=	0.30 (300) = 90 (A)
Children	=	0.20 (200-150)	=	0.20 (50) = 10 (F)
				20 (F)

$$\text{LMV} = \text{SR} (\text{RSH} - \text{AH})$$

$$\text{Calculation of RSH} = \frac{\text{SH} \times \text{TAH}}{\text{TSH}}$$

$$\text{Men} = \frac{1,500 \times 2,300}{2,300} = 1,500$$

$$\text{Women} = \frac{600 \times 2,300}{2,300} = 600$$

$$\text{Children} = \frac{200 \times 2,300}{2,300} = 200$$

$$\text{LMV} = \text{SR} (\text{RSH} - \text{AH})$$

				Rs.
Men	=	0.40 (1,500-1,250)	=	100 (F)
Women	=	0.30 (600-900)	=	90 (A)
Children	=	0.20 (200-150)	=	10 (F)
				20 (F)

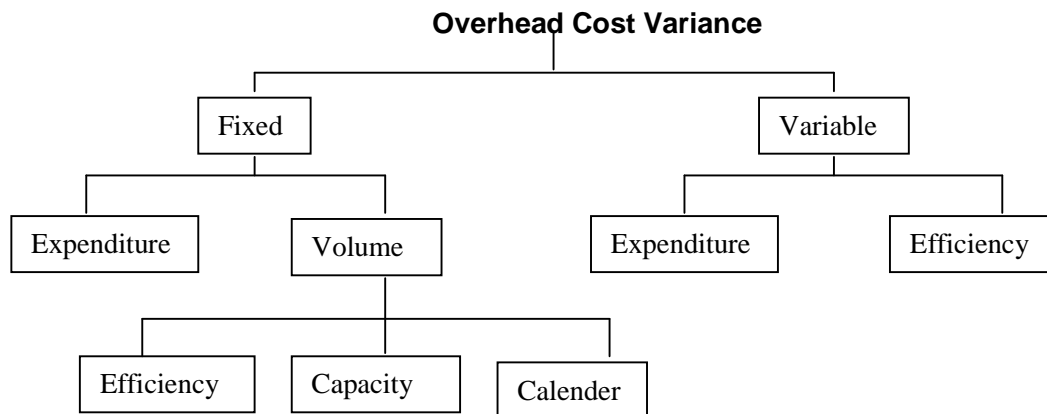
\* Where : SR = Standard Rate; SH = Standard Hours; AR = Actual rate; AH = Actual hours; RSH = Revised standard hours; TAH = Total Actual hours; TSH = Total Standard Hours.

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## 19.2. OVERHEAD VARIANCE

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Overhead variances are the most complicated ones in variance analysis. The presence of fixed overhead often causes the overhead rate change for any increase or decrease in volume level of activity. Further, the fixation of volume brings in additional problems. Any error in determining the volume will be reflected in increased overhead variance. The use of different modes of computation of overhead and the complex jargon involved therein make overhead variance analysis all the more difficult.



### 19.2.1 Variable Overhead Variance:

Variance overhead variance represents the difference between the budgeted and the actual variable overheads. Variable overheads may be manufacturing, administration or selling and distribution. Variances in variable overheads arise because of a change in the expenditure incurred.

- 1. Variable Overhead Expenditure Variance:** It represents the difference between the budgeted variable overheads for the actual hours and the actual overheads incurred. It is also known as variable overhead spending variance.

Variable Overhead Expenditure Variance =

Actual time (Std.variable overhead rate – Actual variable overhead rate)

Or

=Std.variable overhead for actual time – Actual variable overheads.

- 2. Variable Overhead Efficiency Variance:** It represents the difference between the standard hours allowed for the actual production and the actual hours taken for the actual production multiplied by the standard variable overhead rate. The formula is:

Variable Overhead Efficiency Variance = Std. variable overhead rate per unit (Std. time for actual production-Actual time)

### 19.2.2 Fixed Overhead Variance:

The term 'fixed overhead' refers to all items of expenditure which are more or less constant, irrespective of fluctuations in the level of output. The fixed overhead cost variance represents the difference between standard cost of fixed overheads for actual output and the actual fixed overhead cost charged to production. The fixed overhead cost variance consists of two items: (i) expenditure variance and (ii) volume variance.

**(a) Fixed Overhead Expenditure Variance:** It is that portion of the fixed overhead which is incurred during a particular period due to the difference between the budgeted fixed overheads and the actual fixed overheads.

Fixed overhead expenditure variance = Budgeted fixed overheads – Actual fixed overheads

**(b) Volume Variance:** It is the difference between the standard cost of overhead absorbed in actual output and the standard allowance for that output.

Volume variance = Recovered overheads – Budgeted overheads.

**(i) Efficiency Variance:** It is that portion of the volume variance, which is due to the differences between the budgeted efficiency of production and the actual efficiency attained.

Efficiency variance =

Std. overhead rate per hour × (Std. hours for actual production – Actual hours)

**(ii) Calendar Variance:** It is the difference between the number of working days anticipated in the budget period and actual working days in the budget period. This may be the result of unexpected public holiday or holiday being declared due to strike, lock-outs, breakdown etc., as such the work in the unit is stopped.

Std.rate per hour (per day) × Excess or deficit hours (days) worked.

**(iii) Capacity Variance:** The variance which is related to the over and under-utilisation of plant or equipment is known as capacity variance. This variance arises because of the working above or below standard capacity. Strikes, idle time, lock-out etc. leads to under-utilisation, and extra shifts, overtime etc., lead to over-utilisation.

Capacity variance = Standard rate (Actual hours – Budgeted hours)

#### Relationship between overhead variances:

Total overhead cost variance = Variable overhead cost variance + Fixed overhead cost variance

Variable overhead cost variance = Expenditure variance + Volume variance

Fixed overhead cost variance = Expenditure variance + Volume variance

Volume variance = Capacity variance + Calendar variance + Efficiency variance.

**Illu.5: S.V. Ltd., has furnished you the following data:**

	Budget	Actual July, 2001
<b>No.of working days</b>	25	27
<b>Production in units</b>	20,000	22,000
<b>Fixed Overheads</b>	Rs.30,000	Rs.31,000

**Budgeted fixed overhead rate is Re.1 per hour. In July, 2001 the actual hours worked were 31,500.**

**Calculate the following variances: (i) Efficiency Variance (ii) Capacity Variance (iii) Volume Variance (iv) Expenditure Variance, and (v) Total Overhead Variance**

**Solution:**

$$\begin{aligned} \text{Recovered Overhead} &= \frac{\text{Budgeted Overhead}}{\text{Budgeted output}} \times \text{Actual Output} \\ &= \frac{30,000}{20,000} \times 22,000 = \text{Rs.}33,000 \end{aligned}$$

$$\begin{aligned} \text{(i) Efficiency Variance} &= \text{Standard rate per hour (Standard hours for actual production – Actual hours)} \\ &= \text{Re.1} \times (33,000 - 31,500) = \text{Rs.}1,500 \text{ (F)} \\ \text{(ii) Capacity Variance} &= \text{Standard rate per hour} \times \\ &\quad (\text{Actual hours – Budgeted hours}) \\ &= \text{Standard Overheads – Budgeted Overheads} \\ &= \text{Re.1} \times (31,500 - \text{Rs.}30,000) = \text{Rs.}1,500 \text{ (F)} \\ \text{(iii) Volume Variance} &= \text{Recovered Overheads – Budgeted overhead} \\ &= \text{Rs.}33,000 - \text{Rs.}30,000 = \text{Rs.}3,000 \text{ (F)} \\ \text{(iv) Expenditure variance} &= \text{Budgeted Overheads – Actual overheads} \\ &= \text{Rs.}30,000 - \text{Rs.}31,000 = \text{Rs.}-1,000 \\ &= \text{Rs.}1,000 \text{ (A)} \\ \text{(v) Total Overhead Variance} &= \text{Recovered Overhead – Actual Overheads} \\ &= \text{Rs.}33,000 - \text{Rs.}31,000 = \text{Rs.}2,000 \text{ (F)} \end{aligned}$$

**Verification:**

$$\begin{aligned} \text{(i) Total Overhead cost variance} &= \text{Expenditure variance} + \text{Volume variance} = \text{Rs.}2,000 \text{ (F)} \\ &= \text{Rs.}1,000 \text{ (A)} + \text{Rs.}3,000 \text{ (F)} \\ \text{(ii) Volume Variance} &= \text{Capacity Variance} + \text{Efficiency Variance} \\ \text{Rs.}3,000 \text{ (F)} &= \text{Rs.}1,500 \text{ (F)} + \text{Rs.}1,500 \text{ (F)} \end{aligned}$$

**Illu.6: Vinak Ltd., has furnished you the following information for the month of August, 2001.**

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

Calculate the variances.

**Solution:**

Some important calculations have to be made initially.

$$(i) \quad \text{Standard time per unit} = \frac{\text{Budgeted hours}}{\text{Budgeted units}} = \frac{30,000}{30,000} = \mathbf{1 \text{ hour}}$$

$$(ii) \quad \text{Total standard overhead rate per hour} = \frac{\text{Budgeted overheads}}{\text{Budgeted hours}}$$

$$= \frac{1,05,000}{30,000} = \text{Rs.3.50 per hour.}$$

$$(iii) \quad \text{Standard fixed overhead rate per hour} = \frac{\text{Budgeted Fixed overheads}}{\text{Budgeted hours}}$$

$$= \frac{45,000}{30,000} = \text{Rs.1.50}$$

$$(iv) \quad \text{Standard variable overhead rate per hour} = \frac{\text{Budgeted variable overheads}}{\text{Budgeted hours}}$$

$$= \frac{60,000}{30,000} = \text{Rs.2}$$

1. Overhead cost variance = Recovered Overheads – Actual overheads  
Recovered overheads = Actual output × Std.rate per unit  
= Rs.32,500 × Rs.3.50 = Rs.1,13,750  
Overhead cost variance = Rs.1,13,750 – 1,18,000 = Rs.4,250 (A)
2. Variable Overhead cost Variance = Recovered overheads – Actual overheads  
= (32,500 hrs. × Rs.2) – Rs.68,000  
Rs.65,000 – 68,000  
= Rs.3,000 (A)
3. Fixed Overhead Cost Variance = Recovered Overheads – Actual overheads  
= 32,500 hrs. × Rs.1.50 = Rs.50,000  
= Rs.48,750 – Rs.50,000 = Rs.1,250 (A)
4. Expenditure Variance = Budgeted Overheads – Actual Overheads  
= Rs.45,000 – Rs.50,000 = Rs.5,000 (A)

5. Volume Variance = Recovered Overheads - Budgeted Overheads  
 = 32,500 hrs. × Rs.1.50 = Rs.45,000  
 Rs.48,750 – 45,000 = Rs.3,750 (F)
6. Efficiency Variance = Standard rate per hour (Standard hours for actual production – Actual hours)  
 = Rs.1.50 × (32,500 – 33,000) = Rs.750 (A)
7. Capacity Variance = Standard rate per hour × (Actual hours – Budgeted hours)  
 = Standard Overheads – Budgeted Overheads  
 = Rs.1.50 × (33,000 – Rs.30,000) = Rs.4,500 (F)

Calendar Variance = Extra/Deficit hours worked × Standard Rate.

One extra day has been worked.

The total number of extra hours worked =  $\frac{30,000}{25} = 1,200$

= 1,200 × 1.50 = Rs.1,800 (F)

**Illu.7: In a factory the standard units of production for the year were fixed at 1,20,000 units and overhead expenditure were estimated to be:**

	Rs.
<b>Fixed</b>	<b>12,000</b>
<b>Variable</b>	<b>6,000</b>
<b>Semi-Variable</b>	<b>1,800</b>

Actual production during April of the year was 8,000 units. Each month has 20 working days.

During the month in question there was one statutory holiday. The actual overheads amounted to:

	Rs.
<b>Fixed Overheads</b>	<b>1,190</b>
<b>Variable</b>	<b>480</b>
<b>Semi-Variable</b>	<b>192</b>

Semi-Variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

Find out the expenditure, volume and calendar variances.

**Solution:****i. Total Overhead Cost Variance:** Recovered Overheads – Actual Overheads

$$= \frac{19,800}{1,20,000} \times 8,000 = \text{Rs.}1,862$$

$$= \text{Rs.}1,320 - \text{Rs.}1,862 = \text{Rs.}542 \text{ (A)}$$

**a. Variable Overhead Cost or Expenditure Variance = Recovered Overheads – Actual Overheads**

$$\text{Rs.}448 - 556.80 = \text{Rs.}108.80 \text{ (A)}$$

**b. Fixed Overheads = Budgeted Fixed Overheads – Actual Fixed Overheads.**

$$= \text{Rs.}1,090 - 1,305 = 215 \text{ (A)}$$

$$\text{Total Overhead Expenditure Variance} = \text{Rs.}108.80 + 215.00 = 324 \text{ (A)}$$

**ii. Volume Variance:** Recovered Overheads – Budgeted Overheads

$$= \text{Rs.}872 - 1,090 = 218 \text{ (A)}$$

**iii. Calender Variance:** Standard rate per day × Deficit days worked.

$$= \frac{13,080}{240} = \text{Rs.}54.50$$

$$\text{Loss due to one day} = \text{Rs.}54.50 \text{ (A)}$$

$$\text{Total Overhead Cost variance} = \text{Expenditure Variance} + \text{Volume variance}$$

$$\text{Rs.}542 \text{ (A)} = 324 \text{ (A)} + 218 \text{ (A)}$$

**Working Notes:****a. Standard rate of absorption per unit:**

$$\text{Fixed Overheads} = \frac{\text{Budgeted fixed Overheads}}{\text{Budgeted Output}} = \frac{12,000}{1,20,000}$$

$$\text{Fixed Overheads element in semi-variables} = \text{Re.}0.100$$

$$\text{Overheads i.e., 60\% of Rs.}1,800 = \frac{1,080}{1,20,000} = 0.009$$

$$\text{Standard rate of absorption of fixed overheads per unit} = \text{Re.}0.100 + 0.009 = \text{Re.}0.109.$$

$$\text{Fixed Overheads recovered on 8,000 units @ Re.}0.109 = \text{Rs.}872.$$

**b.**

	Rs.
Budgeted Variable Overheads	6,000
Add: Variable elements in Semi-variable Overheads 40% of Rs.1,800	720
<b>Total Budgeted Variable Overheads</b>	<b>6,720</b>



$$\text{Standard Variable Cost per unit} = \frac{6,720}{1,20,000} = 0.056$$

Variable Overheads for 8,000 units @ Re.0.056 = Rs.448

c. Budgeted annual fixed overheads:

Rs.12,000 + 60% of Rs.1,800 = Rs.13,080

Budgeted monthly fixed overheads are =  $\frac{13,080}{12}$  = Rs.1,090

d. Actual fixed overheads are Rs.1,190 + 60% of Rs.192 = Rs.1,305

e. Actual Variable Overheads are Rs.480 + 40% of Rs.192 = Rs.556.

**Illu.8: In Department A the following data is submitted for the week ended 31<sup>st</sup> March:**

<b>Standard output for 40 hours per week</b>	<b>1,400 units</b>
<b>Standard fixed overhead</b>	<b>Rs.1,400</b>
<b>Actual output</b>	<b>1,200 units</b>
<b>Actual hours worked</b>	<b>32 hours</b>
<b>Actual fixed overhead</b>	<b>Rs.1,500</b>

**Prepare a statement of variances**

**Solution:**

$$\text{Standard Overhead Rate per unit} = \frac{\text{Standard fixed overheads}}{\text{Standard output}}$$

$$= \frac{1,400}{1,400} = \text{Rs.1 per unit}$$

$$\text{Standard Fixed Overhead Rate per hour} = \frac{\text{Standard fixed overheads}}{\text{Standard hours}}$$

$$= \frac{1,400}{40\text{hrs.}} = \text{Rs.35 per hour}$$

$$\text{Standard output per hour} = \frac{\text{Standard output}}{\text{Standard hours}}$$

$$= \frac{1,400}{40} = 35 \text{ units}$$

- Fixed Overhead Cost Variance = Recovered Overheads – Actual Overheads  
= Rs.1,200 × Re.1 – Rs.1,500 = Rs.1,200 – Rs.1,500 = Rs.300 (A)
- Fixed Overhead Expenditure Variance = Budgeted Overheads – Actual Overheads  
= Rs.1,400 – Rs.1,500 = Rs.100 (A)
- Fixed Overhead Volume Variance = Recovered Overheads – Budgeted Overheads  
= Rs.1,200 – Rs.1,400 = Rs.200 (A)

4. Fixed Overhead Capacity Variance = Standard Rate per hour × (Actual hours – Budgeted hours)

$$= \text{Rs.}35 \times (32-40) = \text{Rs.}280 \text{ (A)}$$

5. Fixed Overhead Efficiency Variance = Standard Rate per hour × (Standard hours for actual production – Actual hours)

$$\begin{aligned} &= 35 \times \left( \frac{1,200}{35} - 32 \right) \\ &= 35 \times \left\{ \frac{1,200 - 1,120}{35} \right\} \\ &= 35 \times \frac{80}{35} = \text{Rs.}80 \text{ (F)} \end{aligned}$$

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## 19.3 SALES VARIANCE

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Sales variances can be computed in two different ways. They are the Turnover method and Profit method which focus on the impact of changes in the sales on turnover and profit respectively.

Sales variances arise, basically due to changes in price and sales volume. But a change in the sales volume might be caused as a result of change either in the quantity or in the mix of sales. Thus, the total change represents a cumulative effect of the changes in price, volume, quantity and mix of sales.

There are two methods to calculate sales variance. These are:

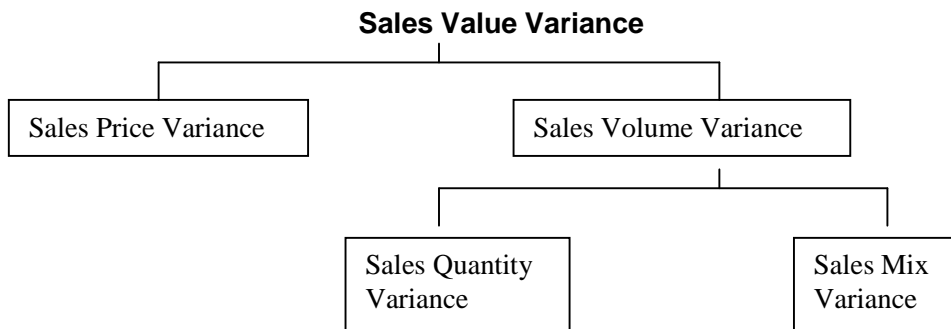
- i. Sales variance based on Turnover
- ii. Sales variance based on Profit

### 19.3.1 Sales variance based on Turnover:

The sales value variance is more or less similar to material cost variance or labour cost variance. It is the difference between the actual sales and budgeted sales. It is calculated by using the following formula:

Sales Revenue Variance = Budgeted Sales – Actual Sales

$$\text{SRV} = \text{BS} - \text{AS}$$



From the above figure one can understand that, sales variance can be divided into two sub-variances as 'Sales Price Variance' and 'Sales Volume Variance'.

1. **Sales Price Variance:** It is the difference between the standard price and actual price of sales. The formula is:

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

$$\text{SPV} = \text{AQ (SP} - \text{AP)}$$

2. **Sales Volume Variance:** It is the difference between the budgeted and actual quantity of sales. The formula is:

$$\text{Sales Volume Variance} = \text{Standard price (Actual Quantity} - \text{Standard Quantity)}$$

$$\text{SVV} = \text{SP (AQ} - \text{SQ)}$$

3. **Sales Quantity Variance:** This is also called 'Sales volume sub-variance'. It represents the difference between the standard sales and the revised standard sales.

$$\text{Sales Quantity Variance} = \text{Standard Sales} - \text{Revised Standard Sales}$$

$$\text{SQV} = \text{SS} - \text{RSS}$$

$$\text{Revised Standard Sales} = \frac{\text{Budgeted Sales of a product}}{\text{Total Budgeted sales}} \times \text{Standard sales.}$$

4. **Sales Mix Variance:** It is a part of sales volume variance which arises due to difference in the proportion in which various products are sold and the standard proportion in which they are expected to be sold. The formula is:

$$\text{Sales Mix Variance} = \text{Revised Standard Sales} - \text{Standard Sales}$$

$$\text{SMV} = \text{RSS} - \text{SS}$$

**Illu.9: The Sales Manager of MTR Ltd., which produces and sales 3 types of products viz., A,B and C furnishes you the following information for the month of December, 1996:**

	Standard			Actual		
	Quantity (Units)	Price Rs.	Amount Rs.	Quantity (Units)	Price Rs.	Amount Rs.
A	500	5.00	2,500	500	5.00	2,500
B	400	6.00	2,400	600	6.25	3,750
C	300	7.00	2,100	400	6.75	2,700
	1,200		7,000	1,500		8,950

Find out sales value variance and sales price variance.

**Solution:**

Sales value variance = Actual Total Sales – Standard Total sales.

$$= 8,950 - 7,000 = \text{Rs.}1,950 \text{ (F)}$$

Sales Price Variance = Actual Sales units (A.P – S.P)

					Rs.
A	=	500 (5 – 5)	=		0
B	=	600 (6.25-6.00)	=		150 F
C	=	400 (6.75-7.00)	=		(-) 100 (A)
					50 (F)

**Illu.10:** The budgeted and actual sales of a concern manufacturing and marketing a single product are as follows:

Standard Sales			Actual Sales		
Quantity Units	Price Rs.	Amount Rs.	Quantity Units	Price Rs.	Amount Rs.
10,000	3	30,000	5,000	3.00	15,000
			8,000	2.50	20,000

Calculate (i) Sales price variance (ii) Sales volume variance.

**Solution:**

1. **Sales price Variance** = (AP – SP) × AQ

i.  $(3-3) \times 5,000 = \text{Nil}$

ii.  $(2.50 - 3) \times 8,000 = \text{Rs.}4,000 \text{ (A)}$

2. **Sales Volume Variance** = (AQ – SQ) × SP

$$= (13,000 - 10,000) \times 3 = \text{Rs.}9,000 \text{ (F)}$$

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

$$= (35,000 - 30,000) = \text{Rs.}5,000 \text{ (F)}$$

**Illu.11: Alka Trading Co. furnishes the following details for April, 2002.**

	Product	Sales Quantity	Sales Price per unit
<b>Budgeted Sales</b>	A	200	15
	B	800	20
	C	2,000	40
<b>Actual Sales</b>	A	880	18
	B	880	20
	C	2,640	38

**Calculate the following variances:**

**(i) Sales Quantity Variance (ii) Sales Mix Variance (iii) Sales Price Variance (iv) Total Sales Variance.**

**Solution:**

Product	Budget			Actual		
	Quantity Unit	Price Rs.	Amount Rs.	Quantity Unit	Price Rs.	Amount Rs.
A	1,200	15	18,000	880	18	15,840
B	800	20	16,000	880	20	17,600
C	2,000	40	80,000	2,640	38	1,00,320
Total	4,000		1,14,000	4,400		1,33,760

**Calculation of Standard Sales:**

Product	Actual Quantity (A)	Budgeted Price Rs.(B)	Standard Sales Rs.(A × B)
A	880	15	13,200
B	880	20	17,600
C	2,640	40	1,05,600
	4,400		1,36,400

**Calculation of Revised Standard Quantity:**

$$\text{Revised Standard Quantity} = \frac{\text{Total Actual Quantity}}{\text{Total Standard Quantity}} \times \text{Standard Quantity.}$$

$$A = \frac{4,400}{4,000} \times 1,200 = 1,320$$

$$B = \frac{4,400}{4,000} \times 800 = 880$$

$$C = \frac{4,400}{4,000} \times 2,000 = 2,200$$

**Calculation of Variances:**

1. **Sales Value Variance** = Actual Sales – Budgeted Sales  
= Rs.1,33,760 – 1,14,000 = Rs.19,760 (F)

2. **Sales Price Variance** = (AP – SP) × AQ

$$A = (18-15) \times 880 = \text{Rs.}2,640 \text{ (F)}$$

$$B = (20-20) \times 880 = \text{Nil}$$

$$C = (38-40) \times 2,640 = \text{Rs.}5,280 \text{ (A)}$$

$$\text{Sales Price Variance} = \text{Rs.}2,640 \text{ (A)}$$

3. **Sales Volume Variance** = (AQ – BQ) × SP

$$A = (880 - 1,200) \times 15 = \text{Rs.}4,800 \text{ (A)}$$

$$B = (880 - 800) \times 20 = \text{Rs.}1,600 \text{ (F)}$$

$$C = (2,640 - 2,000) \times 40 = \text{Rs.}25,600 \text{ (A)}$$

$$\text{Sales Volume Variance} = \text{Rs.}22,400 \text{ (A)}$$

4. **Sales Mix Variance** = (AQ – RSQ) × SP

$$A = (880 - 1,320) \times 15 = \text{Rs.}6,600 \text{ (A)}$$

$$B = (880 - 880) \times 20 = \text{Nil}$$

$$C = (2,640 - 2,200) \times 40 = \text{Rs.}17,600 \text{ (F)}$$

$$\text{Sales Mix Variance} = \text{Rs.}11,000 \text{ (F)}$$

5. **Sales Quantity Variance:** (RSQ – BQ) × SP

$$A = (1,320 - 1,200) \times 15 = \text{Rs.}1,800 \text{ (F)}$$

$$B = (880 - 800) \times 20 = \text{Rs.}1,600 \text{ (F)}$$

$$C = (2,200 - 2,000) \times 40 = \text{Rs.}8,000 \text{ (F)}$$

$$\text{Sales Quantity Variance} = \text{Rs.}11,400 \text{ (A)}$$

**Verification:**

i. Sales Value Variance = Price Variance + Volume Variance

$$19,760 \text{ (F)} = 2,640 \text{ (A)} + 22,400 \text{ (F)}$$

ii. Sales Volume Variance = Mix Variance + Quantity Variance

$$22,400 \text{ (F)} = 11,000 \text{ (F)} + 11,400 \text{ (F)}$$

**Illu.12: Compute the data missing data indicated by the question marks from the following:**

	Product R	Product S
<b>Sales Quantity Units:</b>		
<b>Standard</b>	?	400
<b>Actual</b>	500	?
<b>Price per unit</b>	<b>Rs.</b>	<b>Rs.</b>
<b>Standard</b>	12	15
<b>Actual</b>	15	20
<b>Sales Price Variance</b>	?	?
<b>Sales Volume Variance</b>	1,200 (F)	?
<b>Sales Value Variance</b>	?	?

Sales mix variance for both the products together was Rs.450 (F). 'F' denote favourable.

**Solution:**

Product	Standard Sales			Actual Sales		
	Quantity	Price Rs.	Amount Rs.	Quantity	Price Rs.	Amount Rs.
R	?	12	?	500	15	7,500
S	400	15	6,000	?	20	?

**Product R:**

$$\text{Sales Price Variance} = (AP - SP) \times AQ$$

$$\text{Let us assumed } SQ = X$$

$$= (15 - 12) \times 500 = \text{Rs.1,500 (F)}$$

$$\text{Sales volume variance} = (AQ - SQ) \times SP$$

$$1,200 (F) = (500 - X) \times 12$$

On solving the value of X = 400 units.

The Standard sales quantity = 400 units.

Sales Value Variance = Price Variance + Volume Variance.

$$= 1,500 (F) + 1,200 (F) = \text{Rs.2,700 (F)}$$

**Product S:**

Let the sales quantity be = X; Revised Table can be thus:

Product	Standard Sales			Actual Sales		
	Quantity	Price Rs.	Amount Rs.	Quantity	Price Rs.	Amount Rs.
R	400	12		500	15	7,500
	400	15	6,000	X	20	20X
	800		10,800			7,500 + 20X

**Sales Mix of R & S = (Standard Sales – Revised Standard Sales)**

= Standard Price of Actual Mix – Standard Price of Standard mix  $\times$  AQ

$$= \left( \frac{600 + 15X}{500 + X} - \frac{10,800}{800} \right) 500 + X = \text{Rs.}450 \text{ (F)}$$

$$= 6,000 + 15X - 13.5 \times (500 + X) = \text{Rs.}450 \text{ (F)}$$

$$15X = \text{Rs.}1,200; X = 800 \text{ units.}$$

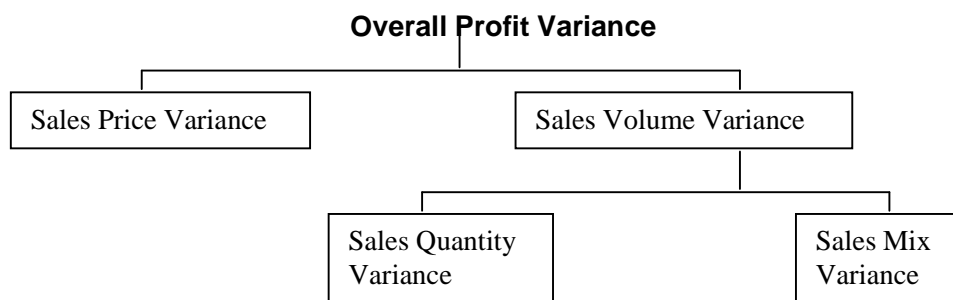
$$\text{Sales Price Variance} = (AP - SP) \times SQ = (20 - 15) \times 800 = \text{Rs.}4,000 \text{ (F)}$$

$$\text{Sales Volume Variance} = (AQ - SQ) \times SP = (800 - 400) \times 15 = 6,000 \text{ (F)}$$

$$\text{Sales Value Variance} = \text{Price Variance} + \text{Volume Variance} = 4,000 \text{ (F)} + 6,000 \text{ (F)} = 10,000 \text{ (F)}$$

### 19.3.2 Sales Variance Based on Profit:

The sales variances discussed above show the effect of change in sales in sales value, whereas the sales variances calculated according to the profit method show the effect on profit. Sales Variance can be known by turnover method or by profit method. Turnover method is also known as Sales value method Profit method is known as Sales Margin Method. The principle profit variances are as follows:



(a) **Value Variance:** This difference is arrived due to difference in budgeted profit to actual profit.

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

(b) **Price Variance:** It is represented by the difference between Standard Profit and Actual Profit. Thus variance is same as price variance in turnover method. It is assumed that price change would affect turnover and profit equally.



**Price Variance** = Standard Profit – Actual Profit.

(c) **Volume Variance:** It is represented by the amount of difference in profit calculated from standard profit to budgeted profits, popularly known as quantity variance.

**Volume Variance** = Budgeted Profit – Revised Standard Profit.

(d) **Mix Variance:** It is a difference between revised standard profit and standard profit is the mix variance.

**Mix variance** = Revised Standard Profit – Standard Profit.

**Illu.13:**

**Budgeted Sales**

		(SP)	Value Rs.	Actual Sales		
				(AP)	Rs.	
A	900 Unit	50	45,000	1,000	55	55,000
B	650 Units	100	65,000	700	95	66,500
C	1,200 Units	75	90,000	1,100	78	85,800
	2,750		2,00,000	2,800		2,07,300

Cost per unit Rs.45, Rs.85, Rs.65 respectively.

**Solution:**

	A Rs.	B Rs.	C Rs.
Standard Sales per unit	50	100	75
Less: Cost	45	85	65
Budgeted Profit %	5	15	10
	10	15	13.33
Actual Sale and Profit	55	95	78
Less: Cost	45	85	65
Profit	10	10	13

$$1,000 \times 50 = \text{Rs.}50,000$$

$$700 \times 100 = \text{Rs.}70,000$$

$$1,100 \times 75 = \text{Rs.}82,500$$

$$\underline{\text{Rs.}2,02,500}$$

**Revised Standard Sales:**

	<b>Revised Standard Sales</b>	<b>Rs.</b>
A	$\frac{2,02,500 \times 45,000}{2,00,000} =$	45,562
B	$\frac{2,02,500 \times 65,000}{2,00,000} =$	65,813
C	$2,02,500 \times 90,000 =$	91,125
		<u>2,02,500</u>

	<b>Budgeted Profit</b>	<b>Rs.</b>
A	$900 \times 5 =$	4,500
B	$650 \times 15 =$	9,750
C	$1,200 \times 10 =$	12,000
		<u>(-) Rs.26,250</u>

	<b>Actual Profit</b>	<b>Rs.</b>
A	$1,000 \times 10 =$	10,000
B	$700 \times 10 =$	7,000
C	$1,100 \times 13 =$	14,300
		<u>Rs.31,300</u>

	<b>Revised Standard Profit</b>	<b>Rs.</b>
A	$(45,562 \times 10\%) =$	4,556
B	$(65,813 \times 15\%) =$	9,872
C	$(91,125 \times 13.33\%) =$	12,150
		<u>26,578</u>

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

$$A = (4,500 - 10,000) = 5,500 \text{ (F)}$$

$$B = (9,750 - 7,000) = 2,750 \text{ (A)}$$

$$C = (12,000 - 14,300) = 2,300 \text{ (F)}$$

**Total Sales Margin Variance = Rs.5,050 (F)**

**B. Sales Margin Variance due to Selling Price**

Standard Profit – Actual Profit or (Budgeted Price – Actual Price)

$$A = 5,000 - 10,000 = 5,000 \text{ (F)}$$

$$B = 10,500 - 7,000 = 3,500 \text{ (A)}$$

$$C = 11,000 - 14,300 = 3,300 \text{ (F)}$$

**Sales Margin variance due to Selling Price = Rs.4,800 (F)**

**C. Sales Margin due to Volume:** Budgeted Profit – Standard Profit

$$A = 4,500 - 5,000 = 500 \text{ (F)}$$

$$B = 9,750 - 10,500 = 750 \text{ (F)}$$

$$C = 12,000 - 11,000 = 1,000 \text{ (A)}$$

**Sales Margin due to Volume = Rs.250 (F)**

**D. Sales Margin due to Quality:** Budgeted Profit – Revised Standard Profit.

$$A = 4,500 - 4,556 = 56 \text{ (F)}$$

$$B = 9,750 - 9,872 = 122 \text{ (F)}$$

$$C = 12,000 - 12,150 = 150 \text{ (F)}$$

**Sales Margin due to quality: Rs.328 (F)**

**E. Sales Margin Variance due to Sales Quantity Mix:** (Revised Standard Profit – Standard Profit)

$$A = 4,556 - 5,000 = 444 \text{ (F)}$$

$$B = 9,872 - 10,500 = 628 \text{ (F)}$$

$$C = 12,150 - 11,000 = 1,150 \text{ (A)}$$

**Sales Margin Variance due to Sales Quantity Mix = Rs.78 (A)**

**Verification:**

Price Variance	4,800 (F)
Volume Variance	250 (F)
Total Sales Margin Variance	5,050 (F)
Quantity Variance	328 (F)
Mixture Variance	78 (A)
Volume Variance	250 (F)

**Illu.14: From the following calculate sales variance.**

Product	Standard			Actual		
	Units	Price	Total	Units	Price	Total
<b>A</b>	<b>300</b>	<b>30</b>	<b>9,000</b>	<b>350</b>	<b>35</b>	<b>12,250</b>
<b>B</b>	<b>200</b>	<b>20</b>	<b>4,000</b>	<b>240</b>	<b>25</b>	<b>6,000</b>
<b>C</b>	<b>100</b>	<b>10</b>	<b>1,000</b>	<b>50</b>	<b>5</b>	<b>250</b>
	<b>600</b>		<b>14,000</b>	<b>640</b>		<b>18,500</b>

**i. Sales Volume Variance (Quantity Basis): (BQ – AQ) × SP**

$$A = (300 - 350) \times 30 = 1,500 \text{ (F)}$$

$$B = (200 - 240) \times 20 = 800 \text{ (F)}$$

$$C = (100 - 50) \times 10 = 500 \text{ (F)}$$

**Value Basis: (BS – SS)**

$$A = 9,000 - 10,500 = 1,500 \text{ F}$$

$$B = 4,000 - 4,800 = 800$$

$$C = 100 - 50 \times 10 = 500 \text{ A} = 1,800 \text{ F}$$

**Standard Sales: AQ × SP**

$$A = 350 \times 30 = 10,500$$

$$B = 240 \times 20 = 4,800$$

$$C = 50 \times 10 = 500$$

**B. Calculation of Sales Price Variance:****Quantity Basis (SP – AP) × AQ**

$$A = (30 - 35 \times 350) = 1,750 \text{ F}$$

$$B = (20 - 25 \times 240) = 1,200 \text{ F}$$

$$C = (10 - 5 \times 50) = 250 \text{ A}$$

**Value Basis (SS – AS)**

$$A = (10,500 - 12,250) = 1,750 \text{ F}$$

$$B = (4,800 - 6,000) = 1,200 \text{ F}$$

$$C = (500 - 250) = 250 \text{ F}$$

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**19.4 QUESTIONS**

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1. Define and explain briefly the following terms:
  - a. Wages Rate Variance
  - b. Labour Efficiency Variance
  - c. Labour Mix Variance
  - d. Labour Idle time Variance
  
2. Define and explain the following terms:
  - a. Fixed overhead Expenditure Variance
  - b. Fixed overhead Volume Variance
  - c. Fixed Overhead Capacity Variance
  - d. Fixed Overhead Calendar Variance
  - e. Fixed overhead Efficiency Variance.
  
3. Discuss various types of sales variance.

## 19.5 EXERCISES

1. Using the following information calculate each of three labour variance for each department: (a) Labour cost variance, (b) Labour Rate variance, (c) Labour efficiency variance:

	Dept.X	Dept.Y
Direct Wages (Gross)	Rs.28,080	Rs.19,370
Standard hours produced	8,640 hours	6,015 hours
Standard Rate per hour	Rs.3	Rs.3.40
Actual hours worked	8,200 hours	6,345 hours

**[Ans.: (a) X Rs.2,160 (A); Y Rs.1,081 (F); (b) X Rs.3,444 (A); Y Rs.2,221 (F); (c) X Rs.1,320 (F); Y = Rs.1,122 (A)]**

2. Calculate labour cost variance, labour rate variance and labour efficiency variance.  
 Actual gross wages Rs.2,050  
 Standard hours produced 8,000  
 Standard rate per hour 30 paise  
 Actual hours worked 8,200

**[Ans.: LCV = 350 (F); LRV = 410 (F); LEV = 60 (A)]**

3. The information regarding the composition and the weekly wage rates of labour force engaged on a job scheduled to be completed in 30 weeks are as follows:-

Category of workers	Standard		Actual	
	No. of workers	Weekly wage rate per worker Rs.	No. of workers	Weekly wage rate per worker Rs.
Skilled	75	60	70	70
Semi skilled	45	40	30	50
Unskilled	60	30	80	20

The work is completed in 32 weeks. Calculate:-

- (i) Labour cost variance  
 (ii) Labour rate variance  
 (iii) Labour efficiency variance.

**[Ans.: (i) 13,000 (A); (ii) 6,400 (A); (iii) 16,200 (A)]**

4. 100 skilled workmen, 40 semi-skilled workmen and 60 unskilled workmen were to work for 30 weeks to get a contract job completed. The standard weekly wages were Rs.60, Rs.36 and Rs.24 respectively. The job was actually completed in 32 weeks by 80 skilled, 50 semi-skilled and 70 unskilled workmen who were paid Rs.65, Rs.40 and Rs.20 respectively as weekly wages.

Find out the labour cost variance, labour rate variance, labour efficiency variance and labour mix variance.

**[Ans.: Labour Cost Variance Rs.8,800 (A); Labour Rate Variance Rs.10,240 (A); Labour Efficiency Variance = Rs.17,760 (A); Labour Mix Variance Rs.19,200 (F)]**

5. Calculate (1) Labour Cost Variance (2) Labour Rate Variance (3) Labour Efficiency Variance. The details are given below:

	Dept. A	Dept. B
Actual Direct wages	Rs.80,000	Rs.72,000
Standard hours produced	10,000	8,000
Standard rate per hour	Rs.8	Rs.10
Actual hours worked	12,000	7,000

**[Ans.: (1) LCV: Dept. A = 0; Dept. B Rs.8,000 (F); (2) LRV: Dept. A : Rs.16,000 (F); Dept. B Rs.2,000 (A); (3) LEV: Dept A Rs.16,000 (A); Dept. B Rs.10,000 (F)]**

6. X Ltd., furnish you the following particulars.

Product X requires 20 hours per unit

Standard Rate per hour is Rs.2

Units produced: 4,000.

Hours taken 76,000 (including 200 hours for power failure) at Rs.2.10 per hour. Calculate: (a) Direct labour cost variance (b) Direct labour rate variance (c) Direct labour efficiency variance, and (d) Labour Idle time variance.

**[Ans.: (a) LCV = Rs.400 (F); (b) LRV = Rs.7,600 (A); (c) LEV = Rs.8,400 (F); (d) LITV : Rs.400 (A)]**

7. The standard cost card for a product shows the following details.

Material cost – 2 Kg. @ Rs.2.50		Rs.5.00
Wages – 2 hours @ 0.50 ps.		Rs.1.00
The actuals are as follows:		
Production 8,000 units		
Materials consumed:		
16,500 k.g. at Rs.2.40	Rs.39,600	
Wages Paid		
18,000 hours @ 0.40	Rs.7,200	

Calculate appropriate material and labour variances.

**[Ans.: Material Cost Variance = 400 (F); Material Price Variance = 1,650 (F); Material Usage Variance = 1,250 (A); Labour Cost Variance Rs.800 (F); Labour Rate Variance = Rs.1,800 (F); Labour Efficiency Variance : Rs.1,000 (A)]**

8. The standard cost card for a product shows the following details:

	Per Unit
Material cost – 2 Kg @ Rs.3.00 per kg.	6.00
Wages – 2 hours @ Re.1.00 per hour	2.00

The actuals are as follows:

Production 8,000 units

Material consumed: 16,500 kg. @ Rs.2.90 per kg. Rs.47,850

Wages Paid: 18,000 hours @ Rs.0.90 per hour – Rs.16,200

Calculate appropriate material and labour variances.

**[Ans.: Material Cost Variance = Rs.150 (F); Material Price Variance = Rs.1,650 (F); Material Usage Variance Rs.1,500 (A); Labour Cost Variance Rs.200 (A); Labour Efficiency Variance Rs.2,000 (A); Labour Rate Variance Rs.1,800 (F)]**

9. From the following information compute fixed overhead cost, expenditure and volume/capacity variances.

Normal capacity is 5,000 hours; Budgeted fixed overhead rate is Rs.10 per standard hour. Actual level of capacity utilised is 4,400 standard hours. Actual fixed overheads, Rs.52,000.

**[Ans.: Fixed Overhead Variance Rs.8,000 (A); Budgeted fixed overhead Rs.44,000; Expenses variance Rs.2,000 (A); Volume variance Rs.6,000 (A)]**

10. Determine the budget and capacity variance from the following data.

Estimated factory overhead	Rs.25,000
Estimated direct labour hours	5,000
Actual Overhead expenses	Rs.26,500
Applied Overhead Expenses	Rs.22,500

**[Ans.: Overhead budget variance Rs.1,500 (A); Overhead capacity variance Rs.2,500 (A)]**

11. Calculate variable overhead variances from the following.

	Budgeted	Actual
Output (Units)	20,000	19,000
Hours	5,000	4,500
Overhead – Fixed	Rs.10,000	10,500
Variable	Rs.5,000	4,800

**[Ans.: (a) Variable Overhead Cost variance: Rs.50 (A); (b) Expenditure Variance: Rs.300 (A); (c) Efficiency Variance: Rs.250 (F)]**

12. The following data is given:

	Budget	Actual
Production in units	12,500	11,000
Man hours	6,250	5,750
Overhead costs		
Fixed	12,500	13,000
Variable	50,000	45,000

Calculate overhead variances when:

- Standard overhead rate per hour is used.
- Standard overhead rate per unit is used.

**[Ans.: (A) Standard Fixed over rate (per hour) Rs.2; Standard Variable overhead rate (per hour) Rs.8; Standards hour actual output 5,500 hours; (a) (i) VOCV = Rs.1,000 (A); (ii) OBV Rs.1,000 (F); (iii) Rs.2,000 (A); (b) (i) FOCV = Rs.2,000 (A); (ii) OBV Rs.500 (A); (iii) Rs.1,500 (A); (B) Standard Fixed Overhead rate: Rs.1 per; Standard variable overhead rate: Rs.4 per unit; Standard output for actual for actual hours Rs.11,500 units; (a) (i) VOCV = Rs.1,000 (A); (ii) VOEV Rs.1,000 (F); (iii) VOEV Rs.2,000 (A); (b) (i) FOCV Rs.2,000 (A); (ii) FOEV Rs.500 (A); (iii) FOVV Rs.1,500 (A)]**

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

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

Calculate overhead variances.



**[Ans.: (i) Fixed Overhead Cost Variance Rs.1,250 (A); (ii) Fixed Overhead Expenditure Variance: Rs.5,000 (A); (iii) Fixed Overhead Volume Variance Rs.3,750 (F); (iv) Fixed Overhead Efficiency Variance: Rs.750 (A); Variable Overhead Cost Variance Rs.3,000 (A); Variable Overhead Expenditure variance: Rs.2,000 (A); Variable Overhead Efficiency Variance Rs.1,000 (A)]**

14. Modern Toys Limited had budgeted the following sales for December, 2002.

Toy A 900 units @ Rs.50 per unit  
 Toy B 650 units @ Rs.100 per unit  
 Toy C 1,200 units @ Rs.75 per unit

As against this, the actual sales were:

Toy A 1,000 units @ Rs.55 per unit  
 Toy B 700 units @ Rs.95 per unit  
 Toy C 1,100 units @ Rs.78 per unit

The cost per unit of A, B and C was Rs.45, Rs.85 and Rs.65 respectively.

Compute the differences variance to explain the difference between the budgeted and actual profit.

**[Ans.: Value Variance Rs.5,050 (F); Price Variance Rs.4,800 (F); Volume Variance Rs.250 (F); Quantity Variance Rs.328 (F); Mixed Variance Rs.78 (A)]**

15. The standard cost for 100 units product are as given below

	Rs.
Material 100 Kgs. at Rs.1	100
Labour 40 Hours at Rs.2 per hour	80
Variable Factory Overheads at Rs.1 per	
Standard direct labour hour	40
Fixed Factory Overhead at Rs.0.50 per	
Standard direct labour hour	<u>20</u>
	<u>240</u>

During a particular period, 500 units of the product were manufactured. The normal volume is 220 direct labour hours. 520 kgs. of material at Rs.1.10 were consumed. 190 labour hours at Rs.1.90 were used. The actual variable factory overhead incurred was Rs.209. the actual fixed factory overhead incurred was Rs.115. Calculate material, labour and overhead variances.

**[Ans.: Material Cost Variance Rs.72 (A); Material Price Variance Rs.52 (A); Material Usage Variance Rs.20 (A); Labour Cost Variance Rs.39 (F); Labour Rate Variance Rs.19 (F); Labour efficiency Variance Rs.20 (F); Variable overhead Cost Variance Rs.9 (A); Variable overhead Expenditure Variance Rs.19 (A); Variance overhead Efficiency Variance Rs.10 (F); Fixed overhead Variance (Cost) Rs.15 (A)]**

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## Chapter - 20

**REVISIONARY PROBLEMS****1. BUDGET & BUDGETARY CONTROL**

1. Prepare a flexible budget for production at 80 per cent and 100 percent activity on the basis of the following information :

Production at 50% capacity	5,000 units
Raw materials	Rs.80 per unit
Direct labour	Rs.50 per unit
Direct expenses	Rs.15 per unit
Factory expenses	Rs.50,000 (50% fixed)
Administration expenses	Rs.60,000 (60% variable)

2. Draw up a flexible budget for overhead expenses on the basis of the following data and determine the overhead rates at 70%, 80% and 90% plant capacity.

	<b>At 80% Capacity Rs.</b>
Variable overheads :	
Indirect labour	12,000
Stores including spares	4,000
Semi-variable Overheads :	
Power (30% fixed, 70% variable)	20,000
Repairs and maintenance (60% fixed , 40% variable)	2,000
Fixed Overheads :	
Depreciation	11,000
Insurance	3,000
Salaries	10,000
Total overheads	62,000
Estimated direct labour hours	<b>1,24,000 hrs.</b>

3. The expenses budgeted for production of 10,000 units in a factory are furnished below :

	<b>Rs. Per unit</b>
Material	70
Labour	25
Variable overheads	20
Fixed overheads (Rs.1,00,000)	10
Variable expenses (direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administration expenses (Rs.50,000)	5
<b>Total</b>	<b>155</b>

Prepare a Budget for the production of (a) 8,000 units, and (b) 6,000 units.

Assume that administration expenses are rigid for all levels of production.

4. A department of AXY company attains sales of Rs.6,00,000 at 80% of its normal capacity. Its expenses are given below :

	<b>Rs.</b>
Office Salaries	90,000
General expenses	2% of sales
Depreciation	7,500
Rent and Rates	8,750
<b>Selling costs :</b>	
Salaries	8% of sales
Travelling expenses	2% of sales
Sales office	1% of sales
General expenses	1% of sales
<b>Distribution Costs :</b>	
Wages	15,000
Rent	1% of sales
Other expenses	4% of sales

Draw up Flexible Administration, Selling and Distribution Costs Budget, operating at 90%, 100% and 110% of normal capacity.

5. A company is expecting to have Rs.25,000 cash in hand on 1<sup>st</sup> April 2003 and it requires you to prepare cash budget for the three months. April to June 2003. The following information is supplied to you.

	<b>Sales Rs.</b>	<b>Purchases Rs.</b>	<b>Wages Rs.</b>	<b>Expenses Rs.</b>
February	70,000	40,000	8,000	6,000
March	80,000	50,000	8,000	7,000
April	92,000	52,000	8,000	7,000
May	1,00,000	60,000	10,000	8,000
June	1,20,000	55,000	12,000	9,000

**Other information :**

- Period of credit allowed by suppliers is two months;
- 25% of sale is for cash and the period of credit allowed to customers for credit sale is one month;
- delay in payment of wages and expenses one month;
- income tax Rs.25,000 is to be paid in June 2003.

6. Prepare a Cash Budget for the three months ending 30<sup>th</sup> June 2003 from the information given below :

(a) Month

	<b>Sales Rs.</b>	<b>Materials Rs.</b>	<b>Wages Rs.</b>	<b>Overheads Rs.</b>
February	14,000	9,600	3,000	1,700
March	15,000	9,000	3,000	1,900
April	16,000	9,200	3,200	2,000
May	17,000	10,000	3,600	2,200
June	18,000	10,400	4,000	2,300

(b) Credit terms are : Sales and debtors – 10% sales are on cash, 50% of the credit sales are collected next months and the balance in the following month.

Creditors -

Materials 2 months

Wages ¼ month

Overheads ½ month

(c) Cash and Bank Balance on 1<sup>st</sup> April, 2003 is expected to be Rs.6,000.

(d) Other relevant information are :

- (i) Plant and Machinery will be installed in February 2003 at a cost of Rs.96,000. The monthly installment of Rs.2,000 is payable from April onwards.
- (ii) Dividend @ 5% on Preference Share Capital of Rs.2,00,000 will be paid on 1<sup>st</sup> June.
- (iii) Advance to be received for sale of vehicles Rs.9,000 in June.
- (iv) Dividends from investments amounting to Rs.1,000 are expected to be paid in June is Rs.2,000.

7. The following data relate COSMOS Ltd.

The financial manager has made the following sales forecasts for the first five months of the coming year, commencing from 1<sup>st</sup> April, 2004 :

<b>Month</b>	<b>Sales (Rs.)</b>
April	40,000
May	45,000
June	55,000
July	60,000
August	50,000

Other Data :

- (i) Debtors' and creditors' balance at the beginning for the year Rs.30,000 and Rs.14,000 respectively. The balance of other relevant assets and liabilities are :
  - Cash Balance Rs.7,500
  - Stock Rs.51,000
  - Accrued Sales Commission Rs.3,500
- (ii) 40% sales are on cash basis. Credit sales are collected in the month following the sale.
- (iii) Cost of sales is 60 percent on sales.
- (iv) The only other variable cost is a 5% commission to sales agents. The sales Commission is paid in a month after it is earned.
- (v) Inventory (Stock) is kept equal to sales requirements for the next two months budgeted sales.
- (vi) Trade creditors are paid in the following month after purchases.
- (vii) Fixed cost are Rs.5,000 per month including Rs.2,000 depreciation.

You are required to prepare a Cash Budget for the months of April, May and June 2004 respectively.

## 2. FUNDAMENTALS OF CAPITAL BUDGETING

1. From the following information advise the management as to which project is preferable based on payback period. The standard cutoff period for the company is 5 years.

	Project A (Rs.)	Project B (Rs.)
Capital cost	15,000	15,000
Cash flows (savings before depreciation, but after taxes)		
I year	5,000	4,000
II year	5,000	4,000
III year	5,000	4,000
IV year	2,000	3,000
V year	2,000	7,000
VI year	2,000	9,000
	<b>21,000</b>	<b>31,000</b>

2. Kumar Ltd. is producing articles mostly by manual labour and thus project A is adjudged it by a new machine. There are two alternative models M and N of the new machine. Prepare a statement of profitability showing the pay-back period from the following information.

	Machine M	Machine N
Estimated life of machine	4 year	5 years
Cost of machine	Rs.9,000	Rs.18,000
Estimated savings in scrap	500	800
Estimated savings in direct wages	6,000	8,000
Additional cost of maintenance	800	1,000
Additional cost of supervision	1,200	1,800

3. Calculate the average rate of return for project 'A' and 'B' from the following information.

	Project A	Project B
Investment (Rs.)	25,000	37,500
Expected life (in years)	4	5
Net earnings (after depreciation and taxes)		
Years		
1	2,500	3,750
2	1,875	3,750
3	1,875	2,500
4	1,250	1,250
5	-	1,250

If the desired rate of return is 12%, which project should be selected?

4. X Ltd., is considering the purchase of a new machine which will carry out some operations at present performed by labour. Two alternative models A and B are available for the purpose. From the following information prepare a profitability statement using Pay Back Period and Pay Back Profitability for submission to management.

	Machine A	Machine B
Estimated life (years)	5	6
Cost of Machine	80,000	1,50,000
<b>Estimated additional costs (Rs.)</b>		
Maintenance (per month)	500	750
Indirect materials (p.a.)	2,000	3,000
Supervision (per quarter)	3,000	4,500
Estimated savings in scrap (p.a.) (Rs.)	8,000	12,000
Employees not required	10	15
Wages per employee (Rs.)	7,200	7,200

Depreciation is calculated using straight line method. Taxation may be taken at 50% of profit (net savings).

5. A choice is to be made between two competing proposals which require an equal investment of Rs.50,000 and are expected to generate net cash flows as under with a cost of capital of 10%.

Year	Project A	Project B	Year	P.V. Factor at 10%
1	25,000	10,000	1	0.909
2	15,000	12,000	2	0.826
3	10,000	18,000	3	0.751
4	NIL	25,000	4	0.683
5	12,000	8,000	5	0.621
6	6,000	4,000	6	0.564

Which project should be chosen based on Net present Value.

6. Rank the following projects on the basis of (a) Pay Back (b) Accounting rate of return and (c) NPV.

Particulars	Year	Project A (Rs.)	Project B (Rs.)	Project C (Rs.)
Investment	0	30,000	30,000	30,000
Annual savings	I	13,800	36,150	-
Annual Savings	II	13,800	-	-
Annual Savings	III	13,800	-	46,827

7. Calculate the pay back periods of the following projects each requiring a cash outlay of Rs.1,00,000.

Year	Cash Inflow		
	Project A	Project B	Project C
1	30,000	30,000	10,000
2	30,000	40,000	20,000
3	30,000	20,000	30,000
4	30,000	10,000	40,000
5	30,000	5,000	---

Project A :  $30,000 + 30,000 + 30,000 = 3$  years  
 $3 \text{ years} + 10,000 / 30,000 = 3 \frac{1}{3}$  years 4 months

8. Using the information given below, compute the Net Present Value.  
 Initial outlay Rs.80,000  
 Estimated Life 5 years



Profit after tax End of the year	1	6,000
	2	14,000
	3	24,000
	4	16,000
	5	NIL

Depreciation has been calculated under straight line method. The cost of capital may be taken at 20% per annum and the present value factor of Re.1 at 20% per annum is as under.

Year	1	2	3	4	5
P. V. Factor	0.83	0.69	0.58	0.48	0.40

Calculation of Depreciation =  $80,000 / 6 \text{ years} = \text{Rs.}16,000$

9. Intimate Fashions Ltd., Chennai is considering the purchase of a new machine, two alternative machines A and B have been recommended. Each having an initial outflow of Rs.4,00,000 and requiring Rs.20,000 as additional working capital at the end of first year. Earnings after taxation are expected as follows.

Year	Machine A (Rs.)	Machine B (Rs.)
1	40,000	1,20,000
2	1,20,000	1,60,000
3	1,60,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	80,000

The company has a target of return of capital of 10 percent and on this basis, you are required to compare the profitability of the machines and recommended which project is preferable based on Net Present Value.

Present value factor of Re.1 in "n" number of years.

Year	Present Value Factor at 10%
1	0.91
2	0.83
3	0.75
4	0.68
5	0.62

### 3. WORKING CAPITAL MANAGEMENT

1. Prepare an estimate of working requirement from the following information of a trading concern:
- |                          |                |
|--------------------------|----------------|
| (a) Project annual sales | 1,00,000 units |
| (b) Selling price        | Rs.8 per unit  |

- (c) Percentage of net profit on sales 25%
- (d) Average credit period allowed to customers 8 weeks
- (e) Average credit period allowed by suppliers 4 weeks
- (f) Average stock holding in terms of sales requirement 12 weeks
- (g) Allow 10% for contingencies.

2. A proforma cost sheet of a company provides the following particulars :

**Elements of Cost**

Material	40%
Direct Labour	20%
Overheads	20%

The following further particulars are available :

- (a) It is proposed to maintain a level of activity of 2,00,000 units.
- (b) Selling price is Rs.12 per unit
- (c) Raw materials are expected to remain in stores for an average period of one month
- (d) Materials will be in process, on averages half a month.
- (e) Finished goods are required to be in stock for an average period of one month.
- (f) Credit allowed to debtors is two months.
- (g) Credit allowed by suppliers is one month.

You may assume that sales and production follow a consistent pattern.

You are required to prepare a statement of working capital requirements, a forecast Profit and loss account and Balance Sheet of the company assuming that :

	<b>Rs.</b>
Share capital	15,00,000
8% Debentures	2,00,000
Fixed Assets	13,00,000

3. X & Co. is desirous to purchase a business and has consulted you and one point on which you are asked to advise them is the average amount of working capital which will be required in the first year's working.

You are given the following estimates and are instructed to add 10% to your computed figure to allow for contingencies :

	<b>Figures for the year Rs.</b>
(i) Amount blocked up for stocks :	
Stocks of finished product	5,000
Stocks of stores, materials, etc.	8,000
(ii) Average credit given :	
Inland Sales – 6 weeks credit	3,12,000
Export sales 1 ½ weeks credit	78,000

(iii) Lag in payment of wages and other out goings :	<b>Rs.</b>
Wages – 1 ½ Weeks	2,60,000
Stocks of materials, etc. – 1 ½ months	48,000
Rent, Royalties, etc. – 6 months	10,000
Clerical staff = ½ month	62,400
Manger ½ month	4,800
Miscellaneous Expenses – 1 ½ months	48,000
(iv) Payment in Advance :	
Sundry Expenses (paid quarterly in advance)	8,000
(v) Undrawn profit on the average throughout the year	11,000

Set up you calculations for the average amount of working capital required.

4. A proforma cost sheet of a company provides the following particulars :

Elements of Cost	Amount per unit Rs.
Raw material	80
Direct Labour	30
Overheads	60
Total Cost	<b>170</b>
Profit	30
Selling price	<b>200</b>

The following further particulars are available :

Raw materials are in stock on an average for one month. Materials are in process on an average for half a month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month. Credit allowed to customer is two months. Lag in payment of wages is 1 ½ weeks. Lag in payment of overhead expenses is one month.

One-fourth of the output is sold against cash. Cash in hand and at bank is expected to be Rs.25,000.

You are required to prepare a statement showing the working capital needs to finance a level of activity of 1,04,000 units of production.

You may assume that production is carried on evenly throughout the year, wages and overheads accrue similarly and a time period of 4 weeks is equivalent to a month.

5. A company newly commencing business in 2000 has the under mentioned projected Profit and Loss Account :

	Rs.	Rs.
Sales		42,00,000
Cost of goods sold		30,60,000
Gross profit		<b>11,40,000</b>
Administrative expenses	2,80,000	
Selling expenses	2,60,000	5,40,000
Profit before tax		<b>6,00,000</b>
Provision for taxation		2,00,000
Profit after tax		<b>4,00,000</b>
The cost of goods sold has been arrived at as under :		
Material used		16,80,000
Wages and manufacturing expenses		12,50,000
Depreciation		4,70,000
		<b>34,00,000</b>
<b>Less:</b> Stock of finished goods (10% of goods produced not yet sold)		3,40,000
		<b>30,60,000</b>

The figures given above relate only to finished goods and not to work in progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping material equal to two months consumption in stock.

All expenses will be paid one month in arrear; Suppliers of material will extent 1 ½ month credit ; Sales will be 20% for cash and the rest at two month's credit : 90% of the income-tax will be paid in Advance in quarterly installments. The company wishes to keep Rs.1,00,000 in cash.

Prepare an estimate of the requirement of (I) working capital and (ii) cash cost of working capital.

6. From the following Balance Sheet of Z Ltd. calculate (a) Gross Working Capital, and (b) Net Working Capital .

**Balance Sheet as on 31-3-2004**

Liabilities	Rs.	Assets	Rs.
Equity Share capital	4,00,000	Goodwill	90,000
Redeemable Preference		Land and Buildings	1,70,000
Share Capital	1,00,000	Plant	2,00,000
General Reserve	70,000	Debtors	2,00,000
Profit & Loss a/c	48,000	Stock	1,09,000
Proposed Dividend	50,000	Bills Receivable	30,000
Creditors	83,000	Cash in Hand	10,000
Bills Payable	16,000	Cash at Bank	8,000
Provision for Taxation	50,000		
	<b>8,17,000</b>		<b>8,17,000</b>

7. From the following information taken from the books of a manufacturing concern, compute the operating cycle in days :

Period covered	365 Days
Average period of credit allowed by suppliers	16 days
	Rs.'000
Average of total debtors outstanding	480
Raw materials consumption	4,400
Total production cost	10,000
Total cost of sales	10,500
Sales for the year	16,000
Value of average stock maintained :	
Raw materials	320
Work-in-progress	350
Finished goods	260

8. AB Ltd. Provides the following particulars relating to its working :

		Amount in Rs. (Per Unit)
(i)	<b>Cost / Profit per unit :</b>	
	Raw material cost	84
	Direct labour cost	36
	Overheads (all variable)	36
	Total Cost	<b>156</b>
	Profit	44
	Selling price	<b>200</b>
(ii)	<b>Average amount of back up stock :</b>	
	Raw material	1 month
	Work-in-progress (50% complete)	½ month
	Finished goods	1 month
(iii)	Credit allowed by suppliers – 1 month	
(iv)	Credit allowed to customers – 2months	
(v)	Average time lag in the payment of :	
	Wages	½ month
	Overhead expenses	1 ½ month
(vi)	Required cash in hand and at bank Rs.3,00,000	
(vii)	25% of the output is sold for cash.	

For an expected sale of 1,00,000 units of AB Ltd., work out the working capital requirements assuming that production is carried on evenly throughout the year and wages and overheads accrue similarly.

9. Compute the estimated working capital requirement during the next year during the next year. (Assume 1 year = 360 days)

Average Collection period – 60 days

Average payment period – 75 days

Inventory holding period – 90 days (calculated with reference to cost of goods sold)

Cash and bank balance – 2.5% of sales.

Sales Rs.20,00,000; gross profit – 25%

Credit purchases – 1/3 of the cost of goods sold

The company expects 50% increase in sales during the next year.

10. Prepare an estimate of net working capital requirements of Zerox company from the data given below :

	Per unit Rs.
<b>Estimated cost per unit of production</b>	
Raw materials	100
Direct labour	40
Overheads	80
	<b>220</b>

The following is the additional information :

Selling price	Rs.240
Level of activity	1,04,000 units per annum
Raw materials in stock	average 4 weeks
Work in progress [Assume 100 percent stage of completion of material and 50 percent for labour and overheads)	average 2 weeks
Finished goods in stock	average 4 weeks
Credit allowed by suppliers	average 4 weeks
Credit allowed to debtors	average 8 weeks
Lag in payment of wages	average 1 ½ weeks

Cash at Bank is expected to be Rs.25,000. Assume production is sustained during 52 weeks of the year.

11. The following are the extracts from the Balance Sheet of X Ltd. as on 31-3-2004. You are required to compute the additional working capital required by the company for the next year.

**Balance Sheet (Extracts ) as on 31-3-2004**

	Rs.	Rs.	Rs.
Fixed Assets :			
Land and Buildings	5,00,000		
Plant and Machinery	3,00,000		8,00,000
Working Capital :			

Current Assets	Rs.	Rs.	Rs.
Stock	8,00,000		
Debtors	3,00,000		
Cash and Bank	2,00,000	13,00,000	
<b>Less: Current liabilities :</b>			
Creditors	3,40,000		
Tax	80,000		
Bank overdraft	1,40,000		
Outstanding liabilities	1,60,000	7,20,000	5,80,000
			<b>13,80,000</b>

**Additional Information :**

1. It is estimated that sales will increase by 25% next year.
2. Maximum amount of bank overdraft will be only Rs.1,60,000.
3. Period of credit allowed to customers and the stock turnover will not change.
4. Period of credit allowed by creditors will also not change. Bill payable will remain at the same relative position.
5. There will be no increase in the tax liability due to increase in exports.

12. A company supplies you the following information from its annual budget :

- (i) Sales Rs.46.80lakhs (78,000 units) 25% cash sales and balance in credit
- (ii) Raw material cost 60% of sales value
- (iii) Labour cost Rs.6 per unit
- (iv) Variable overhead Rs.1 per unit
- (v) Fixed overhead Rs.5 lakhs (including Rs.1,10,000 as depreciation)
- (vi) Budgeted stock levels
 

Raw material	3 weeks
Work in progress	1 week (Material 100%, Labour and overhead 50%)
Furnished goods	2 weeks.
- (vii) Debtors are allowed credit for 3 weeks.
- (viii) Creditors allow 4 weeks credit.
- (ix) Wages are paid bi-monthly i.e., by the 3<sup>rd</sup> week and by the 5<sup>th</sup> week for 1<sup>st</sup> and 2<sup>nd</sup> week and the 3<sup>rd</sup> and 4<sup>th</sup> weeks respectively.
- (x) Lag in payment of overhead – 2 weeks
- (xi) Cash in hand required Rs.50,000
- (xii) Allow 10% margin for contingencies.

Prepare the working capital budget for a year for the company, making the necessary assumptions you deem fit.

## 4. FUNDS FLOW STATEMENT

1. The following Balance Sheets are given :

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Equity share capital	3,00,000	4,00,000	Goodwill	1,15,000	90,000
Redeemable preference capital	1,50,000	1,00,000	Land and Building	2,00,000	1,70,000
General reserve	40,000	70,000	Plant	80,000	2,00,000
Profit and loss a/c	30,000	48,000	Debtors	1,60,000	2,00,000
Proposed Dividend	42,000	50,000	Stock	77,000	1,09,000
Creditors	55,000	83,000	Bills receivable	20,000	30,000
Bills payable	20,000	16,000	Cash in hand	15,000	10,000
Provision for taxation	40,000	50,000	Cash at Bank	10,000	8,000
	<b>6,77,000</b>	<b>8,17,000</b>		<b>6,77,000</b>	<b>8,17,000</b>

It is also given that :

- (a) Depreciation of Rs.20,000 on land and building and Rs.10,000 on plant has been charged in 2003
- (b) Interim dividend of Rs.20,000 has been paid in 2003
- (c) Income tax Rs.35,000 has been paid during 2003

Prepare Statement of Sources and Applications of Funds and statement of changes in working Capital when

- (a) Provision for taxation is treated as a non-current item
- (b) Provision for taxation is treated as a current item.

2. The following is the Balance Sheet of AZ Co. Ltd. for two years.

Assets :	1994	1995
Plant and Machinery (at cost)	8,00,000	12,90,000
Land and Building (at cost)	6,00,000	8,00,000
Stock	6,00,000	7,00,000
Bank	40,000	80,000
Preliminary expenses	14,000	12,000
Debtors	1,38,000	1,22,000
	<b>21,92,000</b>	<b>30,04,000</b>



	1994	1995
<b>Liabilities :</b>		
Share capital	12,00,000	16,00,000
Debentures	4,00,000	6,00,000
Profit and loss a/c	2,50,000	5,00,000
Creditors	2,30,000	1,80,000
Provision for :		
(a) Bad and doubtful debts	12,000	6,000
(b) Depreciation on Land and Building	40,000	48,000
(c) Depreciation on plant and machinery	60,000	70,000
	<b>21,92,000</b>	<b>30,04,000</b>

**Additional Information :**

- During the year a part of the machinery costing Rs.1,40,000 (accumulated depreciation thereon Rs.4,000) was sold for Rs.12,000.
- Dividend of Rs.1,00,000 was paid during the year.

Ascertain :

- Change in working Capital in 1995
  - Funds Flow Statement for 1995.
3. The Summarized Balance Sheets of K Ltd. as on 31<sup>st</sup> March, 2002 and 31<sup>st</sup> March 2003 are as follows :

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Share capital	12,00,000	15,00,000	Buildings	8,00,000	7,60,000
14% Debentures	6,00,000	4,00,000	Machinery	5,00,000	7,20,000
Profit and loss a/c	1,00,000	1,50,000	Short-term investments	3,00,000	4,50,000
General Reserve	3,00,000	3,50,000	Inventories	4,00,000	4,70,000
Creditors	4,90,000	5,60,000	Debtors	6,70,000	5,30,000
Proposed dividends	1,20,000	1,80,000	Cash at Bank	2,20,000	3,30,000
Provision for taxation	1,00,000	1,30,000	Prepaid expenses	20,000	10,000
	<b>29,10,000</b>	<b>32,70,000</b>		<b>29,10,000</b>	<b>32,70,000</b>

**Additional Information :**

- Debentures were redeemed at a premium of 10%.
- Taxes paid during the year amounted to Rs.1,40,000
- A machine which appeared at a WDV of Rs.80,000 was sold for Rs.1,30,000; and new machines worth Rs.3,60,000 were acquired during the year.

Prepare a statement of sources and applications of funds, showing changes in the working capital.

4. The following is the Balance-sheet Rupriya & Co.

<b>Liabilities</b>	<b>2000 Rs.</b>	<b>2001 Rs.</b>	<b>Assets</b>	<b>2000 Rs.</b>	<b>2001 Rs.</b>
Share capital	3,00,000	4,00,000	Goodwill	1,15,000	90,000
Debentures	1,50,000	1,00,000	Buildings	2,00,000	1,70,000
General Reserve	40,000	70,000	Debtors	1,60,000	2,00,000
Profit and Loss a/c	72,000	98,000	Bills Receivable	20,000	30,000
Creditors	55,000	83,000	Stock	1,57,000	3,09,000
Bills payable	20,000	16,000	Cash	25,000	18,000
Provision for tax	40,000	50,000			
	<b>6,77,000</b>	<b>8,17,000</b>		<b>6,77,000</b>	<b>8,17,000</b>

**Additional Information :**

You are required to prepare :

- Statement of Changes in Working Capital.
- Funds Flow Statement

**Note :** Provision for tax is to be treated as a non-current liability.

5. From the following Balance sheets and other information of Abhipra Ltd. for the years 2003 and 2004, prepare Funds Flow Statement and Statement of Changes in Working Capital :

<b>Liabilities</b>	<b>2003 Rs.</b>	<b>2004 Rs.</b>	<b>Assets</b>	<b>2003 Rs.</b>	<b>2004 Rs.</b>
Share capital	2,00,000	2,50,000	Goodwill	7,500	5,000
General Reserve	10,000	25,000	Buildings	1,42,500	1,57,500
Profit & Loss a/c	15,000	50,000	Plant and Machinery	93,000	75,000
12% Debentures	2,00,000	2,35,000	Investments (long-term)	75,000	75,000
Sundry creditors	1,25,000	60,000	Stock	2,00,000	1,80,000
Bills payable	75,000	40,000	Sundry debtors	1,50,000	1,65,000
Proposed Dividends	40,000	40,000	Cash in hand	6,250	12,500
Provision for tax	60,000	50,000	Cash at Bank	50,750	80,000
	<b>7,25,000</b>	<b>7,50,000</b>		<b>7,25,000</b>	<b>7,50,000</b>

**Additional information :**

- During the year investments costing Rs.20,000 were sold at a profit of Rs.10,000.
- An interim dividend of Rs.25,000 was paid during the year.
- Taxes paid during the year Rs.60,000.
- Rs.15,000 was charged as depreciation on buildings.
- Depreciation charged on plant and Machinery Rs.9,300.

6. Following are summarised Balance Sheets of X Ltd. as on 31<sup>st</sup> December 2001 and 2002 :

Liabilities	2001	2002	Assets	2001	2002
Equity Share capital	2,00,000	2,50,000	Bank	35,000	16,000
12% Debentures	1,00,000	80,000	Stock	40,000	75,000
10% preference Share capital	50,000	80,000	Bills Receivable	20,000	50,000
Public deposits	20,000	30,000	Debtors	70,000	1,00,000
Loans	50,000	80,000	Machinery	75,000	60,000
Reserves	20,000	25,000	Furniture	10,000	8,000
Profit and Loss a/c	50,000	60,000	Land	1,70,000	2,80,000
Provision for Depreciation on Machinery	10,000	15,000	Buildings	1,40,000	99,000
Proposed Dividend	20,000	25,000	Goodwill	30,000	25,000
Creditors	40,000	50,000			
Bills payable	30,000	18,000			
	<b>5,90,000</b>	<b>7,13,000</b>		<b>5,90,000</b>	<b>7,13,000</b>

**Additional Information :**

- Depreciation charged during 2002 was Rs.4,000 on Furniture, Rs.12,000 on Machinery and Rs.20,000 on Buildings.
- Redemption of debentures was made at 10% premium.
- Part of machinery was sold for Rs.15,000 at a loss of Rs.4,000.
- During 2002 interim dividend was paid Rs.10,000 and income tax was paid Rs.5,000

Prepare :

- Statement of changes in working capital.
- Funds flow statement.

Working notes are also required to be shown.

7. The following summarised Balance Sheets are given to you by Dee Cee Ltd. :

	31-12-2001	31-12-2002		31-12-2001	31-12-2002
Share capital	10,00,000	11,00,000	Fixed Assets :		
Reserves	3,50,000	3,00,000	Cost less		
Profit & loss a/c	80,000	70,000	Depreciation	11,70,000	16,90,000
Loans @ 10%	6,00,000	8,00,000	Investments	2,00,000	1,50,000
Provision for Tax	2,10,000	2,40,000	Sundry Debtors	5,00,000	4,50,000
Provision for Doubtful debts	30,000	20,000	Stock in trade	4,50,000	3,90,000
Sundry Creditors	3,10,000	2,90,000	Cash at Bank	90,000	60,000
Proposed Dividend	1,00,000	1,20,000	Goodwill	2,70,000	2,00,000
	<b>26,80,000</b>	<b>29,40,000</b>		<b>26,80,000</b>	<b>29,40,000</b>

The following information is also available :

- (i) Investments were sold during 2002 at a loss of 20% on the cost.
- (ii) An items of fixed assets, cost Rs.70,000, depreciation provided for Rs.66,000, had to be discarded in 2002 without any scrap value:
- (iii) Depreciation provided during 2002 came to Rs.1,80,000
- (iv) The increase in Share capital was because of issue of bonus shares out of reserves.

Prepare the Funds Flow Statement for the year ended December 31, 2002.

8. From the following balance sheets of Joymatara Ltd., make out (1) Statement of changes in the working capital and (2) Funds Flow Statement.

	2001	2002		2001	2002
Equity share capital	40,000	60,000	Goodwill	10,000	8,000
7 percent redeemable preference shares	20,000	10,000	Land and Buildings	20,000	15,000
General reserve	4,000	6,000	Plant	18,000	38,200
Capital reserve	-	5,000	Trade investments	2,000	7,000
Profit and Loss a/c	3,600	5,400	Stock	17,000	15,600
Proposed dividend	5,600	7,900	Sundry debtors	12,000	18,000
Sundry creditors	5,000	9,400	Bills receivable	3,000	3,600
Bills payable	2,000	1,200	Cash in hand, and at bank	3,400	5,600
Liabilities for expenses	1,600	1,200	Preliminary expenses	2,000	1,400
Provision for taxation	5,600	6,400			
	<b>87,400</b>	<b>1,12,400</b>		<b>87,400</b>	<b>1,12,400</b>

**Information :**

1. In 20X2, Rs.3,600 Depreciation has been written off the plant. No depreciation has been charged on land and buildings.
  2. A piece of land has been sold out and the balance has been revalued ; the profits on revaluation and sale have been transferred to capital reserve. There is no other capital profit.
  3. A plant has been sold for Rs.2,400 (W.D.V. – Rs.3,000).
  4. Rs.400 dividend (including Rs.100 as pre-acquisition dividend) has been received and credited to the profit and loss account.
  5. An interim dividend of Rs.2,000 has been paid during 20X2.
9. From the following summarized financial statements of Exwye Ltd., as at 31<sup>st</sup> December 2001 and 31<sup>st</sup> December 2002 respectively, prepare :

(Rs. thousand)

	2001	2002		2001	2002
Capital and Liabilities			Property and Assets		
10percent redeemable preference shares of Rs.100 each fully paid	1,000	500	Land at cost	200	200
Equity share capital of Rs.10 each fully paid	3,000	3,200	Buildings (at cost less depreciation)	300	275
Share premium	300	270	Investments (at cost)	800	850
Capital redemption reserve	-	300	Stock in trade	1,600	2,600
General reserve	500	300	Book debts	2,000	1,875
Profit and loss a/c	320	430	Loans and advances	350	175
Secured loan	880	970	Cash and bank balances	50	25
Proposed dividend	400	530			
Sundry creditors	1,600	2,500			
	<b>8,000</b>	<b>9,000</b>		<b>8,000</b>	<b>9,000</b>

**Additional Information :**

- (a) During the year, 5,000 redeemable preference shares of Rs.100 each were redeemed at a premium of 10 percent. The premium was paid out of the share premium a/c. For this purpose, 20,000 equity shares were issued fully paid for cash at a premium of 10 percent. The capital redemption reserve was created out of transfer from the general reserve.
- (b) Depreciation provided during the year was :
- On Buildings Rs.25,000  
On Plant and Machinery Rs.3,00,000
- (c) A plant (original cost Rs.95,000, depreciation provided till 31.12.20001 Rs.78,000) was sold for Rs.35,000 and the profit on sale was transferred to the profit and loss a/c.
- (d) Dividend proposed for 2001 was duly paid in 2002.

10. From the following comparative summary and information, prepare a statement of sources and applications of funds :

	31-12-2002 Rs.	31-12-2001 Rs.
<b>Liabilities :</b>		
Sundry creditors	1,43,000	1,12,000
Dividend payable	25,000	-
Provision for taxation	48,000	8,000
Accrued interest on debentures	3,000	3,750
6% debentures	1,00,000	1,25,000
Share capital	5,75,000	5,25,000
Reserves	2,52,000	2,52,000
Surplus	59,070	1,75,535
	<b>12,05,070</b>	<b>12,01,285</b>

	31-12-2002 Rs.	31-12-2001 Rs.
<b>Assets :</b>		
Cash and bank balance	2,87,800	1,70,650
Sundry debtors	1,53,000	1,38,760
Inventories	2,87,670	2,35,800
Prepaid expenses	4,600	3,200
Investments	25,000	1,05,000
Debentures discount	5,000	6,875
Patents	24,000	30,000
Goodwill	5,000	85,000
Property, plant and equipment less depreciation	4,13,000	4,26,000
	<b>12,05,070</b>	<b>12,01,285</b>

**Additional Information :**

1. Depreciation on property, plant and equipment amounts to Rs.4,24,000 on 31<sup>st</sup> December, 2001 and to Rs.4,11,000 on 31<sup>st</sup> December 2002. Depreciation for the year amount to Rs.66,000.
2. A machine was sold for Rs.20,000. At the time of sale, the net book value of the machine was Rs.30,000 (cost Rs.70,000 and accumulated depreciation Rs.40,000).
3. Investments costing Rs.80,000 were sold for Rs.1,00,000.
4. During the year 2002, debentures of the face value of Rs.25,000 were redeemed at a premium of 5 percent.
5. The surplus as at 31<sup>st</sup> December, 2002 was arrived at as under :

Balance as on 31 <sup>st</sup> December 2001	<b>Rs.</b> 1,75,535
<b>Less:</b> Net Loss for the year after providing for all write-offs	66,465
	<b>1,09,070</b>
<b>Less:</b> Dividend declared	50,000
	<b>59,070</b>

**5. CASH FLOW STATEMENT**

1. From the following calculate cash from operations :

	(Rs.'000)		(Rs.'000)
To Salaries	5,000	By Gross profit	25,000
To Rent	1,000	By Profit on sale of land	5,000
To Depreciation	2,000	By Income-tax refund	3,000
To Loss on sale of plant	1,000		
To Goodwill written off	4,000		
To Proposed dividend	5,000		
To Provision for tax	5,000		
To Net profit	10,000		
	<b>33,000</b>		<b>33,000</b>

2. Following information is available from the books of Standard Company Ltd.

	2003	2004
Profit made during the year	2,50,000	-
Income received in advance	500	600
Prepaid expenses	1,600	1,400
Debtors	80,000	95,000
Bills receivable	25,000	20,000
Creditors	45,000	40,000
Bills payable	13,000	15,000
Outstanding expenses	2,500	2,000
Accrued income	1,500	1,200

Calculate Cash Flow from operations.

3. The Balance Sheets of X Ltd. as on 31<sup>st</sup> March 2001 and 31<sup>st</sup> March 2002 were as follows :

	31 <sup>st</sup> March 2001 Rs.	31 <sup>st</sup> March 2002 Rs.
<b>Assets :</b>		
Land and Buildings	80,000	1,20,000
Plant and Machinery	5,00,000	8,00,000
Stock	1,00,000	75,000
Sundry Debtors	1,40,000	1,50,000
Prepaid expenses	14,000	12,000
Cash at Bank	16,000	18,000
	<b>8,50,000</b>	<b>11,75,000</b>
<b>Liabilities and Capital :</b>		
Share Capital	5,00,000	7,00,000
Profit & Loss Account	1,00,000	1,60,000
General Reserve	50,000	70,000
Sundry Creditors	1,63,000	2,00,000
Bills Payable	30,000	40,000
Outstanding expenses	7,000	5,000
	<b>8,50,000</b>	<b>11,75,000</b>

**Additional Information :**

- (i) Rs.50,000 depreciation has been charged to Plant and Machinery during the year, 2002.
- (ii) A piece of machinery was sold for Rs.8,000 during 2002. It had cost Rs.12,000, depreciation of Rs.7,000 has been provided on it.

Prepare Cash Flow Statement from the above details.

4. From the following Balance Sheet of PK Ltd. for the year ending 31-12-2003 and 31-12-2004, prepare cash flow statement.

Liabilities	2003 Rs.	2004 Rs.	Assets	2003 Rs.	2004 Rs.
Equity share capital	2,15,000	2,75,000	Goodwill	-	20,000
Reserves	40,000	40,000	Plant & Machinery	1,12,950	1,16,200
Profit & Loss a/c	39,690	41,220	Land and Building	1,48,500	1,44,250
Provision for tax	40,000	50,000	Current assets	1,98,530	1,70,730
Bank loan	59,510	-	Cash	7,500	7,700
Current liabilities	73,280	52,660			
	<b>4,67,480</b>	<b>4,58,880</b>		<b>4,67,480</b>	<b>4,58,880</b>

The following information is also provided :

1. A dividend of Rs.26,000 was paid during the year 2004.
  2. Profit before tax for the year was Rs.62,530.
  3. During the year 2004, the company paid tax of Rs.25,000
  4. During the year, the company purchased another company and paid Rs.60,000 in share capital. It acquired stock Rs.21,640 and plant Rs.18,360.
  5. It purchases machinery costing Rs.5,650 during the year.
5. Given below are the balance sheets of Glow Ltd. as on 31<sup>st</sup> March 2003 and 31<sup>st</sup> march 2004 :

	2003 Rs.	2004 Rs.
Equity share capital	2,00,000	3,00,000
Long-term loan	1,00,000	1,00,000
Creditors	1,50,000	2,00,000
Bills payable	2,00,000	3,00,000
Retained earnings	1,80,000	2,00,000
	<b>8,30,000</b>	<b>11,00,000</b>
Cash	60,000	30,000
Stock	1,20,000	1,90,000
Debtors	80,000	1,20,000
Goodwill	2,00,000	1,50,000
Plant and machinery	1,00,000	2,00,000
Land and buildings	2,00,000	4,00,000
Furniture	70,000	10,000
	<b>8,30,000</b>	<b>11,00,000</b>

**Additional Information ;**

- (a) Operating expenses include depreciation Rs.80,000 and amortization of goodwill Rs.50,000.
- (b) A machine has been sold for Rs.15,000. The written down value of the machine was Rs.40,000 and Rs.20,000 depreciation is changed on the same in 2004.
- (c) Plant and machinery was purchased for cash Rs.1,40,000 and Land and Buildings for Rs.2,60,000.



- (d) Furniture was sold for cash Rs.60,000.  
 (e) Equity shares were issued for cash Rs.1,00,000.  
 (f) Rs.80,000 dividend was paid in cash.  
 (g) Net profit for the year ending 31-3-2004 was Rs.1,00,000.  
 Prepare a Statement of Cash Flow for the year ending 31-3-2004.

6. From the following condensed comparative Balance Sheets of Bangalore Mills Ltd. and additional information, prepare a Cash Flow Statement for the year 2004.

Liabilities	2003 Rs.	2004 Rs.	Assets	2003 Rs.	2004 Rs.
Share Capital	70,000	80,000	Plant & Machinery	62,000	66,000
Share Premium	9,000	11,000	Accumulation	(-) 37,000	(-) 26,200
			Depreciation on Plant and Machinery		
Retained earnings	23,820	30,820	Building	95,000	1,16,000
7% Mortgage loan	-	20,000	Accumulation depreciation on building	(-) 43,000	(-) 45,000
Creditors	6,900	6,000	Land	10,000	12,000
Outstanding salaries	2,000	1,400	Stock	10,2220	9,620
Provision for taxation	1,000	1,400	Debtors	8,600	7,600
			Prepaid expenses	720	800
			Cash	6,180	9,800
	<b>1,12,720</b>	<b>1,50,620</b>		<b>1,12,720</b>	<b>1,50,620</b>

**Additional Information :**

- Plant costing Rs.16,000 (accumulated depreciation Rs.14,800) was sold during the year for Rs.1,200.
- Building was acquired during the year at a cost of Rs.21,000. In addition to cash payment of Rs.1,000, a 7% mortgage loan was raised for the balance.
- Dividend of Rs.8,000 was paid during the year.
- A sum of Rs.13,900 was transferred to provision for taxation account in 2004.

7. Balance Sheets for 2003 and 2004 and income statement for 2004 of ABX Ltd. are presented below :

Liabilities	2004 Rs.	2003 Rs.	Assets	2004 Rs.	2003 Rs.
Creditors	66,000	78,000	Cash	11,000	13,000
Dividends payable	2,000	-	Debtors	95,000	79,000
Income Tax Payable	3,000	5,000	Provision for doubtful debts	(-) 3,000	(-) 2,000
Long Term Debt	75,000	42,000	Inventory	1,03,000	92,000
Equity Share Capital	26,000	26,000	Prepaid expenses	6,000	5,000
Profit & Loss			Land	69,000	66,000
Appropriation Account	1,68,000	1,56,000			

Liabilities	2004 Rs.	2003 Rs.	Assets	2004 Rs.	2003 Rs.
			Machinery & Equipment	1,72,000	1,56,000
			Provision for Depreciation	(-) 1,13,000	(-) 1,02,000
	<b>3,40,000</b>	<b>3,07,000</b>		<b>3,40,000</b>	<b>3,07,000</b>

#### Income Statement for the year ended 31<sup>st</sup> December 2004

		Rs.
	Net Sales Revenue	6,00,000
<b>Less:</b>	Cost of goods sold	5,00,000
	Gross Margin	<b>1,00,000</b>
<b>Less:</b>	Operating Expenses	66,000
	Operating income	<b>34,000</b>
<b>Less:</b>	Interest expenses	4,000
	Income before tax	<b>30,000</b>
<b>Add :</b>	Law suit compensation	5,000
		<b>35,000</b>
	<b>Less: Income Tax</b>	17,000
	<b>Net Income</b>	<b>18,000</b>

The following additional information is available :

- (i) Dividends declared during 2004, Rs.6,000.
- (ii) Equipment worth Rs.16,000 was acquired by the issuance of long term note Rs.10,000 and by paying cash Rs.6,000.
- (iii) Land was acquired for Rs.3,000.
- (iv) There were no accruals and prepaid amounts for interest.

Prepare a Cash Flow Statement for the year 2004.

8. The following are the Balance Sheets of a company as at 31<sup>st</sup> December 1998 and 31<sup>st</sup> December 1999:

Liabilities	1998	1999	Assets	1998	1999
Equity share capital	7,00,000	8,00,000	Fixed Assets	5,00,000	6,00,000
General Reserve	4,50,000	6,00,000	Additions	1,00,000	80,000
Profit & Loss a/c	1,73,000	2,33,000		<b>6,00,000</b>	<b>6,80,000</b>
Provision for taxation	1,97,000	3,70,000	Depreciation	2,00,000	3,20,000
Proposed Dividend	1,50,000	1,50,000		<b>4,00,000</b>	<b>3,60,000</b>
Trade Creditors	7,00,000	9,00,000	Investments	1,20,000	-

Liabilities	1998	1999	Assets	1998	1999
Bank Overdraft	11,50,000	14,00,000	Current Assets :		
Creditors for expenses	80,000	92,000	Debtors	13,00,000	21,85,000
			Stock at cost	17,80,000	20,00,000
	<b>36,00,000</b>	<b>45,45,000</b>		<b>36,00,000</b>	<b>45,45,000</b>

The profit for the year 1999 as per profit and loss account after providing for depreciation amounted to Rs.7,00,000 which was further adjusted as follows ;

	Rs.	Rs.
Profit & Loss Balance b/f	1,73,000	
<b>Add:</b> Profit after depreciation	7,00,000	
Profit on sale of investments	20,000	8,93,000
<b>Less:</b> Provision for taxation	<b>3,60,000</b>	
Transfer to Reserve	1,50,000	
Proposed Dividend	1,50,000	6,60,000
Balance c/f		<b>2,33,000</b>

You are informed that :

- The sales and purchases for the year 1999 amounted to Rs.80,00,000 and Rs.65,00,000 respectively.
- In arriving at the profit from the sales referred to already, the cost of sales and administrative and selling expenses were deducted.

9. Prepare Cash Flow Statement from the following balance Sheets of Excel Ltd. :

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Share capital	17,00,000	18,35,000	Buildings	8,00,000	10,00,000
Reserves	40,000	83,700	Plant and machinery	2,50,000	3,70,000
Profit & Loss App. a/c	1,00,000	1,30,000	Furniture	5,000	6,000
Provision for dividends	70,000	50,000	Cash	2,000	2,200
Creditors	1,00,000	95,000	Debtors	1,00,000	45,000
Bank overdraft	8,000	18,000	Bills receivable	8,000	9,000
Bills payable	14,000	13,000	Stock	4,00,000	3,43,700
Mortgage loan	10,000	70,000	Prepaid expenses	3,000	3,100
			Investments	1,64,000	1,70,000
			Goodwill	3,00,000	3,43,700
			Preliminary expenses	10,000	2,000
	<b>20,42,000</b>	<b>22,94,700</b>		<b>20,42,000</b>	<b>22,94,700</b>

- (a) Depreciation is charged on buildings at 3% of cost of Rs.9,00,000; on Plant and Machinery at 8% of cost Rs.4,00,000; Furniture at 5% of cost Rs.8,000.
- (b) Investments were purchased and interest received Rs.3,000 was used in writing down the book value of investments.
- (c) The declared dividends for 70,000 were paid and interim dividend for Rs.20,000 was paid out of profit and loss appropriation a/c.

10. A company finds on 1<sup>st</sup> January 2002 that it is short of funds with which to implement its expansion program. On 1<sup>st</sup> January 2001 it had a credit balance of Rs.1,80,000. From the following information prepare a statement for the Board of Directors to show how the overdraft of Rs.68,750 as on 31<sup>st</sup> December has arisen.

**Figures as per Balance Sheet (as on 31<sup>st</sup> December)**

	2000 Rs.	2001 Rs.
Fixed Assets	7,50,000	11,20,000
Stock and stores	1,90,000	3,30,000
Debtors	3,80,000	3,35,000
Bank balance	1,80,000	68,750 (O/D)
Share capital [shares of Rs.10 each]	2,50,000	3,00,000
Bills Receivable	87,500	95,000

The profit for the year ended 31<sup>st</sup> December 2001 before charging depreciation and taxation amounted to Rs.2,40,000. On 1<sup>st</sup> January 2001, 5000 shares were issued at a premium of Rs.5 per share. Rs.1,37,500 was paid in March 2001 by way of income tax. Dividends were paid as follows ;

2000 [final] on the capital on 31<sup>st</sup> December 2000 at 10% less tax at 25%

2001 [interim] 5 percent free of tax.

Preparation of Cash Flow Statement [as per Traditional Method]

## 6. MARGINAL COSTING

1. Given :

Margin of Safety Rs.50,000

Present Sales Rs.1,50,000

P/V Ratio 40%

What is Profit?

2. The Sales turnover and total cost during two years were as follows :

Year	Sales (Rs.)	Total Cost (Rs.)
2002	3,00,000	2,60,000
2003	3,40,000	2,90,000

You are required to calculate : (I) Profit Volume Ratio (ii) Break-even sales.

3. A company is producing two Products X and Y. The key factor (limited factor) is the availability of raw material. From the following particulars, decide to product you would recommended for priority.

Particulars	Product X Cost per unit	Product Y Cost per unit
	Rs.	Rs.
Materials	25	40
Labour	10	15
Variable expenses	05	06
Fixed expenses	04	04
	44	65
Selling price	55	80
Profit	11	15

4. Prepare marginal cost statement for the production and sale of 500 units @ Rs.50 each from the following:
- Materials @ Rs.10 per unit – (100% variable)
  - Labour @ Rs.5 per unit – (100% variable)
  - Production overheads @ Rs.8 per unit (60% fixed)
  - Selling and distribution expenses Rs.5 per unit (60% variable)
5. From the following, find out 'margin of safety':  
 Present sales Rs.40,000  
 Fixed costs Rs.10,000  
 Profit volume ratio 40 percent
6. The following data relating to a company:  
 Budgeted sales Rs.80,000  
 Variable costs Rs.60,000  
 Fixed Costs Rs.15,000  
 You are required to calculate:
- Break even sales
  - Margin of safety when profit is Rs.20,000
7. Product 'A' can be manufactured either by Machine X or Machine Y. Machine X can produce 50 units per hour and Machine Y, 100 units per hour. Total machine hours available are 2000 hours per annum. Taking into account the following cost data, determine the profitable method of manufacture.

	Per unit of Product 'A'	
	Machine X Rs.	Machine Y Rs.
Direct materials	08	10
Direct wages	12	12
Variable overheads	04	04
Fixed overheads	05	05
	<b>29</b>	<b>31</b>
Selling price per unit	30	30

8. A company has fixed expenses of Rs.90,000 with sales at Rs.3,00,000 and a profit of Rs.60,000. Calculate P/v ratio.
9. A Ltd. and B Ltd. both under the same management make and sell the same type of product. Their budgeted profit and loss accounts for the year ending 31<sup>st</sup> December, 2004 are as follows :

Particulars		A Ltd.		B Ltd.
Sales		3,00,000		3,00,000
Less : Variable cost	2,40,000		2,00,000	
Fixed cost	30,000	2,70,000	70,000	2,70,000
Profit		30,000		30,000

You are required to :

- (a) Calculate the BEP for both companies
- (b) Calculate the sales volume at which each of the two companies will make a profit of Rs.10,000.
10. From the following information, find out the amount of profit earned during the year using marginal costing technique:
- Fixed Cost                      Rs.5,00,000  
Variable cost                    Rs.10 per unit  
Selling price                    Rs.15 per unit  
Output level                    150000 units
11. From the following information for 50% activity, calculate the costs at 85% activity.

Output	500 units
Variable cost per unit	Rs.5
Fixed Costs (Total)	Rs.5,000
Semi-variable costs (50% fixed)	Rs.10,000

12. The PV ratio of a firm dealing in precision instruments is 50% and the margin of safety is 40%.

You are required to work out the break-even point and the net profit if the sales volume is Rs.50,00,000.

13. A mechanical toy factory presents the following information for the year 2004.

Material cost (Rs.)	1,20,000
Labour cost (Rs.)	2,40,000
Fixed overheads (Rs.)	1,20,000
Variable overheads (Rs.)	60,000
Units produced	12,000
Selling price per unit (Rs.)	50

The available capacity is a production of 20,000 units per year. The firm has an offer, for the purchase of 5,000 additional units at a price of Rs.40 per unit. It is expected that by accepting this offer there will be a saving of rupees one per unit in material cost on all units manufactured, the fixed overhead will increase by Rs.35,000 and the overall efficiency will drop by 2 percent on all production. State whether offer is acceptable or not.

14. Maruthi Udyog Ltd., is presently purchasing car tyres from Ceat Ltd. @ Rs.4,500 per tyre. Now it proposes to produce the tyres by itself. The cost of production per tyre would be as follows.

	Rs.
Materials	2,000
Wages	1,500
Variable expenses	500
Fixed expenses	1,000

You are required to decide whether to make or buy.

15. Two competing companies Tata Ltd., and Santro Ltd., produce and sell the same type of product in the same market. For the year ended March 2002, their forecasted profit and loss accounts are as follows:

Particulars	Tata Ltd.		Santro Ltd.	
	Rs.	Rs.	Rs.	Rs.
Sales		2,50,000		2,50,000
Less: Variable cost	2,00,000		1,50,000	
Fixed Cost	25,000		75,000	
		2,25,000		2,25,000
Forecasted Net Profit (Before tax)		25,000		25,000

You are required to compute:

- (i) P/ V ratio and
- (ii) Break – even sales volume of above two companies/

You are also required to state which company is likely to earn greater profit in conditions of: (1) Low demand and (2) High demand.

16. From the following particulars, find out the break – even point and the selling price per unit if the break – even point is reduced to 6000 units:

Variable cost per unit	= Rs.15
Fixed Expenses	= Rs.54,000 p. a.
Selling price per unit	= Rs.20

17. Sagar company manufactures and markets three products A, B and C. All the three products are made from the same set of machines. Production is limited by machine capacity. From the data given below indicate priorities for products A, B and C with a view to maximising profits.

	A Rs.	B Rs.	C Rs.
Raw material cost per unit	2.25	3.25	4.25
Direct labour cost per unit	0.50	0.50	0.50
Other variable costs per unit	0.30	0.45	0.71
Selling price per unit	5.00	6.00	7.00
Standard machine time required per unit	39mins	20 mins	28 mins

In the following year the company faces extreme shortage of raw materials. It is noted that 3 kg, 4kg, and 5 kg of raw materials are required to produce one unit of A, B and C respectively. How would product priorities change?

## 7. STANDARD COSTING

1. From the following information calculate
  - (a) Material cost variance
  - (b) Material price variance
  - (c) Material usage variance



Material	Standard Qty. (Kg)	Standard Price (Rs.)	Actual Qty. (Kg)	Actual Price (Rs.)
X	10	4	12	3.75
Y	15	5	18	4.50
	<b>25</b>		<b>30</b>	

2. From the following calculate material variances:

	Standard			Actual		
	Quantity	Rate	Value	Quantity	Rate	Value
Material X	120	12	1,440	110	13	1,430
Material Y	80	15	1,200	90	16	1,440
Total	200		2,640	200		2,870
Less: Loss	20		-	26		-
Net Output	<b>180</b>		<b>2,640</b>	<b>174</b>		<b>2,870</b>

3. From the following particulars find the, (a) Material cost variance, (b) Material usage variance, (c) Material price variance.

Quantity of materials purchased	3,000 units
Value of materials purchased	Rs.9,000
Standard quantity of materials required per tonne of finished product	25 units
Standard rate of material	Rs.2 per unit
Opening stock of material	NIL
Closing stock of material	500 units
Finished production during the year	80 tonnes

4. G.V. P. Ltd., has furnished you the following data :

	Budget	Actual
No. of working days	25	27
Production in units	20,000	22,000
Fixed overheads	Rs.30,000	Rs.31,000

Budgeted fixed overhead rate is Re.1.00 per hour. In July 2005, the actual hours worked were 31,500.

Calculate the overhead variance.

5. From the following data calculate sales price and sales mix variances .

Product	Standard		Actual	
	Quantity (Units)	Price (Rs.)	Quantity (Units)	Price (Rs.)
A	400	5.00	500	6.00
B	600	3.00	700	2.50

6. From the data given below, calculate the material cost variance, material price variance, material usage variance.

Raw material	Standard	Actual
A	40units at 50 per unit	50 units at 48 per unit
B	60 units at Rs.40 per unit	60 units at Rs.45 per unit

7. From the data given, below calculate the material cost variance, material price variance and material usage variance.

Raw material	Standard	Actual
A	40 units @ Rs.50 per unit	50 units @ Rs.48 per unit
B	60 units @ Rs.40 per unit	60 units @ Rs.45 per unit

8. Calculate overhead cost variance :

	Budgeted	Actual
No. of working days	20	22
Standard man hours per day	8,000	8,400
Output per man hour in units	1.00	0.90
Overheads	Rs.1,60,000	Rs.1,80,000

9. From the following data, calculate labour variances :

The budgeted labour force :

- 20 Unskilled workers @ Rs.0.75 per hour for 50 hours.  
10 skilled workers @ Rs.1.25 per hour for 50 hours.

The actual labour force :

- 22 Unskilled workers @ Rs.0.80 per hour for 50 hours.  
8 Skilled workers @ Rs.1.20 per hour for 50 hours.

10. From the following data, calculate labour variances :

The budgeted labour force.

20 unskilled workers @ 75 paise per hour for 50 hours.

10 skilled workers @ Rs.1.25 per hour for 50 hours

The actual labour force.

22 unskilled workers @ Rs.1.25 per hour for 50 hours

8 skilled workers @ Rs.1.20 per hour for 50 hours.

11. From the data given below, calculate labour cost variances of the two departments :

	Dept. A Rs.	Dept. B Rs.
Actual gross wages	1,968	1,798
Standard hours (produced)	8,000	6,000
Standard rate per hour	0.30	0.35
Actual hours worked	8,200	5,800

12. Rao Ltd., manufactures a product, the standard mix of which is

Material X 60% at Rs.40 per kg

Material Y 40% at Rs.20 per kg.

Normal loss in production is 20% of input. Due to shortage of material X, the standard mix was changed. Actual results for March 2006 were :

Material X 52.5 kg at Rs.40 per kg.

Material Y 47.5 kg at Rs.18 per kg

Input 100.00 kg

Loss 17.50 kg

Output 82.50 kg

Calculate material variances.

13. Arun ice – cream works for 50 hours a week and employs 100 workers on production. The standard rate is Re.1 an hour and standard output is 200 units per gang hour. During the week, 10 employees were paid at 80 paise an hour and 5 at rate, Actual number of units produced were 10,200.

Calculate labour variances.

14. From the following, compute Material Cost Variance (MCV).

	Standard	Actual
Material usage p.u. (kgs)	2	2.2
Price per kg (Rs.)	14	15
Actual units produced	-	100

15. Calculate :

- (i) Labour cost variance
- (ii) Labour rate variance
- (iii) Labour efficiency variance
- (iv) Idle time variance from the following :  
 Standard hours = 5000  
 Standard wage rate = Rs.4 per hour  
 Actual hours = 6000  
 Actual wage rate = Rs.3.50 per hour.  
 Idle time 300 hours due to breakdown of plant.

16. Calculate material variance from the following data:

Material	Standard price per kg.	Standard quantity per unit of output Kg	Actual price per Kg.	Actual usage Kg.
X	5	3	9	300
Y	4	5	3	250
Z	10	4	8	218
		<b>12</b>		<b>768</b>

Actual Output: 80 units.

17. Budgeted hours for the month of March 2006 180 hours

Standard rate of articles produced per hour 50 units

Budgeted Fixed Overheads Rs.2, 700

Actual production in March 2006 9,200 units

Actual hours for production 175 hours

Actual fixed overheads Rs.2, 800

Calculate fixed overheads variances.

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

	Standard		Actual	
	No. of workers	Rate per hour	No. of workers	Rate per hour
Skilled workers	32	3	28	4
Semi- skilled workers	12	2	18	3
Unskilled workers	6	1	4	2

During the 40 hour working week the gang produced 1800 standard labour hours of work.

Calculate (a) Labour efficiency variance, (b) Labour mix variance, (c) Labour rate variance, (d) Labour cost variance.

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

	<b>Standard</b>	<b>Actual</b>
Units	4,000	3,800
No. of working days	20	21
Fixed overheads	40,000	39,000
Variable overheads	12,000	12,000

You are required to calculate the following overhead variances :

- (a) Variable overhead variance (b) Fixed overhead efficiency variance (c) Fixed overhead calendar variance (d) Fixed overhead volume variance (e) Fixed overhead cost variance.
20. Product "X" requires 10kgs of material at 4 per kg. The actual consumption of material for the manufacturing of product "X" came to 12kgs of material at Rs.4.50 per kg. Calculate Material Cost Variance and Material Price variance.
21. The details regarding composition and weekly wage rates of labour force engaged on job scheduled to be completed in 30 weeks are as follows:

<b>Category of Workers</b>	<b>Standard No. of workers</b>	<b>Weekly wage rate per labourer</b>	<b>No. of workers</b>	<b>Actual weekly wage rate per labourer</b>
Skilled	75	60	70	70
Semi-skilled	45	40	30	50
Unskilled	60	30	80	20

The work is actually completed in 32 weeks. Calculate the (a) Labour Rate Variance, (b) Labour Cost Variance, (c) Labour Efficiency, (d) Labour Mix Variance.

22. Calculate labour variances from the following information :

Standard time = 3900 hours  
 Standard wages = Rs.7,800  
 Actual time taken = 4025 hours  
 Actual wages paid = Rs.8,050.