ADVANCED MANAGEMENT ACCOUNTING

M.Com., (Accountancy)

Semester – IV, Paper-I

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M.Com. (Accountancy) - ADVANCED MANAGEMENT ACCOUNTING

First Edition 2023

No. of Copies :

Published by:
Dr. NAGARAJU BATTU,
Director
Centre for Distance Education,
Acharya Nagarjuna University

Printed at:

FOREWORD

Since its establishment in 1976, Acharya Nagarjuna University has been forging a head in the path of progress and dynamism, offering a variety of courses and research contributions. I am extremely happy that by gaining 'A' grade from the NAAC in the year 2016, Acharya Nagarjuna University is offering educational opportunities at the UG, PG levels apart from research degrees to students from over 443 affiliated colleges spread over the two districts of Guntur and Prakasam.

The University has also started the Centre for Distance Education in 2003-04 with the aim of taking higher education to the door step of all the sectors of the society. The centre will be a great help to those who cannot join in colleges, those who cannot afford the exorbitant fees as regular students, and even to housewives desirous of pursuing higher studies. Acharya Nagarjuna University has started offering B.A., and B.Com courses at the Degree level and M.A., M.Com., M.Sc., M.B.A., and L.L.M., courses at the PG level from the academic year 2003-2004onwards.

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

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

Prof. P. RajaSekhar
Vice-Chancellor
Acharya Nagarjuna University

Semester – IV
401CO21: INTERNATIONAL BUSINESS
Paper-I
SYLLABUS

1. **Management Accounting:** Management Accounting, Nature – Scope - Functions – Differences between Management Accounting and Financial and Cost Accounting – Emerging Trends in Management Accounting.
2. **Cost Management:** Techniques for profit improvement, cost reduction and value analysis; Activity based costing. Target costing; cost as certainment and pricing of products and services
3. **Cost Volume Profit Analysis:** Relevant cost, Product sales price in gand mix, Limiting factors
4. **Pricing Decisions:** Theory of price, Product pricing, New product pricing, Pricing strategies, Pricing of services
5. **Budgets and Budgetary Control:** Budget manual, Preparation and monitoring procedures, Budget variances, Flexible budgets, preparation of functional budget operating and non-operating functions, cash budgets, Capital expenditure budget, Master budget, Principal budget factors.

FURTHER READINGS:

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CONTENTS

LESSON -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

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 al dependable fromthe 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.

Management Accounting – Definitions:

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

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."

Robert N. Anthony: "Management Accounting is concerned with accounting information that are useful to management."

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".

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."

1.2 LIMITATIONS OF FINANCIAL ACCOUNTING

Financial Accounting is concerned with recording, classifying and summarising financial transactions pertaining to an accounting period. The basic objective is to provide a commentaryto 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:

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.

Expenditure is not split up according to departments, process and products and, hence, prices of articles manufactured cannot be fixed accurately.

Financial accounting does not indicate the remunerative prices which may be quoted in times of depression.

It does not ensure proper control over materials and supplies, wages, labour and overheads.

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.

It does not provide any measure to judge the efficiency of the concern.

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.

It does not provide a complete analysis of losses due to idle time, idle plant and equipment.

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.

1.3 FINANCIAL ACCOUNTING – MANAGEMENT ACCOUNTING –COST ACCOUNTING

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 helpsin 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.

Differences between Financial Accounting and Management Accounting

	Basis for Difference	Financial Accounting	Management Accounting
1.	**Objective**	The primary objective of financial accounting is to ascertain profit and to find out financial status of a 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.	**Nature**	Financial Accounting is concerned almost exclusively with historical records and past performance.	Management accounting is concerned with future plans and policies.
3.	**Dependency**	Financial accounting is not dependent on management accounting.	Management accounting depends on financial accounting for vital information.
4.	**Application of Accounting Principles**	It adheres to Generally Accepted Accounting Principles.	Such accounting principles are not considered.
5.	**Approach**	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.	**Presentation**	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.	**Control**	It does not lay emphasis on control.	Management accounting controls the performance of the organisation by preparing performance reports for each responsibility centre.
8.	**Valuation of Stock**	Stocks are valued on the principle of "cost or market price whichever is lower".	No such principle is followedfor valuation of stocks.
9.	**Statutory obligation**	Financial accounting is guided by statutes	Management accounting is not statutory
10	**Audit**	Audit of financial accounts is compulsory	Audit of management accountsis not compulsory.

Differences between Cost Accounting and Management Accounting:

	Basis for Difference	Cost Accounting	Management Accounting
1.	**Objective**	The primary objective of cost accounting is to set routine, budgets and standards. It is mainly aimed at knowing the per unit cost of output.	The primary objective of management accounting is to measure actual performance measure actual performance and report to the management for taking corrective actions by detecting the mistakes.
2.	**Scope**	It is primarily concerned with cost allocation.	Its scope is wider. It covers financial accounting an tax accounting.
3.	**Applicability**	It is generally applicable to manufacturing concerns.	Management accounting methods and techniques are applicable to all concerns.
4.	**Data used**	Here quantitative figures are used.	Here both quantitative and qualitative costs are used.
5.	**Transactions**	Cost accounting embraces internal as well as external transactions.	Management accounting is concerned with internal transactions.
6.	**Future Activities**	Cost accounting does not attach importance to future activities.	Future activities are primarily considered.

1.4 IMPORTANCE OF MANAGEMENT ACCOUNTING

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 reliedupon.

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.

1.5 FUNCTIONS OF MANAGMENT ACCOUNTING

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 the 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 centresand 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.

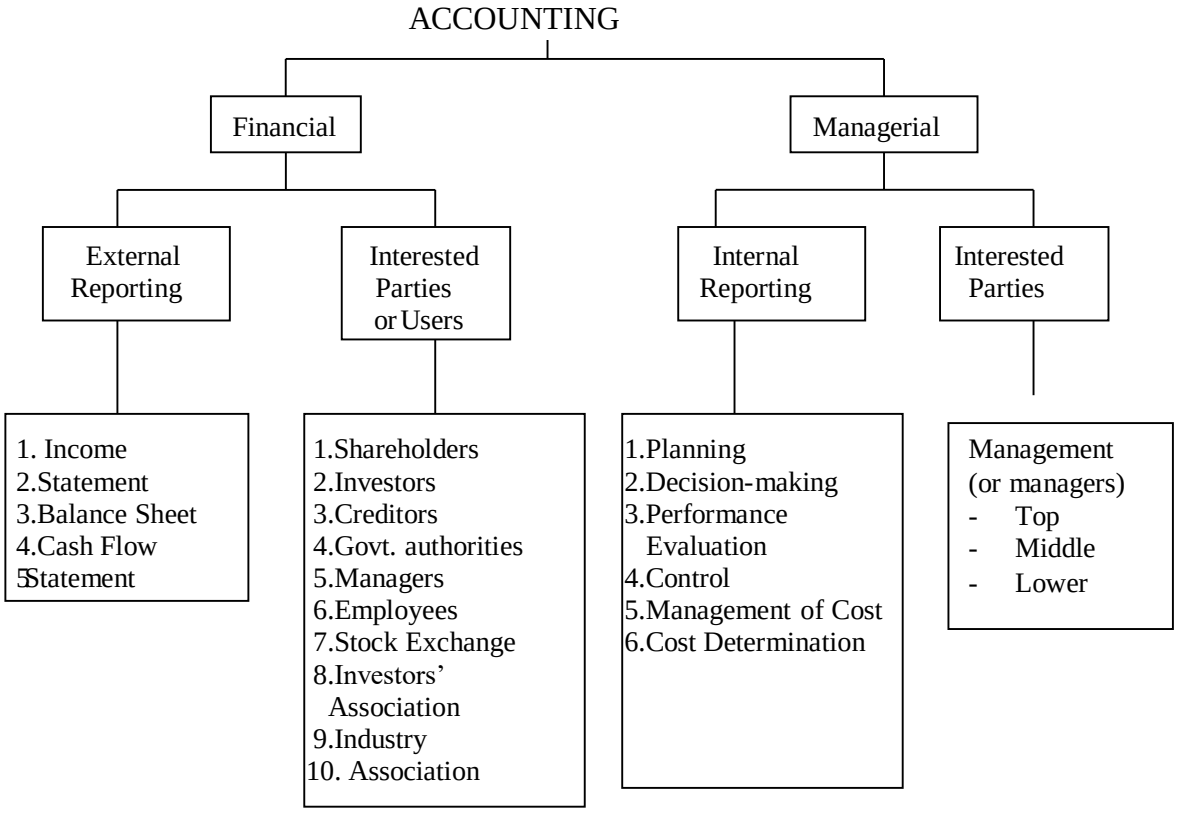
6. Control function: Management accounting facilitates management in controlling the destiny of the organisation. The standards for performance are maintained and any deviation from them is measured and estimated. Measuring actual performance against approved operating plans, standards and budgets are 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 thebusiness 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.

1.6 SCOPE OF MANAGEMENT ACCOUNTING

The scope of Management Accounting is very wide and broad based 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, strengtheningof 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 isan integral part of Management Accounting. Reports are made in uniform intervalsof 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 fromthe following figure. Through this one can exactly find out the role of the Management Accountant and Financial Accountant.

1.7 LIMITATIONS OF MANAGEMENT ACCOUNTING

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.

1.8 TOOLS OF MANAGEMENT ACCOUNTING

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 accountant 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 interpretationof 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. Itis 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 costingis 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 costsinto 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 scientificdecisions 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 thespeed 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 peopleto 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.

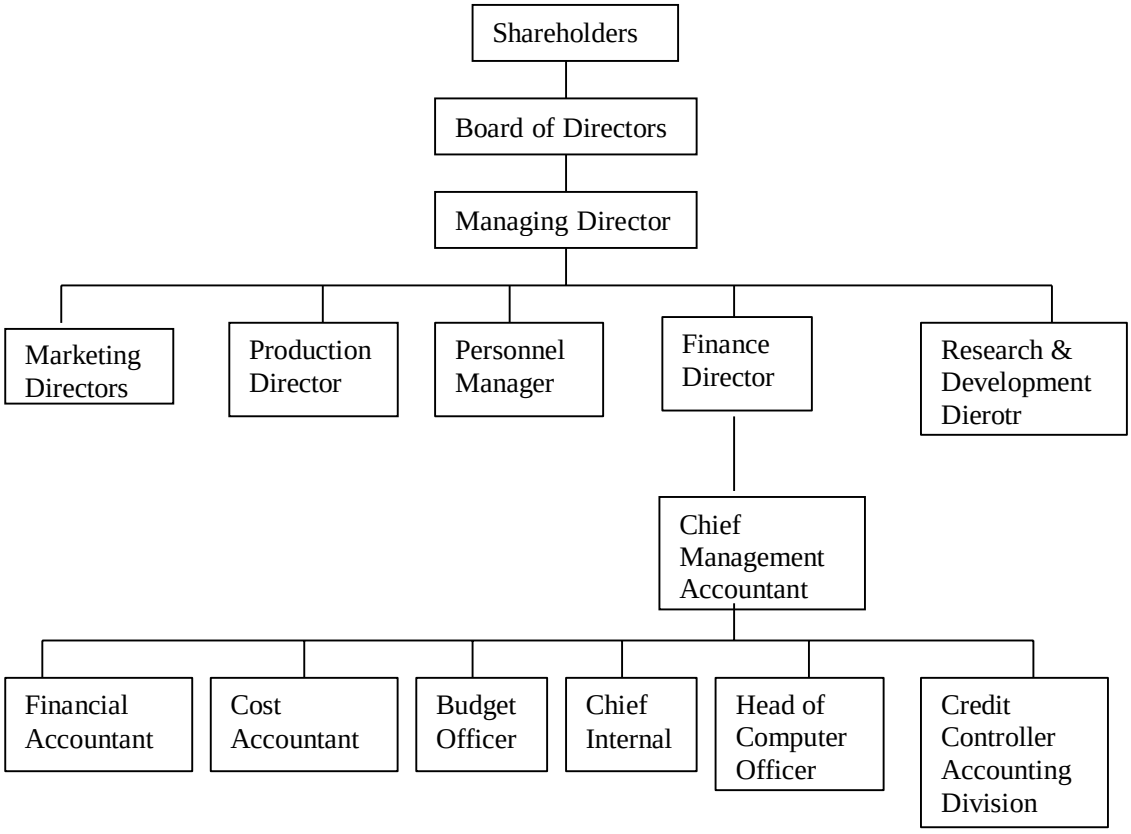
1.8.11 Financial Reporting:

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.

1.9 ORGANISATION FOR MANAGEMENT ACCOUNTING

The organisation of the Management Accounting System should provide relevant information for all levels of management to achieve maximum efficiency. The organisation chartshould be adopted keeping adequae 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.



1.10 ROLE OF MANAGEMENT ACCOUNTANT

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 FinanceDirector.

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 otherhe 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.

1.11 SELF ASSESSMENT QUESTIONS

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.

1.12 REFERENCE BOOKS :

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

LESSON 2
COST REDUCTION, PROFIT IMPROVEMENT AND VALUE ANALYSIS

OBJECTIVES

After careful understanding of the lesson, student will be in a position to
1. Understand the profit improvement process through control of costs and its reduction
2. Understand the evaluate the differences between the cost control and cost reduction mechanism
3. How the cost reduction, cost control and value analysis are interlinked and knows how to apply practically in the industry.

STRUCTURE

2.0 PROFIT IMPROVEMENT

Cost control and cost reduction are the two very efficient tools used to reduce the cost of production and maximise profit. In simple words, Cost control is a technique used to provide the management with all the necessary information regarding the actual costs and also align them properly with the budgeted costs. On the other hand, the term cost reduction is used to save the unit cost of the product, without causing any compromise to its quality.

The companies use a wide variety of techniques of cost control and cost reduction in order to carry out the process effectively.

2.1 COST CONTROL

Business firms aim at producing the product at the minimum cost. It is necessary in order to achieve the goal of profit maximization. Profit is the difference between selling price and cost of production. Generally, selling price is not within the control of a firm but it can minimize the cost. In fact, the success of a business firm is judged in controlling its costs. Cost control by management means a search for better and more economical ways of completing each operation. Cost control is simply the prevention of waste within the existing environment.

It aims at reducing costs and increasing the profitability of the firm. This is done by reduction in specific expenses of the firm and making a better use of the money spent. If a firm is producing a certain quantity of product, it should ensure that it is produced at the minimum cost and gives more profit.

Management should follow three rules in cost control activities

(i) It is easier to keep costs down than to bring costs down.

(ii) The amount of effort put into cost control tends to increase when business is bad and decrease when business is good.

(iii) Cost control is more profitable when business is good than when it is bad.

2.2 COST REDUCTION

Profit is the result of two varying factors, viz., sales and cost. The wider the gap between these two factors, the larger is the profit. Thus, profit can be maximised either by increasing sales or by reducing cost. In a competition loss market or in case of monopoly products, it may perhaps be possible increase price to earn more profits and the need for reducing costs may not be felt. Such conditions cannot, however, exist paramount and when competition comes into play, it may not be possible to increase the sale price without having its adverse effect on the ale volume, which, in turn, reduces profit. Besides, increase in price of products has the ultimate effect of pushing up the raw material prices, wages of employees and other expenses all of which tend to increase costs. In the long run, substitute products may come up in the market, resulting in loss of business. Avenues have, therefore, to be explored and method devised to cut down expenditure and thereby reduce the cost of products. In short, cost reduction would mean maximization of profits by reducing cost through economics and savings in costs of manufacture, administration, selling and distribution.

Cost reduction may be defined as the real and permanent reduction in the unit costs of goods manufactured or services rendered without impairing their suitability for the use intended. As will be seen from the definition, the reduction in costs should be real and permanent. Reductions due to windfalls, fortuities receipts, changes in government policy like reduction in taxes or duties, or due t6 temporary measures taken for tiding over the financial difficulties do not strictly come under the purview of cost reduction. At the same time a programmer of cost reduction should in no way affect the quality of the products nor should it lower the standards of performance of the business.

Broadly speaking reduction in cost per unit of production may be affected in two ways viz.,

1. By reducing expenditure, the volume of output remaining constant, and
2. By increasing productivity, i.e., by increasing volume of output and the level of expenditure remains unchanged.

These aspects of cost reduction are closely linked and they act together - there may be a reduction in the expenditure and the same time, an increase in productivity.

Cost reduction is a planned positive approach to reduce expenditure. It is a corrective function for reducing cost in various operations.

The Chartered Institute of Management Accountants, London defines cost reduction as "Cost reduction is to be understood as the achievement of real and permanent reduction in the unit cost of goods manufactured without impairing the quality of the product".

Cost reduction is the process of eliminating wasteful elements in the method of production. Cost reduction is a continuous process of critically examining various elements of cost to improve the efficiency for reducing cost.

Cost reduction means maximization of profit by reducing cost through economies and savings in cost of manufacture, administration, selling and distribution.

2.3 CHARACTERISTICS OF COST REDUCTION

Reduction must be a real one. It may be done through

1. Large volume of production
2. Use of lower priced material
3. Reducing cost through process substitution
4. By simplifying the manufacturing process
5. By changing the features of product
6. Reduction must be a permanent one. It would be a permanent one if it is through improvements in methods of production.
7. Reduction should not be at the cost of quality of the product

2.4 ESSENTIALS FOR SUCCESS OF COST REDUCTION PROGRAMME

1. Cost reduction programme must be appropriate to the organisation
2. It should be a continuous activity
3. It should be real and permanent cost reduction
4. It should start from top executives. Then only cooperation of all can be achieved
5. Persons giving innovative ideas for cost reduction should be rewarded
6. It should consider all other factors like social and legal factors too

2.5 COST CONTROL VS COST REDUCTION

Cost Control VS Cost Reduction: Both cost reduction and cost control are efficient tools of management but their concepts and procedure are widely different. The differences are summarised below:

Cost Control Cost Reduction	Cost Control Cost Reduction
(a) Cost Control represents efforts made towards achieving target or goal.	(a) Cost reduction represents the achievement in reduction of cost
(b) The process of cost control is to set up a target, ascertain the actual performance and compare it with the target, Investigate the variances, and take remedial measures.	(b) Cost reduction is not concern with maintenance of performance according to standard
(c) Cost control assumes the existence of standards or norms which are not challenged	(c) Cost reduction assumes the existence of concealed potential savings in standards or norms which are therefore subjected to a constant challenge with a view to improvement by bringing out savings
(d) Cost Control is a preventive function. Costs are optimized before they are incurred	(d) Cost reduction is a corrective function. It operates even when an efficient cost control system exists. There is room for reduction in the achieved costs under controlled conditions
(e) Cost control lacks dynamic approach	(e) Cost reduction is a continuous process of analysis by various methods of all the factors affecting costs, efforts and functions in an organization. The main stress is upon the why of a thing and the aim is to have continual economy in costs

2.6 SCOPE OF COST REDUCTION (AREAS OR FIELDS OF COST REDUCTION)

***1. Product design*:** Possibilities of cost reduction should be checked when designing the product itself. Different alternatives and substitutes must be checked before finalizing the product design. Efficient designing of a product reduce cost in the following ways

- By finding cheaper substitutes of material or by using less quantity of materials
- By ensuring minimum time of operation to reduce labour cost
- Reduction in after sales service cost

***2. Organisation*:** Proper care should be taken while setting the type of organisation. Cost reduction can be achieved if the following considerations are looked into

- Define cash function and responsibility
- Proper assignment of tasks and delegation of responsibility
- Fix a suitable channel of communication
- Encourage employees for cost reduction suggestions
- Avoid overlapping of duties

3. Factory layout and equipment: A cost reduction programme should study the factory layout to determine whether there is any scope for cost reduction by elimination of wastage of men, material and maximize utilization of the facilities available. Replacement of plant,

introduction of new technology, expansion of plant, changing the arrangements of equipment etc. should be considered with a view to reduction in cost. Any hidden difficulties in the plant should be probed into. Factory layout and position of equipment must be in such a way to minimize related costs and maximize utilization.

4. Production plan, Programme and methods: There must be proper planning for material ordering, material movement, machine loading and proper utilization of men and other resources to avoid waste of time and resources.

5. Administration: Use of unnecessary forms should be avoided to save the cost of stationary and labour. Reduce the cost of lighting, telephone and travelling as much as possible. Through computerization cost can be reduced to an extent.

6. Marketing: Another area where cost reduction can be brought is marketing, which includes market research, advertisement, packing, warehouses, distribution, after sales services etc. Proper care should be taken in the following areas to ensure minimum cost

- Channel of distribution must be efficient and economical
- Sales promotion system must be effective
- Check the chance to reduce selling and distribution expenses

7. Personnel management: Personnel management is another prominent area where cost reduction programmes can be applied. Recruitment, selection, training and placement stages of employees must be critically examined. Take measures to improve labour relations, welfare measures to improve operational efficiency.

8. Material control**:** By taking the following steps a company can keep material cost at minimum.

- Economical purchase of material
- Stick on EOQ
- Keep low inventory
- Proper check on goods received
- Proper control on material storage and issues

9. Financial management*:* Cost reduction programme must care about over and undercapitalization. Capital should be procured at minimum cost and it should be utilised so as to maximize return. Due consideration should be given in the following areas

- Ensure fair capitalization
- Procure capital at minimum cost
- Make investment for maximum return

10. Utility services: Utility services include power, water, steam, repair, maintenance, transport and clerical services. Proper system of control must be there to avoid wastage and other losses related to these utilities.

2.7 TOOLS AND TECHNIQUES OF COST REDUCTION

It includes

1. Budgetary control
2. Standard costing
3. Standardization of products, tools and equipments
4. Simplification and variety reduction
5. Improvement in design
6. Material control
7. Labour control
8. Overhead control
9. Production planning and control
10. Automation
11. Operation research
12. Market research
13. Financial planning and control
14. Value analysis
15. Cost benefit analysis
16. Contribution analysis
17. PERT
18. Job evaluation and merit rating

2.8 ADVANTAGES OF COST REDUCTION

1. It increases profit
2. Improve men – management relationship
3. Make goods available at cheaper price
4. Help to meet competition effectively
5. Higher profit leads to more revenue to the government
6. Increase export
7. Increase productivity
8. Improved method of production

2.9 VALUE ANALYSIS

Concept

The current business scenario is very demanding with a continuous demand from the market forces to reduce the product price. The pricing as demanded by the market, forces the businesses to reduce product development and manufacturing costs to remain competitive. Manufacturing costs of a product can be broadly categorized in the following heads:

- Raw material
- Labor
- Process that is technology driven

Product engineers are constantly faced with the following challenges:

- Reduce production cost
- Reduce the material cost

Value Analysis & Value Engineering (VAVE) methods are very important and useful in driving down the product cost which helps companies retain market share and sustain their profitability

Important to distinguish between four types of value

Cost value - the cost of producing and selling an item.

Exchange value – the market value of the product or service.

Use value – the value an item has because of the uses to which it can be put, e.g. using a car to go from A to B.

Esteem value - the value put on an item because of its beauty, craftsmanship etc, e.g. the colour, image or top speed of a car.

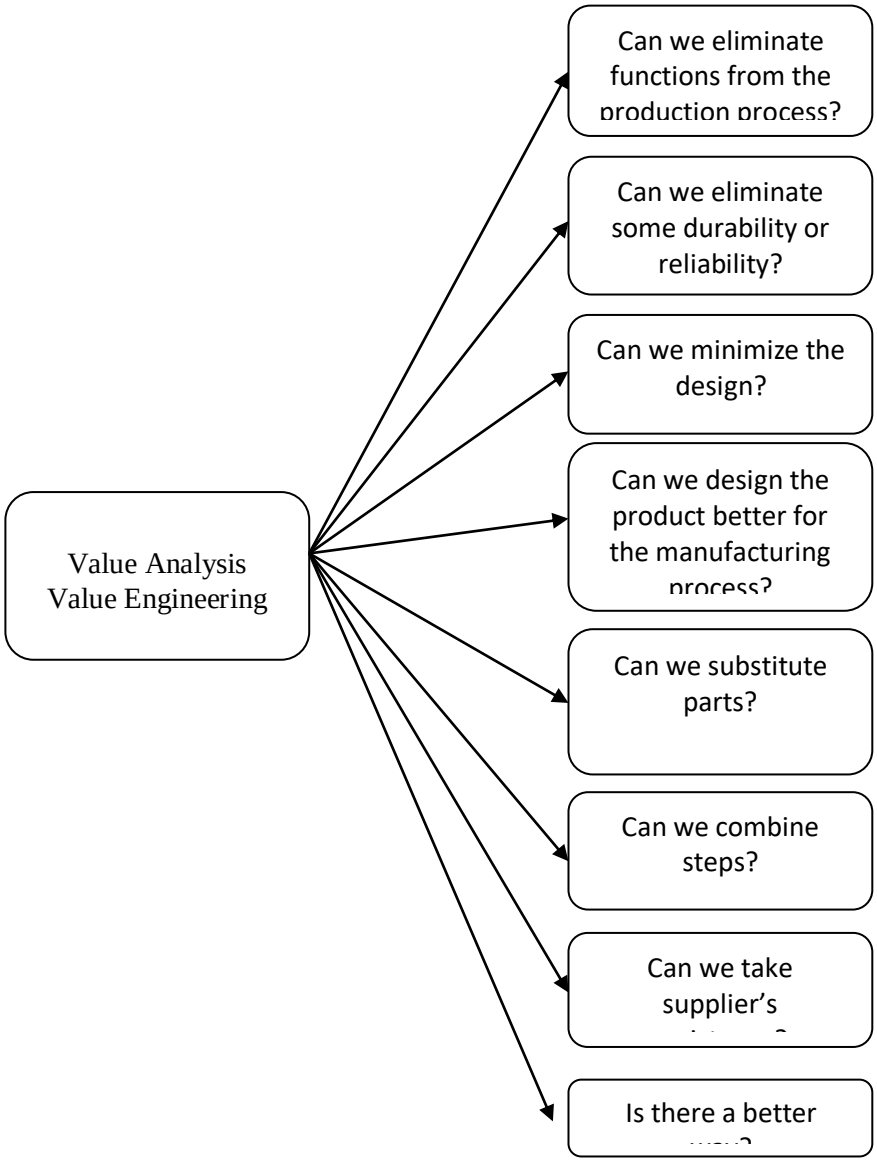
Meaning

Value analysis (VA) is a tool to enhance cost efficiency by evaluating the functionality of a product or a process about its cost. It helps identify and eliminate unnecessary costs incurred while making a product or conducting a business function.

Typically, the total target is broken down into its various components, each component is studied and opportunities for cost reductions are identified. These activities are often referred to as Value Analysis (VA) and Value Engineering (VE).

Value Analysis is a planned, scientific approach to cost reduction which reviews the material composition of a product and production design so that modifications and improvements can be made which do not reduce the value of the product to the customer or to the user. Value Engineering is the application of value analysis to new products. Value engineering relates closely to target costing as it is cost avoidance or cost reduction before production. Value analysis is cost avoidance or cost reduction of a product already in production; both adopt the same approach i.e. a complete audit of the product.

Here are some of the issues that are dealt with during a Value Analysis/ Value Engineering review:



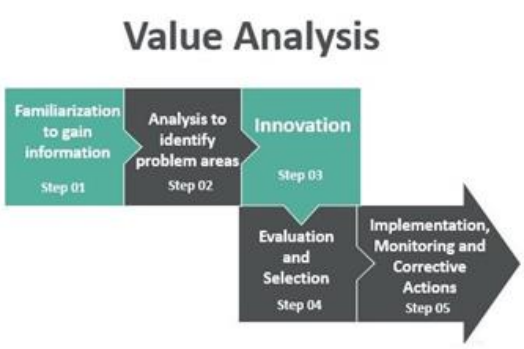
2.10 PROCESS OF VALUE ANALYSIS AND VALUE ENGINEERING (VAVE)

Cost reduction helps a business spend less on expenses leaving it with more profit at the end of a year. As such, businesses devise innovative ways to reduce costs while ensuring that the quality of their products, services, or processes is not compromised.

Value Analysis is a method to achieve cost reduction by analyzing the utility or value of a product, service, or process about the cost incurred on it. In the process, the value analysis team conducts a thorough examination of different segments or components of a product/service/process and identifies areas of avoidable costs. It then comes up with innovative ways to enable cost reduction. The solutions are then implemented to enhance profits by reducing costs.

For example, value analysis of a wall clock will involve applying different methods to break down a wall clock's functions and the cost involved at various stages to bring in those functions. Finally, the team will analyze the functions of the wall clock for customers, which will be to see the time and add to the beauty of their homes.

A classification between necessary and unnecessary functions will become possible based on function analysis. As a result, the business can achieve cost-reduction by eliminating unnecessary functions that add to the cost but are neither improving quality nor enhancing customer satisfaction. Not only does it help in cost-saving, but it will make the product available to the customer at a lower price.



The analysis involves more complex steps, which we will study under the steps of value analysis.

1 – Familiarization to gain information

The first step involves the team familiarizing itself with the process, product, or service that requires value analysis. Then, each component is studied in detail, keeping in mind the department's goals and the organization. Other details could be how much loss it incurred or profit it attained in the last quarter, people employed to carry out the process, etc.

The team also takes down all the costs involved at all levels. It is like the research stage in which the team also documents competitor-related information regarding cost and function to favor comparisons.

2 – Analysis to identify problem areas

Once the team has all the relevant information, it gets into the analysis. The analysis is focused on breaking down the functions of the subject in question. Usually, a product or a process serves two functions, primary and secondary. For example, the primary function of the wall clock was to see the time. Its secondary function was adding to the beauty of the house. There could be several functions that all need to be studied from the point of view of customer satisfaction.

Functions have a weight age and a cost. A detailed analysis is done regarding how a particular function meets customer requirements and the cost of that function. In this process, the value analysis team compiles a list of all the functions in descending order of their utility. The cost incurred on these functions is mentioned alongside. Some formulas like cost-benefit ratios are applied to give weight to the study. The most unnecessary function which will have the least utility can be removed.

3 – Innovation

In this stage, the team searches for alternative ways that allow reduction, change, or modifications in the existing components and functions. This stage thus emphasizes producing new ideas and finding alternative ways of accomplishing the basic and secondary functions.

The underlying idea behind innovation focuses on delivering the said process or product at a reduced cost without compromising its quality. In other cases, it focuses on bringing in some investment like automation while suggesting lay off for cost-cutting.

Sometimes, the team suggests enhancing the quality for greater profits at a lower cost by replacing a component. For example, replacing the clock's wooden digits with cheaper but similar-looking ceramic ones could make the product available at a cheaper rate. As a result, it could increase its sales and help the business make greater profits at a lesser cost.

4 – Evaluation and Selection

The evaluation phase estimates the value of each idea generated during the innovation phase and selects the best. Evaluation involves checking the feasibility and cost of various ideas presented. It also measures the value of the best alternative. Cash flow analysis or break-even point is some of the techniques which may be used for this.

The evaluation phase may be carried out via qualitative analysis or quantitative analysis. The overall process involves computing the cost and picking the most feasible idea based on quantitative or qualitative analysis.

The alternative that reduces cost without compromising the quality will be selected. Many additional details include organizational goals, constraints, customer preference, competitor analysis, impact on the pollution, law abidance, etc.

5 – Implementation, Monitoring and Corrective Actions

The next step involves implementing the selected alternative. Over months or as defined in the report, the performance of the alternative implemented will be constantly monitored and documented. Any deviations from plans will need to be rectified to ensure high performance. Companies usually monitor the performance very carefully and make it a permanent practice upon the initial implementation's success.

Over the years, value analysis and value engineering have come to be understood as similar terms as both involve an in-depth analysis to help reduce costs. However, one salient feature of value engineering compared to value analysis is that the former is usually undertaken at the design stage of new or old projects and products.

Now that we have understood the steps to conduct value analysis, let us look at some examples to understand the process better.

Example 1

The production process of a lead pencil was analyzed using the value analysis technique to reduce cost. Wood and paint were the two most expensive elements in producing the pencil, which shared 37.5% of the pencil's total cost.

A round-shaped design for the pencil was suggested instead of the hexagonal-shaped design to reduce the manufacturing time and manufacturing cost. In addition, normal paints were suggested instead of expensive glitter paints, and additional care was required while applying them to wood.

With the suggested design changes, the production cost of each pencil was reduced by 25%.

Example2

A bank is incurring extra costs at a particular branch. At the same time, it is getting complaints from customers about not adding a self-help desk. So the value analysis team evaluated all the bank processes, such as banking services, technology maintenance, staff duties and roles, and relative costs.

It was discovered that the bank had employed two extra people than the required capacity and yet could not address customer problems due to confusion in roles. The team suggested introducing a help desk and employing the two extra employees at the desk to guide and help the customers. In a year, the branch's profit grew by 30% at the same cost while receiving a positive response from its customers

2.11 SUMMARY OF THE LESSON

In competitive environment, companies have to make continuous efforts to find out ways and means to control and reduce costs.

Cost Control is exercised by comparing actual costs with pre determined standard costs so that the difference between the two can be measured and then analysed according to reasons for taking corrective action. Cost control is thus simply the function of keeping costs within the prescribed limits

Cost Reduction is the achievement of real and permanent reduction in the per unit cost of goods manufacture or services rendered without impairing their suitability for use intended, say, through increase in productivity, change in product design, improvement in technology, etc.

Cost reduction is much wider in scope than cost control and consists of effecting savings in cost by continuous research for improvement in products, methods, procedures and organizational practices.

Value analysis is a systematic method to enhance an item's value and utility. The item could be a product or a process.

It carries techniques to systematically identify areas of avoidable costs in a product or service. The analysis is also applied to the various components and functions of the subject in question.

Another part of this tool involves removing these unnecessary costs without compromising the quality and efficiency of a product, service, or process.

The value analysis team undertakes extensive research, identifies problem areas, devises innovative ways to do away with extra cost, or enhances the product/processes' functionality at the same cost.

2.12 KEY TERMS

1. Continuous Improvement (KAIZEN)
2. Cost Reduction & Control

3. Cost Optimization
4. Value Analysis and Value Engineering
5. Just-in-time JIT
6. PERT (Program Evaluation and Review Technique)

2.13 REVIEW QUESTIONS

1. Cost Measure is What Kind of Control?
   a) Corrective b) Preventive c) Both d) None of the above
   Ans: (b) Preventive
2. Which Type of Control Process Does Not Affect the Quality of the Products?
   a) Cost control b) Cost reduction c) Cost-cuttingd) None of the above
   Ans: (b) Cost reduction
3. Distinguish between Cost Control and Cost Reduction
4. Define cost reduction and illustrate with industry examples

2.14 SUGGESTED READINGS

1. A Text Book of Cost and Management Accounting by MN Arora, 9th Edition, Vikas Publications
2. Strategic Cost Management by ICMAI Material

Dr. David Raju Gollapudi

LESSON 3
ACTIVITY BASED COSTING & ABSORPTION COSTING

OBJECTIVES

After going through this lesson, one should be able to–

- Understand about basic concepts of Activity Based Costing (ABC) and its evolution its objectives.
- Know about difference between Traditional Absorption Costing and Activity Based Costing.
- Understand about Cost drivers, its types.
- Understand about practical uses of Activity Based costing.

STRUCTURE

3.1 INTRODUCTION

Wrong cost analysis leads to wrong decision making. Traditional cost accounting can be used appropriately where the organisation has only few products but when organisation expand their products offering and these products use different amount of resources , it become difficult to determine accurate cost of products by using Traditional Absorption Costing and use of Activity Based Costing (ABC) is inevitable in such situations. Activity-based cost-management systems trace indirect and support expenses accurately to individual products, services and customers.

The Activity Based Costing (ABC) is a method of costing, which focuses on activities performed to produce products. Under this system costs are first traced to activities and then to products. This costing system assumes that activities are responsible for the incurrence of costs and create the demands for activities. E.g. an accounting firm prepares tax returns; a University teaches students. Costs are charged to products based on individual product's use of each activity.

ABC aims at identifying as many costs possible to be subsequently accounted as direct costs of production. Any cost that is traced to a particular product via its consumption of activity becomes direct cost of the product. For instance, in conventional costing system, cost of setup and adjustment time is considered as factory overhead and subsequently assigned to different products on the basis of direct labour hours. But in ABC, setup and adjustment time is determined for each product and its costs are directly charged to each product. ABC is generally used as a tool for understanding product and customer cost and profitability.

As global competition intensifies, companies are producing an increasing variety of products and services. They are finding that producing different products and services places varying demands on their resources. The need to measure more accurately how different products and services use resources has led companies such as American Express, Boeing, General Motors, and Exxon Mobil to refine their costing systems. One of the main ways companies around the globe have refined their costing systems is through activity based costing.

The Evolution: The concepts of ABC were developed in the manufacturing sector of the United States during the 1970's and 1980's.During this time, the consortium for advanced manufacturing – International , now known simply as CAM-I , provided a formative role for studying and formalizing the principles that have become more formally known as Activity Based Costing. ABC is developed due to many deficiencies of Traditional Cost systems, which lead to the discovery of the ABC System.

3.2 MEANING AND DEFINITION

The ABC system assigns costs to each activity that goes into production, such as workers testing a product, setting up of machines, orders passed for purchase of raw materials etc.

Activity-Based costing is allocating costs to the activities involved in the production. It can be defined as a system of costing that recognizes activities involved in producing a product and then traces the cost incurred in performing each activity.

"ABC is the cost attribution to cost units based on benefits received from indirect activities, e.g., ordering, setting up, assuring quality, etc."

- Chartered Institute of Management Accountants (CIMA)

Cost pool: It is an aggregate of all the costs associated with performing a particular business activity.

Cost driver: It is an activity that is the root cause of why a cost occurs. It must be applicable and relevant to the event that is incurring a cost. A cost driver assists with allocation expenses

in a systematic manner that results in more accurate calculations of the true costs of producing specific products.

From the above definition, ABC is the costing system in which cost is attributed to each activity, and then it is summed up to the product.

3.3 THE FEATURES OF ABC ARE AS UNDER

- **Two Stage Costing**: Activity-based costing (ABC) is a two-stage product costing method that first assigns costs to activities and then allocates them to products based on the each product's consumption of activities.
- The cost pools in the two-stage approach now accumulate activity-related costs.
- An activity is any discrete task that an organization undertakes to make or deliver a product or service.
- Activity-based costing is based on the concept that products consume activities and activities consume resources.
- Activity-based costing can be used by any organization that wants a better understanding of the costs of the goods and services it provides, including manufacturing, service, and even nonprofit organizations.

3.4 OBJECTIVES OF ABC

The objectives of Activity Based Costing are as under:

1. To improve product costing
2. To identify non-value adding activities in the production process which might be a suitable focus for attention or elimination?
3. To provide required information for decision making
4. To reduce the frivolous (nonessential) use of common resources
5. To encourage managers to evaluate the efficiency of internally provided services
6. To calculate the full cost of products for financial reporting purposes and for determining cost-based prices

3.5 THE TRADITIONAL COSTING SYSTEM

Absorption costing technique is also termed as Traditional or Full Cost Method. Under this method, the cost of a product is determined, after considering both fixed and variable costs. The variable costs, such as direct materials, direct labour, etc. are, directly, charged to the products. The fixed costs are apportioned on a suitable basis over different products, manufactured during a period. Under absorption costing, all costs, both variable and fixed, are charged to the products for cost determination. Thus, in case of absorption costing, all costs are identified with the products manufactured. Both Fixed costs and Variable costs are also treated as product costs. The cost unit is made to bear the burden of full cost, irrespective of the current level of operations.

Absorption costing is a costing system that is used in valuing inventory. It not only includes the cost of materials and labor, but also both variable and fixed manufacturing overhead costs. Absorption costing is also referred to as full costing. Under the absorption method of costing (aka "full costing"), the following costs go into the product:

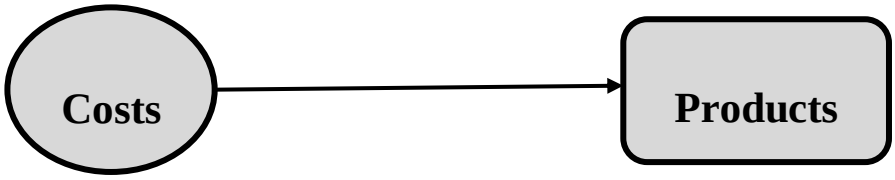
- Direct material (DM)
- Direct labor (DL)
- Variable manufacturing overhead (VMOH)
- Fixed manufacturing overhead (FMOH)

Under absorption costing, the costs below are considered period costs and do not go into the cost of a product. They are, instead, expensed in the period occurred:

- Variable selling and administrative
- Fixed selling and administrative

We can summarise the main difference between ABC and traditional costing by following picture:

Traditional allocation method



Activity-based allocation method

3.6 TERMINOLOGY OF ACTIVITY BASED COSTING

Function	Cost Drivers
Research and Development	• **Number of Research Projects** • **Personal Hours on a project** • **Technical Complexities of Project**
Customer Service	• **No. of service calls** • **No. of products serviced** • **Hours spent on serving products**
Production	• **No. of Machine set ups** • **No. of units** • **No. of machine hours**
Purchase of Materials	• **No. of orders placed** • **No. of receipts of materials** • **No. of inspections**

1. A Cost Object: It is an item for which cost measurement is required e.g. Product, job or a customer.

2. A Cost Driver: In an ABC system, the allocation basis that are used for applying costs to services or procedures are called cost drivers. It is a factor that causes a change in the cost of an activity. Few examples of cost driver as under:

3. Unit level cost: Traditionally, cost drivers were viewed only at the unit level. These drivers create unit-level costs meaning that they are caused by the production or acquisition of a single unit of product or the delivery of a single unit or service.

4. Batch level cost: Costs are caused by a group of things being made, handled or processed at a single time are referred to as batch level costs.

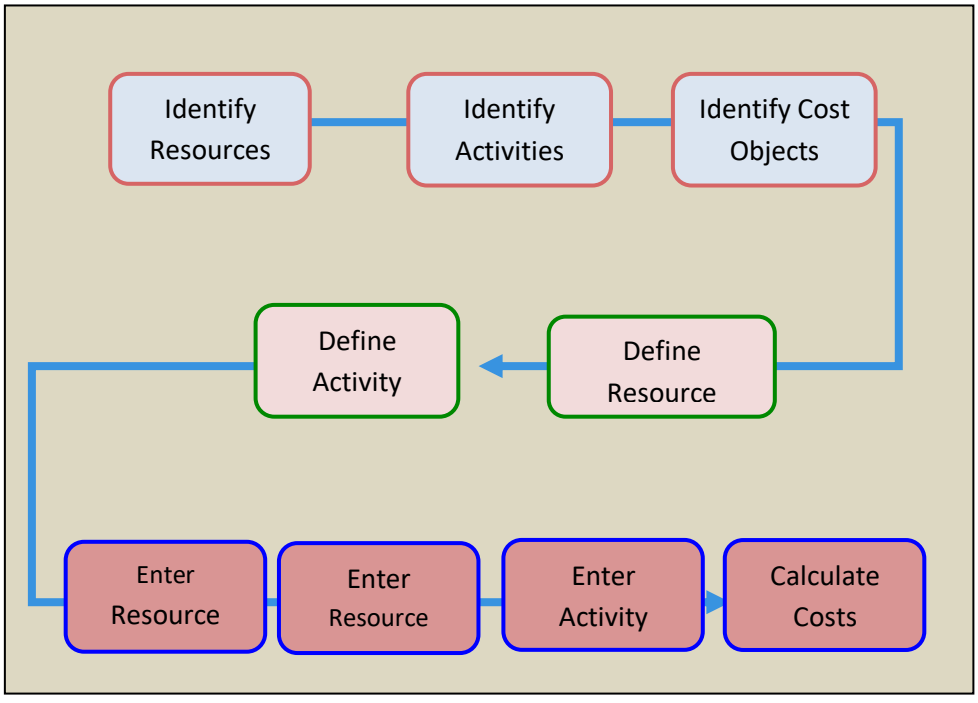
5. Product-level cost: A cost caused by the development, production or acquisition of different items is called a product level or process level cost. These include engineering change orders, equipment maintenance, product development and scrap, if related to product design.

6. Facility-level cost: Some costs cannot be related to a particular product line. These are instead related to providing a facility. For e.g. Cost of maintaining a building or plant security or advertisement promoting the organization.

7. Organizational-level cost: Certain costs are incurred at organizational level for the single purpose of supporting continuing facility operations. These organizational level costs common to many different activities and products and services can be prorated among services and products on an arbitrary basis only. These costs are not product related .thus they should be subtracted from net product revenues instead of an arbitrary and illogical apportionment.

8. Cost Pool: Costs are grouped into pools according to the activities, which drive them. In this al costs associated with procurement i.e. ordering, inspection, storing etc would be included in this cost pool and cost driver identified.

3.7 STAGES IN DEVELOPING ABC SYSTEM



Step 1. Identify Resources

Resources represent the expenditure of an organization. These are the same costs that are represented in a traditional accounting, ABC links these cost to products, customers or services.

Step 2. Identify Activities

Activities represent the work performed in an organization. ABC accounts for the costs based on what activities caused them to occur. By determining the actual activities that occur in various departments it is then possible to more accurately relate these costs to customers, products and services.

Step 3. Identify Cost

Objects ABC provides profitability by one or more cost object. Cost object profitability is utilized to identify money losing customers to validate separate divisions or business units. Defining outputs to be reviewed is an important step in a successful ABC implement action.

Step 4. Determine Resource Drivers

Resource drivers provide the link between the expenditure of an Organisation and activities performed within the Organisation.

Step 5. Determine Cost (Activity) Drivers

Determination of cost drivers completes the last stage of the model. Cost drivers trace or link the cost of performing certain activities to cost objects.

Activity Cost Driver Rate = Activity Cost Driver/Total Cost of Activity(Cost pool)

Step 6. Assign Costs To The Cost Objects

We can use following formula for assigning costs to the cost objects

Costs = Resources Consumed × Activity Cost Driver Rate

3.8. USES OF ACTIVITY BASED COSTING

The areas in which activity based information is used for decision making are as under: -

1. Activity costs: ABC is designed to track the cost of activities, so we can use it to see if activity costs are in line with industry standards. If not, ABC is an excellent feedback tool for measuring the ongoing cost of specific services as management focuses on cost reduction.

2. Customer profitability: Though most of the costs incurred for individual customers are simply product costs, there is also an overhead component, such as unusually high customer service levels, product return handling, and cooperative marketing agreements. An ABC system can sort through these additional overhead costs and determine which customers are actually providing a reasonable profit. This analysis may result in some unprofitable customers being turned away, or more emphasis being placed on those customers who are contributing more in profits.

3. Distribution cost: Organisation uses a variety of distribution channels to sell its products, such as retail, Internet, distributors, and mail order catalogs. Most of the structural cost of maintaining a distribution channel is overhead, so if we can make a reasonable determination

of which distribution channels are using overhead, we can make decisions to alter how distribution channels are used, or even to drop unprofitable channels.

4. Make or buy: ABC enables the manager to decide whether he should get the activity done within the firm or outsource the same. Outsourcing may be done if the firm is incurring higher overhead costs as compared to the outsourcer or vice-versa.

5. Margins: With proper overhead allocation from an ABC system, we can determine the margins of various products, product lines, and entire subsidiaries. This can be quite useful for determining where to position company resources to earn the largest margins.

6. Minimum price: Product pricing is really based on the price that the market will bear, but the marketing manager should know what the cost of the product is, in order to avoid selling a product that will lose company money on every sale. ABC is very good for determining which overhead costs should be included in this minimum cost, depending upon the circumstances under which products are being sold.

7. Production facility cost: It is usually quite easy to segregate overhead costs at the plant-wide level, so we can compare the costs of production between different facilities.

3.9 LIMITATIONS OF ACTIVITY BASED COSTING

Activity based costing help managers in decision making. However activity based costing has certain limitations or disadvantages which as are under:

1. Implementing an ABC system requires substantial resources, which is costly to maintain.

2. Activity Based Costing is a complex system which need lot of record for calculations.

3. In small organisation mangers are accustomed to use traditional costing systems to run their operations and traditional costing systems are often used in performance evaluations.

4. Activity based costing data can be easily misinterpreted and must be used with care when used in decision making. Managers must identify which costs are really relevant for the decisions at hand.

5. Reports generated by this systems do not conform to generally accepted accounting principles (GAAP). Consequently, an organization involved in activity based costing should have two cost systems - one for internal use and one for preparing external reports.

3.10 DISTINCTION BETWEEN TRADITIONAL ABSORPTION COSTING AND ACTIVITY BASED COSTING

Traditional Absorption Costing	Activity Based Costing
Overheads are first related to departments cost centers (Production and Service Cost Centres)	Overheads are first related to activities or grouped into Cost Pools.
Only two types of activities viz. Unit Level Activities and Facility Level Activities are identified.	All levels of activities in the manufacturing cost hierarchy viz. Unit Level, Batch Level, Product Level and

	Facility Level are identified.
This method relates overheads to cost centres i.e. locations. It is not realistic of the behavior of costs.	This method relates overheads to the causal factor i.e. driver. Thus, it is more realistic of cost behavior.
Overhead Rates can be used to ascertain cost of products only. Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels. etc.	Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels. etc.

TARGET COSTING

Generally, in traditional method, price decisions were based on standard. Competitors are emerging and the business for competition inflows other areas as cycle time, quality, reliability. The traditional method standard costing is not effective in longer period for cost reduction. In order to remove the drawback of traditional method, the New Method of Costing is introduced.

In the modern days, fast growing industries use target costing approach moves the decision perspective from book keeper's office to the market. So growing companies are turning equation around and setting cost id prices.

Target costing has been derived from a Japanese term "Gena Kikaku." Concept of target costing was developed in Japan around 1970.

Determination of the price at which they can sell the new product or service and then design a product or service which can be produced a low to provide an adequate profit is called target costing.

In other words, Target Costing is a cost management tool for producing overall cost of product over its entire life cycle with the help of the function engineering and research and development. Target cost is called estimated cost of the product that helps a manufacturing unit to remain. Target Costing is a result of team-work that provides a way to link profit planning, market surveys, value analysis, budgetary control and effective financial management.

3.11 DEFINITION OF TARGET COSTING

CIMA defines Target Cost as "a product cost estimate derived from a competitive market price".

"a disciplined process for determining and achieving a full-stream cost at which a proposed product with specified functionality, performance and quality must be produced in order to generate the desired profitability at the product's anticipated selling price over a specified period of time in the future".

3.12 FEATURES OF TARGET COSTING

The main features of target costing are as follows:

1. *Price Taker*: The price of the product is determined by market conditions. The company is a price taker rather than a price maker.
2. *Profit includes in SP*: The minimum required profit margin is already included in the target selling price.
3. *Management tool:* It is part of management's strategy to focus on cost reduction and effective cost management.
4. *Built-in Selling Price:* Product design, specifications, and customer expectations are already built-in while formulating the total selling price.
5. *Goal Attainment:* The difference between the current cost and the target cost is the "cost reduction," which management wants to achieve.
6. *Team Work:* A team is formed to integrate activities such as designing, purchasing, manufacturing, marketing, etc., to find and achieve the target cost.

3.13 OBJECTIVES OF TARGET COSTING

1. The fundamental objective of target costing is to enable management to use *proactive cost planning*, cost management and cost reduction practices whereby, costs are planned and managed out of a product and business, early in the design and development cycle, rather to a during the later stages of product development and production. Broadly speaking, a target costing system has three objectives:

2. To lower the costs of new products so that the *required profit level* can be *ensured*.

3. *Just-in-Time:* The new products meet the levels of quality, delivery timing and price required by the market.

4. *Collective Activity:* To motivate all company employees to achieve the target profit during new product development by making target costing a companywide profit management activity.

3.14 DIFFERENCE BETWEEN TRADITIONAL COSTING AND TARGET COSTING

S.No.	Target Costing	Traditional Costing
1	Market price is not considered as a part of prime cost planning.	Competitive price is considered as a part of prime cost planning.
2	Costs determine sales price.	It is sales price that determine costs.
3	Losses and inefficiency are taken into consideration in order to reduce costs.	Design is an important factor in reducing costs.
4	Customers are not involved in cost reduction.	Customer data is considered as a guide for cost reduction.
5	Teamwork and multiple skills are not taken into account.	Teamwork and multiple skills are taken into account.
6	Prime cost and some proportion of profit stem from closed system.	It is an open system and takes into consideration the interactive function or the external effect of variables on the system

7	Suppliers of material and equipment are involved after designing the product.	Suppliers of material and equipment are involved before designing the product.
8	It does not use value engineering.	Value engineering is used as a prerequisite in this system.

3.15 PRINCIPLES OF TARGET COSTING

According to Hilton, target costing involves seven key principles listed as follows:

1. Price-Led Costing
2. Focus on the Customer
3. Focus on Product Design
4. Focus on Process Design
5. Cross-Functional Teams
6. Life-Cycle Costs
7. Value-Chain Orientation

a) Price-Led Costing

Target costing sets the target cost by first determining the price at which a product can be sold in the marketplace. Subtracting the target profit margin from this target price yields the target cost, that is, the cost at which the product must be manufactured.

Notice that in a target costing approach, the price is set first, and then the target product cost is determined. This is opposite from the order in which the product cost and selling price are determined under traditional cost-plus pricing.

b) Focus on the Customer

To be successful at target costing, management must listen to the company's customers. What products do they want? What features are important? How much are they willing to pay for a certain level of product quality?

Management needs to aggressively seek customer feedback, and then products must be designed to satisfy customer demand and be sold at a price they are willing to pay. In short, the target costing approach is market driven.

c) Focus on Product Design

Design engineering is a key element in target costing. Engineers must design a product from the ground up so that it can be produced at its target cost. This design activity includes specifying the raw materials and components to be used as well as the labour, machinery, and other elements of the production process. In short, a product must be designed for manufacturability.

d) Focus on Process Design

Every aspect of the production process must be examined to make sure that the product is produced as efficiently as possible. The use of touch labour, technology, global sourcing in procurement and every aspect of the production process must be designed with the product's target cost in mind.

e) Cross-Functional Teams

Manufacturing a product at or below its target cost requires the involvement of people from many different functions in an organisation: market research, sales, design engineering, procurement, production engineering, production scheduling, material handling and cost management.

Individuals from all these diverse areas of expertise can make key contributions to the target costing process. Moreover, a cross-functional team is not a set of specialists who contribute their expertise and then leave; they are responsible for the entire product.

f) Life-Cycle Costs

In specifying a product's target cost, analysts must be careful to incorporate all of the product's life-cycle costs. These include the costs of product planning and concept design, preliminary design, detailed design and testing, production, distribution and customer service.

Traditional cost-accounting systems have tended to focus only on the production phase and have not paid enough attention to the product's other life-cycle costs.

g) Value-Chain Orientation

Sometimes the projected cost of a new product is above the target cost. Then efforts are made to eliminate non-value-added costs to bring the projected cost down. In some cases, a close look at the company's entire value chain can help managers identify opportunities for cost reduction.

3.16 PROCESS OF TARGET COSTING

Target Costing applies to new products and succeeding generations of a product. It begins with understanding the market thoroughly and an intention to satisfy customer needs, concerning product quality, features, timeline and price:

1. Identifying customer needs.
2. Planning of selling price as per the needs.
3. Identifying the target cost.
4. Keep the price in consideration after identifying suppliers and fixing the manufacturing process.
5. Compare sample product with the target and start production for product launch.

Target costing is an excellent tool for planning a suite of products that have high levels of profitability. This is opposed to the much more common approach of creating a product that is based on the engineering department's view of what the product should be like, and then struggling with costs that are too high in comparison to the market price.

Target costing is a tool for Cost Management which helps in reducing the cost of a product over its entire life-cycle. Target costing induces those actions which management must take for establishing reasonable target costs, developing methods to achieve these targets and developing the mechanisms to test the cost effectiveness of various reduction efforts.

3.17 SUMMARY OF THE LESSON

- The Activity-Based Costing (ABC) is a costing system, which focuses on activities performed to produce products. ABC is that costing in which costs are first traced to activities and then to products.
- ABC is developed due to many deficiencies of Traditional Cost systems.
- In traditional product costing system, costs are first traced not to activities but to an organizational unit, such as department or plant and then to products.
- Cost driver is an activity which generates cost. Costs are grouped according to what drives them or causes them to be incurred.
- A Cost Object: It is an item for which cost measurement is required e.g. Product , job or a customer.
- Cost drivers type of Pure Volume, Weighted Volume, Situational, Motivational.
- Cost pool is created for each activity and such activities are related with each type of product to determine the cost of such product.
- Stages in developed ABC system as under:
    - Identify resources
    - Identify activities
    - Identify cost objects
    - Determine resource drivers
    - Determine cost (activity) drivers
    - Assign costs to the cost objects

Target costing is not just a method of costing, but rather a management technique wherein prices are determined by market conditions, taking into account several factors, such as homogeneous products, level of competition, no/low switching costs for the end customer, etc. When these factors come into the picture, management wants to control the costs, as they have little or no control over the selling price.

Target cost is the difference between the competitive market price and required profit. In order to achieve target cost, companies redesign the products, achieve higher productivity and use advanced technology.

3.18 SELF-ASSESSMENT QUESTIONS

1. What is Activity Based Costing? Why is it needed?
2. What is a ‘Cost Driver’? What is the role of cost driver in tracing cost to products?
3. Discuss the steps in applying Activity Based Costing?
4. How are activities grouped in a manufacturing company?
5. Distinguish between traditional costing system and activity based costing.
6. What are the benefits of activity based costing?
7. What is target costing? Explain its objectives
8. Illustrate the process of target costing with suitable market conditions prevailing at present

3.19 KEY TERMS

1. Cost Drivers
2. Cost Allocation
3. Target Costing
4. Absorption Costing

3.20 FURTHER READINGS

1. A text book cost and management accounting by M.N.Arora, 9th edition 2010, Vikas publications.
2. Accounting for managers by Prof. G Prasad, and Prof. V. Chandra sekhara Rao, 8th Edition 2012 Jayabharat Publishers

Dr. David Raju Gollapudi

LESSON 4
COST ASCERTAINMENT AND PRICING OF PRODUCTS AND SERVICES

OBJECTIVES

After studying this Unit, student will be able to:

1. State the meaning and scope of cost accounting.
2. Explain the objectives of cost accounting.
3. Understand how to ascertain the cost for products or services.
4. Explain limitations of cost accounting.
5. Explain the Cost Accounting Systems
6. Ex plain the requirements and limitations to installation of cost accounting systems Explain the methods and techniques of costing

STRUCTURE

4.1 MEANING OF COST ASCERTAINMENT

Cost ascertainment is the process of determining costs on the basis of actual data. Hence, the computation of historical cost is cost ascertainment while the computation of future costs is cost estimation. Both cost estimation and cost ascertainment are interrelated and are of immense use to the management.

If an entrepreneur wants to set up a small business unit, say manufacturing of juice selling business, a problem will arise what price of each box you should quote to the buyer. Many factors are considered while fixing the price of a product/item such as competitors' price etc.

One of the basic factors is the cost of its production. Cost is essential not only to fix price but also to ascertain the margin of profit. Knowledge of the cost determination is also necessary to keep a check on the cost of product/control on wastages, etc. The accounting

used to study the various aspects of cost is known as cost accounting. In this lesson, you will learn about meaning, importance, limitations etc. of cost accounting.

4.2 MEANING OF COSTING

Cost accounting is the process of determining and accumulating the costof product or activity. It is a process of accounting for the incurrence andthe control of cost. It also covers classification, analysis, and interpretationof cost. In other words, it is a system of accounting, which provides theinformation about the ascertainment, and control of costs of products, orservices. It measures the operating efficiency of the enterprise. It is aninternal aspect of the organisation. Cost Accounting is accounting for cost aimed at providing cost data, statement and reports for the purpose of managerial decision making. The Institute of Cost and ManagementAccounting, London defines "Cost accounting is the process of accountingfrom the point at which expenditure is incurred or committed to theestablishment of its ultimate relationship with cost centres and cost units.In the widest usage, it embraces the preparation of statistical data,application of cost control methods and the ascertainment of profitabilityof activities carried out or planned".

Costing includes "the techniques and processes of ascertaining costs." The'Technique' refers to principles which are applied for ascertaining costs of products, jobs, processes and services. The `process' refers to day to dayroutine of determining costs within the method of costing adopted by abusiness enterprise.

Costing involves "the classifying, recording and appropriate allocation of expenditure for the determination of costs of products or services; therelation of these costs to sales value; and the ascertainment of profitability".

4.3 SCOPE OF COST ACCOUNTING

The terms 'costing' and 'cost accounting' are many times usedinterchangeably. However, the scope of cost accounting is broader than thatof costing. Following functional activities are included in the scope of costaccounting:

1. Cost book-keeping:

It involves maintaining complete record of all costsincurred from their incurrence to their charge to departments, productsand services. Such recording is preferably done on the basis of doubleentry system.

2.Cost system:

Systems and procedures are devised for proper accountingfor costs.

3.Cost ascertainment:

Ascertaining cost of products, processes, jobs,services, etc., is the important function of cost accounting. Costascertainment becomes the basis of managerial decision making suchas pricing, planning and control.

4.Cost Analysis:

It involves the process of finding out the causal factorsof actual costs varying from the budgeted costs and fixation of responsibility for cost increases.

5.Cost comparisons:

Cost accounting also includes comparisons betweencost from alternative courses of action such as use of technology forproduction, cost of making different products and activities, and costof same product/ service over a period of time.

6.Cost Control:

Cost accounting is the utilisation of cost information forexercising control. It involves a detailed examination of each cost inthe light of benefit derived from the incurrence of the cost. Thus, wecan state that cost is analysed to know whether the current level of costsis satisfactory in the light of standards set in advance.

7.Cost Reports:

Presentation of cost is the ultimate function of costaccounting. These reports are primarily for use by the management atdifferent levels. Cost Reports form the basis for planning and control, performance appraisal and managerial decision making.

4.4 OBJECTIVES OF COST ACCOUNTING

There is a relationship among information needs of management, costaccounting objectives, and techniques and tools used for analysis in costaccounting. Cost accounting has the following main objectives to serve:

1. Determining selling price,
2. Controlling cost
3. Providing information for decision-making
4. Ascertaining costing profit
5. Facilitating preparation of financial and other statements.

1. Determining selling price

The objective of determining the cost of products is of main importancein cost accounting. The total product cost and cost per unit of productare important in deciding selling price of product. Cost accountingprovides information regarding the cost to make and sell product orservices. Other factors such as the quality of product, the condition of the market, the area of distribution, the quantity which can be suppliedetc., are also to be given consideration by the management beforedeciding the selling price, but the cost of product plays a major role.

2. Controlling cost

Cost accounting helps in attaining aim of controlling cost by usingvarious techniques such as Budgetary Control, Standard costing, andinventory control. Each item of cost [viz. material, labour, and expense]is budgeted at the beginning of the period and actual expenses incurredare compared with the budget. This increases the efficiency of theenterprise.

3. Providing information for decision-making

Cost accounting helps the management in providing information formanagerial decisions for formulating operative policies. These policiesrelate to the following matters:

(i) Determination of cost-volume-profit relationship.
(ii)Make or buy a component
(iii)Shut down or continue operation at a loss
(iv)Continuing with the existing machinery or replacing them by improved and economical machines.

4. Ascertaining costing profit

Cost accounting helps in ascertaining the costing profit or loss of anyactivity on an objective basis by matching cost with the revenue of theactivity.

5. Facilitating preparation of financial and other statements

Cost accounting helps to produce statements at short intervals as the management may require. The financial statements are prepared generally once a year or half year to meet the needs of the management. In orderto operate the business at high efficiency; it is essential for management to have a review of production, sales and operating results. Cost accounting provides daily, weekly or monthly statements of units produced, accumulated cost with analysis. Cost accounting system provides immediate information regarding stock of raw material, semi-finished and finished goods. This helps in preparation of financial statements.

4.5 IMPORTANCE OF COST ACCOUNTING

The limitation of financial accounting has made the management to realize the importance of cost accounting. The importance of cost accounting areas follows:

1. Importance to Management

Cost accounting provides invaluable help to management. It is difficult to indicate where the work of cost accountant ends and managerial control begins. The advantages are as follows:

Helps in ascertainment of cost

Cost accounting helps the management in the ascertainment of cost of process, product, Job, contract, activity, etc., by using different techniques such as Job costing and Process costing.

Aids in Price fixation

By using demand and supply, activities of competitors, market condition to a great extent, also determine the price of product and cost to theproducer does play an important role. The producer can take necessary help from his costing records.

Helps in Cost reduction

Cost can be reduced in the long-run when cost reduction programme and improved methods are tried to reduce costs.

Elimination of wastage

As it is possible to know the cost of product at every stage, it becomes possible to check the forms of waste, such as time and expenses etc.,are in the use of machine equipment and material.

Helps in identifying unprofitable activities

With the help of cost accounting the unprofitable activities are identified, so that the necessary correct action may be taken.

Helps in checking the accuracy of financial account

Cost accounting helps in checking the accuracy of financial account with the help of reconciliation of the profit as per financial accounts with the profit as per cost account.

Helps in fixing selling Prices

It helps the management in fixing selling prices of product by providing detailed cost information.

Helps in Inventory Control

Cost furnishes control which management requires in respect of stock of material, work in progress and finished goods.

Helps in estimate

Costing records provide a reliable basis upon which tender and estimates may be prepared.

2. Importance to Employees

Worker and employees have an interest in which they are employed. An efficient costing system benefits employees through incentives plan intheir enterprise, etc. As a result both the productivity and earning capacity increases.

3. Cost accounting and creditors

Suppliers, investor's financial institution and other money lenders have a stake in the success of the business concern and therefore are benefited by installation of an efficient costing system. They can base their judgment about the profitability and prospects of the enterprise uponthe studies and reports submitted by the cost accountant.

4. Importance to National Economy

An efficient costing system benefits national economy by stepping up the government revenue by achieving higher production. The overall economic developments of a country take place due to efficiency of production.

5. Data Base for operating policy

Cost Accounting offers a thoroughly analysed cost data which forms the basis of formulating policy regarding day to day business, such as:

(a)Whether to make or buy decisions from outside?

(b)Whether to shut down or continue producing and selling at belowcost?

(c)Whether to repair an old plant or to replace it?

4.6 COST ASCERTAINMENT – ELEMENTS OF COST

Cost is referred to ―the amount of expenditure (actual ornotional) incurred on, or attributable to, a given thing. However, an exact definition of the term cost is difficult as its interpretation depends upon the nature of the business, or industry, and the context in which it is used.

For example, the cost of a product can be calculated excluding packaging expenses if the sameare nominal in amount (eg. soap bar) while this treatment of exclusion of cost will not be feasiblein case the nature ofthe product requires heavy packaging cost (eg. perfumes).

Cost can also be considered as monetary valuation of effort, risk involved, opportunity forgonein production and delivery of a good or service and most importantly, resources like time,material and utilities. It is also imperative to remember that all expenses are costs, but not allcosts,especially the ones incurred in acquisition of an income-generating asset, are expenses.

Before proceeding with the elements and components of cost, a basic understanding of costobject and cost driver is necessary.

4.6.1 Cost Object

Cost object may be defined as anything for which a separate measurement of cost is desired. Thefollowing examples will further enhance the understanding:

Cost Object	Example
Product	Laptop
Service	Airfare from Mumbai to Delhi
Project	Construction of Two Storied Building
Department	HR Dept. of a company

4.6.2 Cost driver

Chartered Institute of Management Accountants defines cost driver as ―an activity which generates cost. A cost driver triggers a change in the cost of an activity and is generallyused to assign overhead costs to the number of produced units.

An activity can have more than one cost driver attached to it. For example, a production activity may have a machine, machine operator(s), floor space occupied, power consumed as the associated cost-drivers.

Examples of Cost Drivers

Machine Set-ups; Purchase Orders; Quality Inspections; Production Orders; Shipments; Maintenance Requests; Power Consumed; Kilometers Driven; Projects or Working Hours; Advertisements or Sales Volume; Product Hours

4.6.3 Cost Unit, Cost Centre & Profit Centre

Cost Unit

The Chartered Institute of Management Accountants (CIMA), London, defines a unit of cost as-a unit of quantity of product, service or time in relation to which costs may be ascertained or expressed.

The preparation of cost accounts requires selection of a unit for identification of expenditure. The quantity upon which cost can be conveniently allocated is known as cost unit.

For example: in case of electricity companies cost unit will be per unit of electricity generated and in case of transport companies, it will be per passenger-km. or per tone-km.

Cost Centre

According to the Chartered Institute of Management Accountants, England, cost centre means - a location, person or item of equipment or group of these for which costs may be ascertained and used for the purpose ofcost control. It can be a department or a sub-department or an item ofequipment or machinery or a group of persons.

Profit Centre

A profit center is a business unit or department within an organization that generates revenues and profits or losses. Here, both the inputs and outputs are measured in monetary terms, and accounting for both costs and revenues results in automatic computation of profit with respect tothis centre, termed as profit centre.

4.7 ELEMENTS OF COST

The basic elements of cost can be illustrated as follows:
The broad elements of cost are categorized as Material, Labour and Expenses, which are further classified as direct and indirect. The indirect material, labour and expenses together are termed asoverheads.

A brief explanation of the elements has been given below:

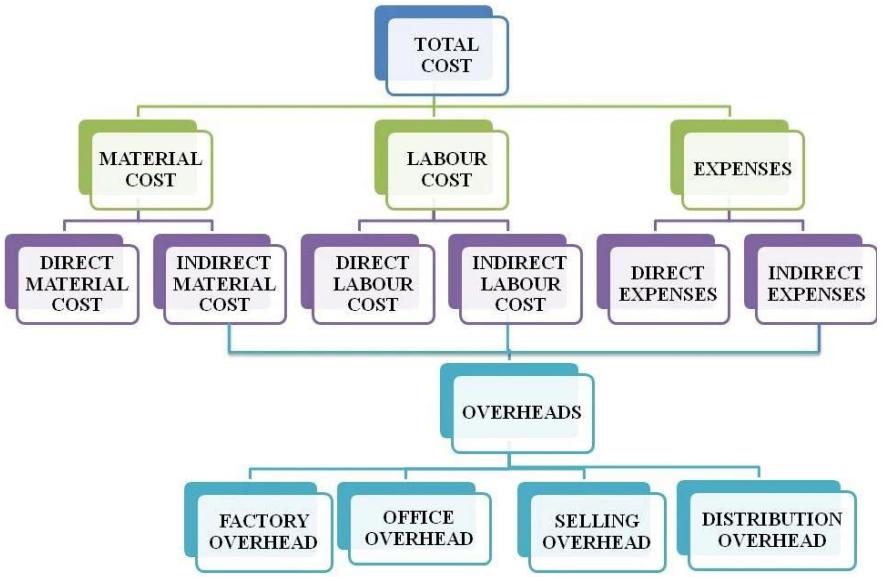
Material: The basic substance used for producing the product is referred to as material. Material can be direct or indirect in nature.

***a. Direct Material*:** The materials which directly contribute to the production of the product andare easily identifiable in the finished product are called direct materials. Cloth in shirt, paper in books, wood in furniture are examples of direct materials.

***b. Indirect Material*:** Other material which is ancillary in the production of any finished productand cannot be conveniently assigned to specific physical units is called indirect material. Forexample, printing in stationery, scissors used in cutting cloth for shirt, nails in shoes or furniture.

Labour: Labour refers to the human effort needed for conversion of materials into finished goods. Labour can be direct or indirect.

***a. Direct Labour*:** Labour which takes an active and direct part in the production of a particular commodity and can be directly co-related to any specific activity of production is termed asdirect labour. Process labour, productive labour, operating labour, manufacturing labour, direct wages etc are used synonymously with direct labour.



***b. Indirect Labour*:** Employees who do not directly take part in the manufacturing process and whose cost cannot be identified with the individual cost centre are included under indirect labour. Such labour does not alter the construction, composition or condition of the product. Salary of foreman, sales men and director are some examples of indirect labour.

Expenses: Costs incurred in the production process but not included under material or labour are generally expenses. They can be direct or indirect.

***a. Direct Expenses*:** These are expenses which can be directly, conveniently and wholly allocated to specific cost centres or cost units. Direct expenses are sometimes also described as - chargeable expenses.

b. Indirect Expenses: All expenses other than direct expenses are indirect in nature.

Overheads

People generally use the terms overheads and indirect expenses synonymously. But, it needs to be understood that – over heads has a wider meaning than the term ―indirect expenses.

Overheads include the cost of indirect material, indirect labour besides indirect expenses.

Indirect expenses may be classified under the following three categories:

***Factory (Manufacturing, works or production) Overheads*:** All expenses incurred in the factory for its smooth functioning including production management expenses are included here. Examples: Rent, rates, insurance, power etc. of factory.

Office and Administrative Overheads: include expenses pertaining to the management and administration of business. Example: Rent of office, lighting, heating, printing, stationery, etc

***Selling and Distribution Overheads*:** These are expenses incurred for marketing of acommodity, for securing orders for the articles, despatching goods sold, and for making efforts to find and retain customers

4.8 METHODS OF COSTING

The fundamental principles of cost ascertainment remain the same but the methods of analysing and presenting theses costs differ from industry to industry. Broadly, there are two main methods used to determine costs viz. Job Cost Method and Process Cost Method. However, the different methods of costing can be further bifurcated and can be explained indetail as follows:

4.8.1 Job Costing

This method is used for tracing specific costs to individual jobs especially where production is not highly repetitive. The cost ascertainment is for specific jobs or orders which are not comparable with each other. Job costing is commonly used in printing press, automobile garage, repair shops, etc.

4.8.2 Contract Costing

Principally, there is no difference between job and contract costing but it is convenient to prepare and maintain separate contract accounts when large scale contracts are carried out at differentsites like in the case of building construction, ship builders, etc. A contract is a big job while ajob is asmall contract.

4.8.3 Cost Plus Costing

In some contracts, an agreed sum or percentage besides – cost‘to cover overheads and profit ispaid tothe contractor. This system of costing is termed as cost plus costing. The system is used generally where Government is the contractee.

4.8.4 Batch Costing

In this method of costing, a batch of similar products is considered as one job and the cost of the complete batch is ascertained. Thereafter, the cost of each unit is determined. Pharmaceutical industries, brick manufacturing companies generally use this method.

4.8.5 Process Costing

If a product passes through different stages, each distinct and well-defined, with the output ofone process becoming the input for the other, it is desirable to know the cost of production at each stage. Process costing is employed to ascertain the same. The system of costing is suitable for the extractive industries, e.g., chemical manufacture, paints, foods, explosives, soap making etc.

4.8.6 Operation Costing

The procedure of operation costing is broadly the same as for process costing except that cost unit is an operation instead of a process. For large undertakings involving a number of operations, it isimportant to compute the cost of each operation. For example, the manufacturing of handles for bicycles will make use of operation costing as it involves many

operations like cutting steelsheets into proper strips, moulding, machining and finally polishing.

4.8.7 Unit Costing (Output Costing or Single Costing)

Under this method of costing, cost of a single product produced by a continuous manufacturing process is computed in addition to amount of each element of cost.The method is suitable in industries such as flour mills, paper mills, cement manufacturing etc.

4.8.8 Operating Costing

Also known as service costing, thismethod is employed to ascertain the cost of services rendered like transport companies, electricity companies, or railway companies. The total expenses regarding operation are divided by the units as may be appropriate (e.g., total number of passenger-kms. in case of bus company) and cost perunit of service is calculated.

4.8.9 Departmental Costing

Departmental Costing aims to ascertain the cost of output of each department of the company separately.

4.8.10 Multiple Costing (Composite Costing)

Application of more than one method of costing for the same product is done under multiple costing. Herein, the costs of different sections of production are combined after finding out thecost ofevery part manufactured. It is applicable where a product comprises of many assembled parts, e.g., motor cars, engines, machine tools, typewriters, radios, cyclesetc.

4.9 TECHNIQUES OF COSTING

In addition to the above stated methods, the following techniques of costing are used by management for the purpose of managerial decision making and controlling costs.

4.9.1 Marginal Costing

Marginal costing has been defined as the accounting system in which variable costs are chargedto cost units and the fixed costs of the period are written-off in full against the aggregate contribution. ‘Fixed overheads are excluded on the ground that in cases where production varies, the inclusion of fixed overheads may give misleading results.

4.9.2 Direct Costing

The practice of charging all direct costs to operation, process or products, excluding all indirect costs to be written off against profits in the period in which they arise, is referred to as directcosting. Direct costing the technique considers some fixed costs as direct costs in appropriate circumstances, thus differentiating it from marginal costing.

4.9.3 Absorption Costing

The Institute of Cost and Management Accountant of India defines absorption costing as – a method of costing by which all direct costs and applicable overheads are charged in products or cost centers for finding out thetotal cost of production. Absorbed cost includes production cost aswell as administrative and other costs Absorption costing does not make any difference between variable and fixed cost in the calculation of profits. It charges all costs, both variable and fixed, to operations, products or processes.

4.9.4 Uniform Costing

Uniform costing refers to a technique of costing wherein standardised principles and methods of cost accounting are employed by a numberof different companies and firms, thus, facilitating inter-firm comparisons, establishment of realistic pricing policies etc.

4.9.5 Activity Based Costing

The Chartered Institute of Management Accountants (CIMA), London, defines it as a technique of ―cost attribution to cost units on the basis of benefits received from indirect activities e.g. ordering, setting up, assuring quality. In other words, it is a method of assigning organizations' resource costs through activities (called cost drivers) to the products and services. It is generally used by a company having products that differ in volume and complexity of production for the purpose of apportionment of overhead costs.

4.10 LIMITATIONS OF COST ACCOUNTING

Like other branches of accounting, cost accounting is not an exact science but is an art which has developed through theories and accounting practices based on reasoning and common sense. These practices are not static but changing with time. Cost accounting lacks a uniform procedure. There isno stereotyped system of cost accounting applicable to all industries. There are widely recognised cost concepts but understood and applied differently by different industries. Cost accounting can be used only by big enterprises.The limitations of cost accounting are as follows:

- It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work.
- The results shown by cost accounts differ from those shown by financial accounts. Preparation of reconciliation statements frequently is necessaryto verify their accuracy. This leads to unnecessary increase in workload.
- It is unnecessary because it involves duplication of work. Some industrial units are functioning efficiently without any costing system.
- Costing system itself does not control costs. If the management is alert and efficient, it can control cost without the help of the cost accounting.Therefore it is unnecessary.

4.11 SUMMARY OF THE LESSON

Cost accounting facilitates overcoming drawbacks of financial accounting like cost ascertainment, tracing costs to individual products, cost reduction, cost control, etc.Although, the terms costing, cost accounting and cost accountancy are generally used inter changeably but they differ from each other.Cost accounting

Cost accounting and financial accounting are different from each other on the basis of their meaning, objective, information recorded, type of cost recorded, mode of presentation, time period of Reporting, users, basis of valuation of stock and such other reasons.

Cost accounting, being voluntary with no specific uniform systems of cost accounting applicable to all industries, makes comparisons difficult due to difference in understanding and application of concepts, methods and techniques of cost accounting by different industries.

Elements of cost include cost of material, labour and expenses. Overheads are different from indirect expenses as the term includes indirect material and indirect labour in addition to indirect expenses.There are two main methods of determination of costs, Job costing and process costing.

4.12 KEY TERMS

Cost
Costing
Cost Reduction
Cost Control
Cost Audit
Cost object
Cost driver
Cost unit
Cost centre
Profit center
Direct Material
Direct Labour
Cost Sheet

4.13 SELF-ASSESSMENT QUESTIONS

Fill in the blanks with correct word/words.

1. ..... Process of accounting for the incurrence of cost and the control of cost.
2. The objective of determining the..... of products is of main importance in cost accounting.
3. Cost accounting provides information regarding the cost to make and .....product or services.
4. Cost accounting helps the management in providing information for..... decisions for formulating operative policies.
5. A ..... system provides immediate information regarding stock of raw material, semi-finished and finished goods
6. State the meaning and scope of cost accounting.
7. Explain the objectives of cost accounting.
8. Differentiate between cost accounting and financial accounting
9. What is the importance of cost accounting in a production unit?
10. Define costing, cost accounting and cost accountancy.
11. Write a short note on objectives of cost accounting.
12. What is a cost unit and a cost centre.
13. How is a cost centre different from profit centre?

14. Differentiate between product cost and period cost.
15. Enumerate the different basis for classifying costs.
16. Write a short note on the elements of cost.
17. What are the different systems of costing?
18. Briefly explain the techniques of costing.

4.14 FURTHER READING

1. Cost Accounting - Theory and Practice by Banerjee Bhabatosh, 12th Edition, Prentice-Hall India
2. A text book cost and management accounting by M.N.Arora, 9th edition 2010, Vikas publications.
3. Accounting for managers by Prof. G Prasd, and Prof. V. Chandra sekhara Rao, 8th Edition 2012 Jayabharat Publishers

Dr. David Raju Gollapudi

LESSON 5
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

5.1 INTRODUCTION

Marginal Costing is a useful technique which guides management in pricing, decision making and assessment of profitability. It classifies costs into fixed and variable ones. The expenses which vary directly in proportion to the volume of production are termed as 'variable expenses'. The expenses which remain constant or unaffected by the change in output are called 'fixed expenses'. This distinction forms the basis of marginal costing.

Profit is influenced by the changes in fixed expenses and these expenses will remain static and do not affect decision–making. Moreover 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.

5.1.1 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.

IIIu.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 x Rs.5)	1,000
Fixed cost	5,000
Total cost	6,000

If production is increased by one plastic can, the cost sheet of 201can would be:

	Rs.
Variable Cost(201 x 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 over heads. 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 (atRs.4.50), the fixed cost per unit decreases from Rs.2 to Rs.0.40. Marginal cost has been calculated thus:

Marginal Cost = Direct Material Cost + Direct Labour Cost +
Direct expenses + Variable overheads

OR

Marginal Cost=Total Cost–Fixed Cost

5.2 MARGINAL COSTING

Marginal Costing is a technique where only the variable costs are taken into account while calculating the cost of product. The fixed costs are met against the total fund arising out of excess of selling price over total variable cost. This fund is called **Contribution.** Let us now 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 over head 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.

5.2.1 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.

5.3 ABSORPTION COSTING AND MARGINAL COSTING

Absorption Costing technique is also known as Traditional or Full Cost Method. In this method, both fixed and variable costs are recovered from production. The variable costs, such as those of direct materials, direct labour etc., are directly charged to the products, while fixed costs are apportioned on a suitable basis over various products manufactured during a period. All costs are, thus, identified with manufactured products.

Illu.3: A Company is manufacturing 3 products A, B and C. The costs of their manufacture are as follows:

	A Rs.	B Rs.	C Rs.
Direct material pre Unit	**3**	**4**	**5**
Direct labour	**2**	**3**	**4**
Selling price	**10**	**15**	**20**
Output (Units)	**1,000**	**1,000**	**1,000**

The total overheads are Rs.12,000 out of which Rs.9,000 are fixed and rest are variable. It is decided to apportion these costs over different products in the ratio of output. You are required to prepare:

(a) A statement showing cost of each product and profit according to absorption costing and

(b) A statement of cost and profit according to the Marginal costing technique.

Solution: (A)

Statement Showing Cost and Profit
(According to Absorption Costing Technique)

Particulars	A=1,000		B=1,000		C=1,000	
	Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Direct Material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Prime Cost	5	5,000	7	7,000	9	9,000
Add: Overheads:						
Fixed	3	3,000	3	3,000	3	3,000
Variable	1	1,000	1	1,000	1	1,000
Total Cost	9	9,000	11	11,000	13	13,000
Profit	1	1,000	4	4,000	7	7,000
Sales	10	10,000	15	15,000	20	20,000

Total Profit=Rs.1,000+Rs.4,000+Rs.7,000=Rs.12,000

The system of absorption costing has a number of limitations. It assumes that prices are simply a function of costs. The demand side of the product is 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 x 6+10,000) would beRs.3,400 and cost per unit would increases not because prices of materials or labour have gone up, but because lower level of production. Obviously, the whole exercise seems to be illogical. The technique of marginal costing is employed to overcome this deficiency, by charging, fixed costs against the total fund arising out of excess of selling price over variable cost.

(b)Marginal Cost Statement

Particulars		A=1,000		B=1,000		C=1,000	
		Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Sales	(S)	10	10,000	15	15,000	20	20,000
Less: Marginal Cost:							
Direct Material		3	3,000	4	4,000	5	5,000
Direct Labour		2	2,000	3	3,000	4	4,000
Prime Cost		5	5,000	7	7,000	9	9,000
Variable Overheads		1	1,000	1	1,000	1	1,000
Total Marginal Cost	(V)	6	6,000	8	8,000	10	10,000
Contribution (S-V)	(C)	4	4,000	7	7,000	10	10,000
Selling Price		10	10,000	15	15,000	20	20,000

Thus, the total contribution from the three products, A, B and C is Rs.21,000.The profit will now be computed as follows:

	Rs.
Total Contribution	21,000
Fixed costs	9,000
Profit	12,000

5.3.3 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 over heads are charged to production, there by leading to under-recovery of overheads.

This obviously leads to undervaluation of closing stock. But this does not result in carrying over of fixed overheads of one period to another, as it happens in absorption costing. The main points of difference between absorption costing and marginal costing are given below:

Differences between Marginal and Absorption Costing

Basis of Difference	**Absorption Costing**	**Marginal Costing**
1.FixedCosts	Fixed overheads are Charged to the product to Be subsequently released As a part of cost of goods Sold i.e., it is included in Cost per unit.	Fixed costs are not Included while computing Cost per unit.

Basis of Difference	Absorption Costing	Marginal Costing
2.Profit	Profit is the difference between sales and cost of goods sold.	Profit in marginal costing is ascertained by establishing the total contribution and then deducting there from the total fixed expenses. Contribution is the excess of sales over variable cost.
3.ClassificationofCosts	Costs are rarely classified into variable and fixed. Although such a classification is possible, it fails to establish a cost– Volume profit relationship.	Cost – Volume – Profit relationship is an essential part of marginal costing. Costs have to be classified into fixed costs And variable costs.
4. Valuation of Inventories	If inventories increase during a period, this method will reveal more profit than marginal costing. When inventories decrease, less profits are reported because in this method closing stock is Valued at higher figures.	If inventories increase during a period, this method generally reports less income than absorption costing, but when inventories decrease this method reports more net income.
5. Recovery of Over heads	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.

5.3.4 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

5.3.5 Marginal Cost Equation:

ThealgebraicexpressionofcontributionisknownasMarginalCostEquation.Itcanbe expressed as follows:

$$S - V = F + P$$

Where

S = Selling Price
V=Variable Cost F = Fixed Cost
P=Profit

IIIu.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
Rs.22,50,000 – Rs.15,00,000 = 5,00,000 + P
Rs.7,50,000 – 5,00,000 = P
Rs.2,50,000=P
P=Rs.2,50,000

5.4. BENEFITS OF MARGINAL COSTING

The technique of marginal costing is of immense use to the management in taking various decisions. It helps the management in taking the following decisions:

1. **Helps in determining level of output:** Marginal costing helps in finding out the output which is most profitable for running a concern. This, in turn, helps in utilising plant capacity in full, and realize maximum profits. By determining the most profitable relationships between cost, price and volume, marginal costing helps a business to determine most competitive prices for its product.

2. **Help in selection of most suitable product mix:** By applying marginal costing techniques, the most suitable production line could be determined.

The profitability of various products can be compared and the most products which languish behind and which do not seem to be feasible (in view of their inability to recover marginal cost) may be eliminated from the production line by keeping the capacity and resources constrains in mind. It will also serve as a guide in arriving at the price for new products.

3. **Helps in determining Make or Buy decisions:** The marginal cost of producing an article inside the factory serves as a useful guide while arriving at make or buy decisions. The costs of manufacturing can be compared with the costs of buying outside and a suitable decision can be arrived at easily.

4. **Helps in the selection of method of production – Manual or Machine Based:** In case a particular product can be produced by two or more methods, as curtaining 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.

5.5 LIMITATIONS OF MARGINAL COSTING

Marginal costing has the following limitations:

1. **Difficulty in Classifications:** In marginal costing, costs are segregated into fixed and variable. In actual practice, this classification scheme proves to be super fluous in that certain costs maybe 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 maybe 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.

5.6 QUESTIONS

I. Short Questions:

1. Defined the term ‘marginal costing’.
2. How can the cost be classified on the basis of variability?
3. What is contribution?

II. Essay type questions:

1. Explain the advantages and disadvantages of marginal costing.
2. Discuss the applications of the marginal costing technique.
3. DefineMarginalCosting.ExplainheadvantagesandlimitationsofMarginalCosting.
4. DefineMarginalCosting.ExplainthedifferencesbetweenMarginalCostingand absorption costing.

5. What is marginal costing? Explain the advantages and disadvantages of marginal costing.

5.7 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(4,000units@Rs.25each)	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 11,000units 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.
Sales4,000unitsatRs.25each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold:(a)14,000 units; Extra units to be sold:14,000 4,000 = 10,000 units]

6. On the basis of the following data prepare a Marginal cost statement:

Variable Cost	Rs.	Rs.
Direct Material	4,500	
Direct Wages	2,500	
Factory overhead	1,050	
Administration, selling and distribution overhead	1,600	9,650
Fixed Cost		
Factory overhead	400	
Administration, selling and distribution overhead	670	1,070
Total Cost		10,720
Profit		4,280
Sales		15,000

[Ans.: Profit Rs.4,280]

7. Takur Ltd., produces 1 standard type of article. The results oflast4 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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LESSON 6

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:

6.1 BREAK-EVENANALYSIS

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. Breakeven point is a point of no profit or no loss. At this point contribution is just sufficient to recover the fixed costs. Breakeven point can be calculated in units or sales. It can be calculated with the help of any of the following formulae.

1. $$\text{B.E.P. (in Units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$= \frac{\text{Fixed cost}}{\text{Selling price per unit - Variable cost per unit}}$$

2. $$\text{B.E.P. (Sales)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} \times \text{Selling price per unit}$$

3. $$\frac{\text{Fixed cost}}{\text{Total contribution}} \times \text{Total sales (Or)} \quad \frac{F \times S}{S - V}$$

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.

Illu.1: From the following particulars calculate the Break-even point in terms of both quantity and value:

Production in units	**10,000**
Sales price	**Rs.5.00perunit**
Variable costs	**Rs.20,000**
Fixed costs	**Rs.12,000**

Solution: Calculation of Break-even Point

Break-even Point (in terms of quantity):

$$= \frac{\text{Fixed Expenses}}{\text{Selling Price pr unit - Variable Cost Per Unit}} = \frac{Rs.12,000}{5.00-2.00} = 4,000 \text{ Units.}$$

Break-even Point in quantity = 4,000 Units

Break-even Point in Value = Break-even Point in Quantity × Selling price per unit

= 4,000 Units × Rs.5.00 = Rs.20,000.

Note: Variable Cost per unit = $\frac{Rs.20,000}{10,000 \text{ units}}$ = Rs.2.00

6.2 PROFIT/VOLUME RATIO

The profitability of business operations could be found outby 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.

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \text{ or } \frac{\text{Sales - Variable Costs}}{\text{Sales}}$$

$$= \frac{C}{S} \text{ or } \frac{S-V}{S} \text{ or } \frac{F+P}{S}$$

$$= 1-\frac{\text{Variable Costs}}{\text{Sales}}$$

The ratio can also be shown by comparing the change in contribution to change in sales, or change in profit to change in sales. Any increase in contribution, obviously,

would mean increase in profit, as fixed expenses are assumed to be constant at all levels of production.

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

The importance of P/V Ratio lies in its use for evaluating the profitability of alternative products or proposals. A higher ratio shows grater profitability. Management should, there force, 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.

IIIu.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

$$\text{P/V. Ratio} = \frac{\text{Sales - Margin Cost}}{\text{Sales}} \times 100$$

$$= \frac{20-12}{20} \times 100 = 40\%$$

P/V. Ratio = 40%

(ii) Sales Required to Break-even: $\frac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \frac{8,000}{40\%} = 8,000 \times \frac{100}{40} = \text{Rs.}20,000$

Sales Required to Break-even = Rs.20,000.

Illu.3: Calculate margin of safety and the amount of actual sales from the following:

		Rs.
(i)	**Profit**	**10,000**
(ii)	**PV Ratio**	**50%**
(iii)	**BEP Sales**	**20,000**

Solution:

(i) Calculation of Margin of safety and the amount of actual Sales:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{10,000}{50\%} = 10,000 \times \frac{100}{50} = \text{Rs.}20,000$$

Margin of Safety = Rs.20,000

(ii) The amount of actual sales:

Margin of Safety	=	Actual Sales – Break-even-Point sales
Rs.20,000	=	Actual Sales – Rs.20,000
Actual Sales	=	Rs.20,000 + 20,000
Actual Sales	=	Rs.40,000

Illu.4: The following figures relating to Sales and profits of a company are of two periods.

	Sales (Rs.)	Profit(Rs.)
Year ending 31-12-2001	**1,00,000**	**15,000**
Year ending 31-12-2002	**1,20,000**	**23,000**

Calculate (a) P.V. ratio (b) Fixed cost, (c) Break-even point.

i. $\text{P.V. Ratio} = \frac{\text{Change in profit}}{\text{Change in Sales}} \times 100$

$$= \frac{8,000}{20,000} \times 40\%$$

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 = Rs.25,000

iii. $\text{BEP Sales} = \frac{F}{P.V.Ratio} = \frac{25,000}{40\%} = \frac{25,000 \times 100}{40} = \text{Rs.}62,500$

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 = Rs.25,000

S(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 × $\frac{100}{40}$ = Rs.1,12,500

6.3 MARGIN OF SAFETY

Total sales minus the sales at breakeven point is known as the margin of safety. Lower break–even point means a higher margin of safety. Margin of safety can also be expressed as a percentage of total sales. The formula is:

Margin of Safety = Total Sales–Sales at BEP

Or

$$\frac{\text{Profit}}{\text{P/V ratio}}$$

$$\text{Margin of Safety (as a percentage)} = \frac{\text{Margin of safety}}{\text{Total sales}} \times 100$$

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.
Total Sales	**3,60,000**
Selling price per unit	**100**
Variable Cost per unit	**50**
Fixed Costs	**1,00,000**

(d) If selling prices is reduced to Rs.90, by how much is the margin of safety is reduced?

Solution:

(a) Calculation of Break-even-point:

$$\text{Break-even point} = \frac{\text{Fixed Costs}}{\text{Selling price per unit - Variable cost per unit}}$$

$$\text{Break-even-Point} = \frac{1,00,000}{100 - 50} = \frac{1,00,000}{50} = 2,000 \text{ units}$$

Break even Sales = 2,000 units @ Rs.100 per unit

= Rs.2,00,000

(b) P.V. Ratio = $\frac{S-V}{S} \times 100$

= $\frac{3,60,000 - (3,600 \times 50)}{3,60,000} \times 100$

= $\frac{1,80,000}{3,60,000} \times 100$

P.V. Ratio = 50%

(c) Margin of Safety = Actual Sales – Break even sales

= Rs.3,60,000 – 2,00,000 = Rs.1,60,000

(d) If Selling price is reduced to Rs.90, the Margin of safety is reduced by:

Margin of Safety = Actual Sales – Break even sales

= Rs.3,60,000 – (2,500 Units × 90)

= Rs.3,60,000 – 2,25,000 = Rs.1,35,000

Illu.6: A manufacture has supplied the following information relating to one of his product.

Total variable costs	**Rs.30,000**
Total sales	**Rs.60,000**
Units sold	**20,000**
Total Fixed Costs	**Rs.18,000**

Calculate:

a. **Contribution per unit**
b. **Break-even point**
c. **Margin of Safety**
d. **Profit**
e. **Volume of sales to earn a profit of Rs.24,000**

Solution:

a. **Contribution = S-V; C = 60,000 – 30,000 = Rs.30,000**

Contribution per unit = $\frac{30,000}{20,000 \text{ units}}$ = 1.50 p.

b. **BEP Sales** = $\frac{F \times S}{S - V}$; $\frac{18,000 \times 60,000}{60,000 - 30,000}$ = **Rs.36,000**

c. **Margin of Safety =** Actual Sales – BEP Sales.

= 60,000 – 36,000 = Rs.24,000

d. **Profit = S-V = F+P; 60,000 – 30,000 = 18,000+P;**

= 30,000 = 18,000 + P; 30,000 – 18,000 =P.

= 12,000 = P; P = Rs.12,000

e. Volume of Sales to earn a profit of Rs.24,000

$$\text{P.V. Ratio} = \frac{C}{S}\times 100; \frac{30,000}{60,000}\times 100 = 50\%.$$

$$S\left(\frac{50}{100}\right) = 18,000 + 24,000$$

$$S\left(\frac{50}{100}\right) = 42,000;\ S = 42,000 \times \frac{100}{50} = \text{Rs.}84,000$$

$$\text{Units} = \frac{\text{Sales Amount}}{\text{Selling Price}} = \frac{84,000}{\text{Rs.}3} = 28,000 \text{ units.}$$

IIIu.7: In 2006, Srikanth Ltd., sold its products worth Rs.40 lakhs and made a profit of Rs.4 lakhs. But in 2002, the sales dipped to Rs.30 lakhs due to competition in the market and the profit is reduced to 3 lakhs. Calculate Break – even points and profit volume rations in 2006 and 2007.

Solution:

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

Change in Profit = Rs.1,00,000
Change in Sales = Rs.10,00,000

$$\text{P.V. Ratio} = \frac{1,00,000}{10,00,000}\times 100 = 10\%$$

Fixed Expenses: Sales (P/V ratio) = F + P

2001: When profit and sales of 2001 are taken:

$$40,00,000 \times \frac{10}{100} = F + 4,00,000$$

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(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) Breakeven point (c) Sales required to earn a profit of Rs.5 lakhs (d) Profit when sales are Rs.50 lakhs, and (e) Margin of safety at a profit of Rs.2.5 lakhs.

Solution:

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

$= \frac{2,00,000}{10,00,000} \times 100 = 20\%$

Fixed Expenses = S × P.V. Ratio = F + P

Rs.20,00,000 × 20% = F + Rs.2,00,000

Rs.4,00,000 = F + Rs.2,00,000

Rs.4,00,000 – Rs.2,00,000 = F

F = Rs.2,00,000

b. $\text{Break-even Point} = \frac{F}{\text{P.V. Ratio}}$

$= \frac{2,00,000}{20\%} = \text{Rs.}10,00,000$

c. Sales (P/V Ratio) = F + P

$S \times \frac{20}{100} = \text{Rs.}2,00,000 + \text{Rs.}5,00,000$

$S \times \frac{20}{100} = \text{Rs.}7,00,000$

$S = \text{Rs.}7,00,000 \times \frac{100}{20} = \text{Rs.}35,00,000$

d. Sales × P.V. Ratio = F + P

$S \times \frac{20}{100} = \text{Rs.}2,00,000 + P$

$\text{Rs.}50,00,000 \times \frac{20}{100} = \text{Rs.}2,00,000 + P$

Rs.10,00,000 = Rs.2,00,000 + P

Rs.10,00,000 – Rs.2,00,000 = P

P = 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.
Sales	**1,80,000**
Less: Variable Costs	**1,44,000**
Contribution	**36,000**
Less: Fixed costs	**24,000**
Net Profit	**12,000**

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

Solution:

(a) **P.V. Ratio** = $\frac{C}{S} \times 100 = \frac{36,000}{1,80,000} \times 100 = 20\%$

(b) **B.E.P** = $\frac{F}{\text{P.V. Ratio}} = \frac{24,000}{20\%} = \frac{24,000}{20} \times 100 = 1,20,000$

(c) **S × P/V Ratio = F + P**

$\text{Rs.}2,70,000 \times \frac{20}{100} = \text{Rs.}24,000 + P$

Rs.54,000 = Rs.24,000 + P

Rs.54,000 = Rs.24,000 + P

P = Rs.30,000

(d) **S × 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.
Materials	**60**
Labour	**20**
Variable Over head	**20**
	100
Fixed Over heads	**50**
Profit	**50**
Selling Price	**200**

This is based on the manufacture of one lakh cycles per annum.

The company excepts that due to competition they will have to reduce selling prices, but they want to keep the total profits intact. What level of production will have to be reduced i.e., how many cycles will have to be made to get the same amount of profit if:

a. **TheSellingpriceisreducedby10%**

b. **The selling price is reduced by 20%**

Solution:

(a)

If Selling price is reduced by 10%	**Rs.**
Selling Price	200
Less: Price	20
Present Selling Price	180

V = 100 (60+20+20); P = 50;

P.V. Ratio = $\frac{C}{S} \times 100 = \frac{80}{180} \times 100 = 44.44\%$

Sales to get the same level of profit Rs.50,00,000.

S (P.V. Ratio) = E + P

$S(\frac{44.44}{100})$ = 50,00,000 + 50,00,000

$S(\frac{44.44}{100})$ = 1,00,00,000

$S = 1,00,00,000 \times \frac{100}{44.44} = 22502250$

Selling Units = $\frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{22502250}{180}$ = 1,25,013 units

If Selling Price is reduced by 20%	**Rs.**
Selling Price	200
Less: 20% reduction	40
Present Selling Price	160

V = Rs.100; P = Rs.50;

P.V. Ratio = $\frac{C}{S} \times 100 = \frac{60}{160} \times 100 = 37.5\%$

Sales to get the same level of profit Rs.50,00,000.

S(P.V.Ratio) = E + P

$S(\frac{37.5}{100})$ = Rs.50,00,000 + 50,00,000

$S(\frac{37.5}{100})$ = Rs.1,00,00,000

$S = 1,00,00,000 \times \frac{100}{37.5} = 26666666$

Selling Units = $\frac{\text{Sales Amount}}{\text{Selling Price Per unit}} = \frac{26666666}{160}$ = 1,66,667 units.

Ilu.11: Find P/V Ratio and Margin of Safety –when sales, variable cost, fixed costs are Rs. Ten lakhs, Four lakhs, Four lakhs respectively.

Solution:

(i) P.V. Ratio $= \frac{S-V}{S}\times 100$

$= \frac{10\text{ lakhs} - 4\text{ lakhs}}{10\text{ lakhs}}\times 100$

$= \frac{10-4}{10}\times 100 = \frac{6}{10}\times 100 = 60\%$

P.V. Ratio = 60%

(ii) Margin of Safety $= \frac{\text{Profit}}{\text{P.V. Ration}} = \frac{?}{60\%}$

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 $= \frac{2\text{ Lakhs}}{60\%} =$ **Rs.3,33,333.33**

Illu.12: Fixed expenses Rs.1,50,000 percentage of variable expenses on sales is 66 2/3 %. Normal sales at 100% capacity is Rs.9,00,000. Calculate,

a. P/V Ratio

b. Breakeven point at what percentage of sales

c. Profitat80% of sales capacity.

Solution:

a. P/V 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. B.E. 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:

Profit = Contribution – Fixed Expenses

= (Sales – Variable cost) – Fixed Expenses

= (Rs.7,20,000 – Rs.4,80,000) – Rs.1,50,000 = Rs.90,000

Note: Sales = $9,00,000 \times \frac{80}{100}$ = Rs.7,20,000; Variable Costs = $7,20,000 \times \frac{2}{3}$ = Rs.4,80,000

Illu.13: Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 1996:

	Rs.
Fixed expenses	**45,000**
Sales value	**1,50,000**
Profit	**30,000**

During the second half of the year, the company has projected a loss of Rs.10,000.

Calculate:

(a) The Break-even point and Margin of safety for six months ending 30th June 1996.

(b) Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.

(c) The Break –even point and Margin of safety for the whole year 1996.

Solution:

(a)	P.V. Ratio	=	$\frac{\text{Fixed Expenses} + \text{Profit}}{\text{Sales}} \times 100$
		=	$\frac{\text{Rs.45,000} + \text{Rs.30,000}}{\text{1,50,000}} \times 100 = 50\%$
	Break-Even Point	=	$\frac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \frac{Rs.45,000}{50\%} = Rs.90,000$
	Margin of Safety	=	Actual Sales – Break-Even sales Rs.1,50,000 – Rs.90,000 = Rs.60,000
	Alternatively		
	Margin of Safety	=	$\frac{\text{Profit}}{\text{P.V. Ratio}}$
		=	$\frac{\text{Rs.30,000}}{50\%} = \text{Rs.60,000}$

(b) Expected Sales volume for second half year:

	Expected Sales Volume	=	$\frac{\text{Contribution}}{\text{P.V. Ratio}} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{P.V. Ratio}}$ or
		=	$\frac{\text{Fixed Cost - Loss}}{\text{P.V. Ratio}} = \frac{Rs.45,000 - 10,000}{50\%}$
		=	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:

Margin of Safety = Actual Sales–Break Even Sales

= (Rs.1,50,000+70,000)Rs.1,80,000=Rs.40,000

Illu.14: The following figures relate to a company manufacturing a varied range of products.

	Total Sales Rs.	Total Cost Rs.
Year ended 31st March, 2001	**22,23,000**	**19,83,600**
Year ended 31st March, 2002	**24,51,000**	**21,43,200**

Assuming stability in prices, with variable costs carefully controlled to reflect predetermined relationships, and an unvarying figure for fixed costs, calculate:

a. The profit / volume ratio, to reflect the rates of growth for profit and sales; and

b. Any other cost figures to be deduced from the data.

Solution:

	Sales Rs.	Cost Rs.
2001	22,23,000	19,83,600
2002	24,51,000	21,43,200
Difference	2,28,000	1,59,600

Variable cost (% of sales) = $\frac{1,59,600}{2,28,000} \times 100 = 70\%$

(or in other words, variable cost is 70 paise per Re.1.00 of sales

Variable cost for the year 2001 = $22,23,000 \times \frac{70}{100}$ = Rs.15,56,100

Variable cost for the year 2002 = $24,51,000 \times \frac{70}{100}$ = Rs.17,15,700

a. P/V ratio = $\left(\frac{S-V}{S}\right) \times 100$

$2001 = \frac{6,66,900}{22,23,000} \times 100 = 30\%$

$2002 = \frac{7,35,300}{24,51,000} \times 100 = 30\%$

b. Other cost figures:

i) Fixed Cost (Total Cost – Variable cost):

2001 = Rs.19,83,600 – 15,56,100 = Rs.4,27,500

2002 = Rs.21,43,200 – 17,15,700 = Rs.4,27,500

ii) Fixed cost % of sales:

$2001 = \frac{4,27,500}{22,23,000} \times 100 = 19\%$ (approx.)

$2002 = \frac{4,27,500}{24,51,000} \times 100 = 17\%$ (approx.)

iii) Break-even point = $\frac{F}{P.V.Ratio}$ = Rs. $\frac{4,27,500}{30\%}$ = Rs.14,25,000

iv) Margin of safety:
2001 = 22,23,000 – 14,25,000 = Rs.7,98,000
2002 = 24,51,000 – 14,25,000 = Rs.10,26,000

Illu.15: From the following data calculate:

i) P/V ratio
ii) Profit when sale are Rs.20,000
iii) New Break-even point if selling price is reduced by 20%. Fixed expenses Rs.4,000
Break-even point Rs.10,000

Solution:

i. Break-even sales = $\frac{\text{Fixed expenses}}{\text{P/V Ratio}}$

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)

New P/V Ratio = $\frac{80-60}{80}$ = 25%

Break-even point will be = $\frac{4,000}{25\%}$ = Rs.16,000

6.4 BREAK-EVEN CHART

The breakeven point can also be shown graphically through the break even chart. The break even chart shows the profitability or otherwise of an under taking 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 breakeven 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

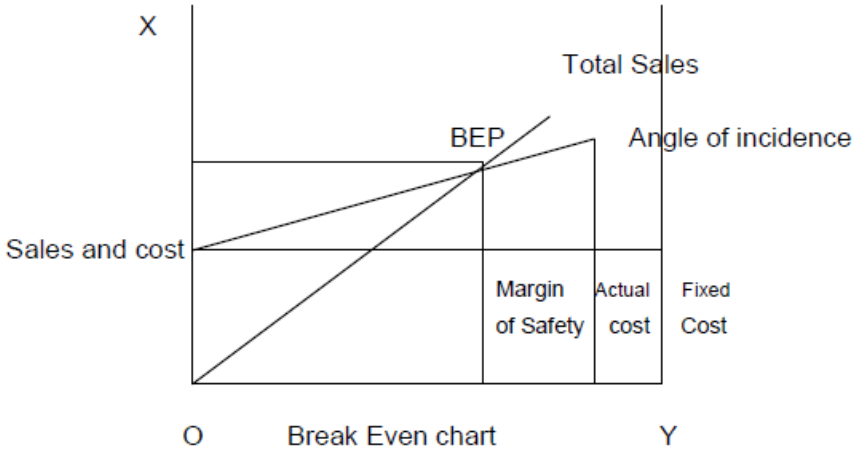
6.4.1 Preparation of break–even Charts:

These charts are shown on the graph paper by drawing lines at the point which are to be plotted. The sales in units are depicted on the horizontal line i.e., X-X' and costs and revenue on the vertical line i.e., Y-Y'. Both are expressed in monetary values.

First of all a line is drawn parallel to X-axis showing the fixed costs. Then the total cost line is drawn and inserted upon the fixe cost line. There after the sales line is drawn diagonally touching the zero at the orgin point and the highest point on the vertical scale. The point at which this sales line interests the total cost line, is the breakeven 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.

6.4.2 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.
Fixed costs(Total)	**40,000**
Variable costs(per unit)	**2**
Selling price(pe runit)	**3**

Solution:

Contribution = Selling price – Variable cost per unit

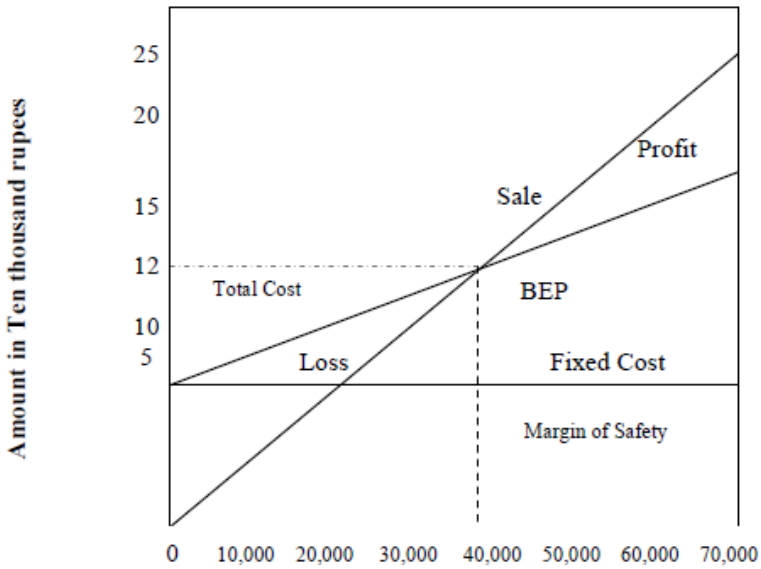
Rs.3 – 2 = Rs.1

$$BEP = \frac{\text{Fixed costs}}{\text{Contribution}} = \frac{40,000}{1} = 40,000 \text{ units.}$$

40,000 units x selling price per unit i.e., Rs.3 = Rs.1,20,000 when output is 40,000 units.

Total cost and Total sales will be Rs.1,20,000.

In the graph given below the horizontal scale OX shows volume of production expressed in units. The vertical scale OY shows sales and cost in Rs.10,000. In the chart three lines are drawn. The first line shows fixed cost which is parallel to the base scale and has not relation with the output.



Output in Units

The sales line (total sales) is drawn from the point where there are no sales (zero intersection of horizontal and vertical scales).

The total cost line (variable costs + fixed costs) is drawn from the point of fixed costs. The total costs and total sales lines intersect each other at point "P" which is a B.E.P. from

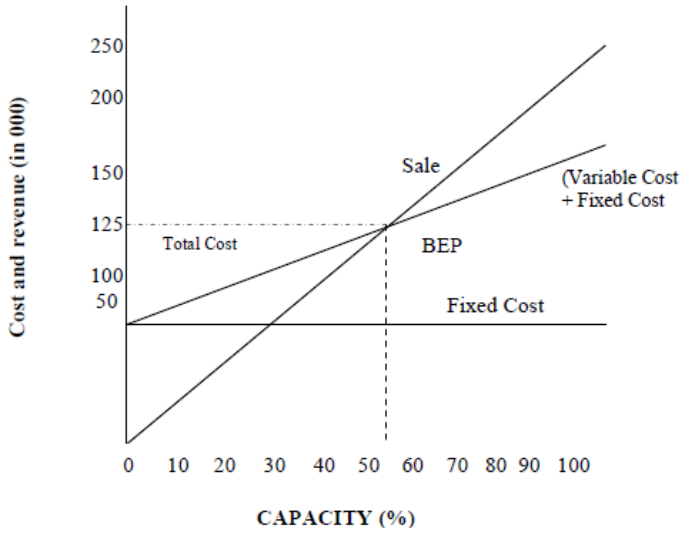
this point perpendicular is drawn which touches output at R (40,000 units) and Revenue at Q (Rs.1,20,000). If the output is below 40,000 units there will be a loss. If output exceeds 40,000 units there will be a profit. Output in excess of 40,000 units i.e., RX shows margin of safety.

Illu.17:The following figures relate to one year's working at 100% capacity level in a manufacturing business.

	Rs.
Fixed Over heads	**30,000**
Variable Overheads	**50,000**
Direct Wages	**40,000**
Direct Materials	**1,00,000**
Sales	**2,50,000**

Represent that above figures on a break-even chart and determine from the chart the break-even point. Verify your result by calculations.

Solution:



Verification:

$$BEP = \frac{F}{P/V\ Ratio}$$

F = Rs.30,000

$$P/V\ Ratio = \frac{C}{S} = \frac{S-V}{S} = \frac{2,50,000-1,90,000}{2,50,000}$$

$$= \frac{60,000}{2,50,000} = \frac{6}{25}$$

$$BEP\ Sales = \frac{30,000}{6} \times 25 = Rs.1,25,000$$

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:

$$\text{Cash Break-even Point} = \frac{\text{Cash Fixed Costs}}{\text{Cash contribution per unit}}$$

6.4.3 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 indirect 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.

6.5. ADVANTAGES OF BREAK EVEN ANALYSIS

The break even analysis is a simple tool employed to graphically represent accounting data. The data revealed by financial statements and reports are difficult to understand and 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 outbreak even output or sales;
3. Understanding the cost, volume, profit relationship;
4. Making inter-firm comparisons;
5. Fore casting 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.

6.6. LIMITATIONSOFBREAKEVENANALYSIS

On the negative side, break even analysis suffers from the following limitations.

1. **Difficulty in segregation of Costs:** It is very difficult, if not impossible, to segregate costs into fixed and variable components. Further, fixed costs to not always remain constant. They have a tendency to rise to some extent after production reaches certain level. Likewise, 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 breakeven 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)**
ThesellingpriceisRs.20per 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 varibale cost	15.00	1,87,500	14.50	3,26,250
c)	Contribution(S-V) **Or(a-b)**	4.40	55,000	4.50	1,01,250
	Less: Fixed cost		30,000		30,000
	Net profit		25,000		71,250
	Break-even point at		50%		90%
	$\text{Units} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$		$\frac{30,000}{4.40}$ = 6,818 units		$\frac{30,000}{4.50}$ = 6,667 units
	Sales value		Rs.1,32,269		Rs.1,26,673

Illu.19:From the following data calculate:

i) **P/V ratio**
ii) **Profit when sales are Rs.20,000**
iii) **New Break – even point if selling price is reduced by 20%.**

Fixed expenses **Rs.4,000**

Break-even point **Rs.10,000**

Solution:

i. **Break-even sales** = $\frac{\text{Fixed expenses}}{\text{P/V Ratio}}$

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

Profit = Sales × P/V ratio – Fixed expenses.

= Rs.20,000 × 40% - Rs.4,000

= Rs.8,000 – Rs.4,000 = Rs.4,000

iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e. 100-40% old P/V ratio)

New P/V Ratio = $\frac{80 - 60}{80} = 25\%$

Break-even point will be = $\frac{4,000}{25\%}$ = Rs.16,000

Illu.20: The sales and profit during the years were as follows.

	Sales Rs.	Profit Rs.
2001	**1,50,000**	**20,000**
2002	**1,70,000**	**25,000**

You are required to calculate

a. P/V Ratio

b. Breakeven level

c. Sales required to earn a profit of Rs.40,000

d. Margin of Safety at a profit of Rs.2,50,000

e. Profit made when sales are Rs.50,000

f. Variable Cost in the two periods.

Solution:

a) P.V. Ratio = $\frac{\text{Change in Profit in 2 periods}}{\text{Change in Sales in 2 periods}} \times 100$

= $\frac{\text{Rs.25,000 - 20,000}}{\text{Rs.1,70,000 - 1,50,000}} \times 100 = \frac{5,000}{20,000} \times 100 = 25\%$

b) Break Even Level = $\frac{\text{Fixed Cost}}{\text{P.V. Ratio}}$

Fixed Cost = Contribution – Profit

Fixed Cost = (Sales × P.V. Ratio) – Profit

= $(1,50,000 \times \frac{25}{100})$-20,000 = Rs.17,500

Break Even Level = $\frac{\text{Rs.17,500}}{25\%}$ = Rs.70,000

c) Sales required to earn a profit of Rs.40,000

$$= \frac{\text{Fixed expenses} + \text{Required Profit}}{\text{P.V. Ratio}} = \frac{\text{Rs.17,500} + 40,000}{25\%}$$

$$= \text{Rs.57,500} \times \frac{100}{25} = \text{Rs.2,30,000}$$

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

Profit = Contribution – Fixed Cost

= (Sales × P.V. Ratio) – Fixed Cost

$$= (\text{Rs.2,50,000} \times \frac{25}{100}) - \text{Rs.17,500} = \text{Rs.45,000}$$

f) Variable Cost in the two periods:

Variable Cost = Sales – Profit – Fixed Cost

2001 = Rs.1,50,000 – 20,000 – 17,500 = Rs.1,12,500

2002 = Rs.1,70,000 – 25,000 – 17,500 = Rs.1,27,500

Solution:

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. $\text{P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in sales}} \times 100; \frac{4,000}{20,000} \times 100 = 20\%$

Calculation of Fixed Expenses:

$\text{S (P/V Ratio)} = \text{F} + \text{P}; 1,20,000 (\frac{20}{100}) = \text{F} + 9,000; 24,000 = \text{F} + 9,000; 24,000 - 9,000 = \text{F}; 15,000 = \text{F}; \text{F} = \text{Rs.15,000}$

b. $\text{S (P/V Ratio)} = \text{F} + \text{P}; 1,00,000 (\frac{20}{100}) = 15,000 + \text{P}; 20,000 = 15,000 + \text{P}; 20,000 - 15,000 = \text{P}; 5,000 = \text{P}; \text{P} = \text{Rs.5,000}$

6.7 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 assumptions 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?

6.8 EXERCISES

1. From the following particulars calculate the Break-even point interms of both quantity and value:

Production in units	10,000
Sales price	Rs.5,00 per unit
Variable costs	Rs.20,000
Fixed costs	Rs.12,000

[Ans.: (a) 4,000 units; (b Rs.20,000]

3. What is the break-even-point when sales is Rs.6.0 lakhs; Fixed expenses are Rs.1.5 lakhs and Variable costs are Rs.4.0 lakhs?

[Ans.:Rs.4.5lakhs]

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 profitofRs.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(4,000units@Rs.25each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

[Ans.: Margin of SafetyRs.40,000]

8. From the following details calculate BEP, Margin of safety:

	Rs.
Sales	4,20,000
Fixed cost	90,000
Variable cost ratio	55% of sales

[Ans.: BEP Rs.2,00,000;Margin of Safety Rs.2,20,000]

9. From the following particulars calculate the margin of safety Sales units: 15,000; Fixed costs Rs.34,000; Selling price per unit Rs.10; Variable cost per unit Rs.6.

[Ans.: Margin of Safety Rs.65,000]

10. From the following information calculate:
    (a) Break-even point
    (b) TurnoverrequiredtoearnaprofitofRs.36,000.
    (c) Margin of safety for Rs.36,000 profit. Fixed overhead Rs.1,80,000 Variable cost per unit Rs.2 Selling price per unit Rs.20.

[Ans.: (a)Rs.10,000 units; ValueRs.2,00,000; (b) 12,000 units; Value Rs.2,40,000; (c) Rs.40,000]

11. Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 2007:

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

During the second half of the year, the company has projected a loss of Rs.10,000. Calculate:

(a) The Break-even point and Margin of safety for six months ending 30th June 2007.
(b) Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.
(c) The Break-even point and Margin of safety for the whole year 2007.

[Ans.:(a)BEPRs.90,000;MOSRs.60,000;(c)BEPRs.1,80,000;MOSRs.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) Breakeven 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 EMEM 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 (b) Safety margin and (d) Sales required to earn a profit of Rs.24,000.

[Ans.: (a) Rs.1.50 (b)12,000 unitsRs.36,000;(c) 8,000 units–Rs.24,000;(d) 28,000 units value Rs.84,000]

14. From the following figures, calculate P/V ratio, BEP, profit on estimated sales of Rs.1,25,000 and sales required to earn a profit of Rs.20,000:

	Sales Rs.	Profit Rs.
Period I	1,00,000	15,000
Period II	1,20,000	23,000

[Ans.: P.V. Ratio=40%;BEP Rs.62,500; Profit Rs.25,000; Sales required Rs.1,12,500]

15. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold:(a)14,000 units; Extra units to be sold:14,000 4,000= 10,000 units]

16. From the following particulars calculate:
    (a) Contribution
    (b) P/V Ratio
    (c) Break-even in units and in Rupees
    (d) Whatwillbethesellingpriceperunitifthebreak-evenisbroughtdownto25,000 units?

	Rs.
Fixed Expenses:	1,50,000
Variable cost per unit	10
Selling price per unit	15

[Ans.: (a) Rs.5; (b) $33\frac{1}{3}$ or $\frac{1}{3}$ (c) 30,000 units; Rs.4,50,000; and (d) Rs.16]

17. Bhargavi Ltd. incurred a total cost of Rs.40,000 on a sales of Rs.45,000 in the 1st half year and Rs.43,000 cost on sales of Rs.50,000 in the 2nd half year.
Assuming that costs and prices remained the same, calculate for the entire year:

    (i) P.V. Ratio (ii) Fixed Expenses
    (iii) Break-even sales (iv) % of margin of safety.

[Ans.: (i) 40%;(ii) Rs.26,000;(iii) Rs.65,000;(iv) Rs.30,000 and 31.58%]

18. The sales and profit during two years are as follows:

Year	Sales Rs.	Profit Rs.
2006	3,00,000	30,000
2007	4,00,000	50,000

You are required to calculate (i) p/v ratio (ii) Break even sales (iii) Margin of Safety at a Profits of Rs.40,000.

[Ans.: (i) 20% or $\frac{1}{5}$; (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 over heads	:	Rs.10,000
Variable cost per unit	:	Rs.7

[Ans.: B.E.P=4,000 Units; Net Profit=Rs.1,000; Rs.1,500]

20. The following figures are available from the records of Sindhu enterprises as at 31st December:

	2006 Rs. in lakhs	2007 Rs. in lakhs
Sales	150	200
Profit	30	50

Calculate:

(a) The p/v ratio and total fixed expenses.

(b) The break-even level of sales.

(c) Sales required to earn a profit of Rs.90 lakhs.

(d) Profit or loss that would arise If the sales were Rs.280 lakhs.

[Ans.:(a) 40% & Rs.30,00,000;(b) Rs.75,00,000 (c) Rs.3,00,00,000 (d) 82,00,000]

21. Calculate the Break-even point from the following particulars:

Budgeted output 70,000 units
Fixed cost (Rs.) 4,00,000
Variable cost per unit (Rs.) 12
Selling price per unit (Rs.) 22

If the selling price is reduced to (Rs.) 20 per unit what will be the revised Break-even point?

[Ans.: BEP = 40,000 units Value Rs.8,80,000; Revised BEP = 50,000 units Value Rs.10,00,000]

22. From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even Volume:-

Selling price per unit:	Rs.10
Trade discount:	5%
Fixed over heads:	Rs.10,000
Variable cost per unit	Rs.7

[Ans.: BEP=400 Units: Profits Rs.(i) Rs.1,000;(ii) Rs.1,500]

23. Sales of a product amount to 200 units per month at Rs.10 per unit. Fixed overhead is Rs.400 per month and variable cost Rs.6 per unit. There is a proposal to reduce prices by 10%. Calculate present and future P/V ratio, how many units must be sold to maintain total profit.

[Ans.: Present and future P/V ratios 40% and $33\frac{1}{3}$%, Units to maintain total Profit = 267]

24. From the following particulars calculate the P/V ratio Break-even sales and Fixed Costs. Profit Rs.2,000 which represents 10% of sales Margin of safety = Rs.10,000.

[Ans.: P/V ratio = $\frac{1}{5}$; Break-even sales Rs.10,000; Fixed cost Rs.2,000]

25. From the following particulars calculate (a) Fixed costs (b) Break Eve Sales (c)Total Sales and (d) Profit.
Margin of Safety=Rs.10,000 (which represents 40% of sales) P/V Ratio=50%.

[Ans.:(a)Rs.7,500;(b)15,000;(c)Rs.25,000;(d)Rs.5,000.]

26. Given:

Sales 10,000 units
Variable cost Rs.1,00,000
Sales value Rs.2,00,000
Fixed cost Rs.40,000
Selling Price per unit Rs.20

You are required to calculate:

(a) P/V Ratio (b) Break-even point (c) Margin of safety (d) Sales to earn a profit of Rs.30,000.

[Ans.:(a)50%(b)Rs.80,000(c)Rs.1,20,000(d)Rs.1,40,000]

27. Assuming that the cost structure and selling prices remain the same in Periods I and II, find out:

(a) Profit Volume Ratio;
(b) Fixed Cost;
(c) Break Even Point for Sales;
(d) Profit when Sales are of Rs.1,00,000;
(e) Sales required to earn a Profit of Rs.20,000; and
(f) MarginofSafetyataprofitofRs.15,000;
(g) Variable cost in Period II

Period	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

[Ans.: (a) 20% (b) Rs.15,000 (c) Rs.75,000 (d) Rs.5,000 (e) Rs.1,75,000 (f) Rs.75,000 (g) Rs.1,12,000]

28. The sales turnover and profit of M/s Sreenivasa & Co. Ltd. during the two years 2006 and 2007 were as follows:

	Sales (Rs.)	Profit (Rs.)
2006	4,50,000	60,000
2007	5,10,000	75,000

You are required to calculate:

1. Profit-volume ratio.
2. Break-even point.
3. The sales required to earn a profit of Rs.1,20,000.
4. The profit made when sales are Rs.7,50,000.
5. Margin of safety at a profit of Rs.1,50,000.
6. Variable costs of the two periods.

[Ans.:(1)25% (2) Rs.2,10,000 (3) Rs.6,90,000 (4) Rs.1,35,000 (5)Rs.6,00,000 (6)1989 =Rs.3,37,500;1990=Rs.3,82,500]

29. Following are the particulars of Pennar Tubes Ltd:
Sales Rs.30,00,000; Fixed costs Rs.9,00,000; Variable costs Rs.15,00,000. Calculate (a)P/V ratio, (b) Break-even point (c) Margins of safety and (d) Margin of safety ratio.

[Ans.:(a)50%(b)Rs.18,00,000(c)Rs.12,00,000(d)40%]

30. M Ltd., manufacturing and selling industrial boxes. It is proposed to decrease the prices due to heavy competition. By decreasing the selling prices by 10% and 15%, how many units to be sold to maintain the current level of profit. The additional information is given:

Currentsales30,000units		Rs.3,00,000
Variablecost30,000units	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 foot wears 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
SalesRs.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/Vratio
    c. Sales required to earn a profit of Rs.4,50,000

    Fixed expenses Rs.90,000
    Variable cost per unit:
    Direct material = Rs.5
    Direct Labour = Rs.2
    Direct overheads = 100 per cent of direct labour
    Selling price per unit = Rs.12

    [Ans.: (a) 25% (b) 3,60,000 (c) Rs.21,60,000]

37. From the following information pertaining to the years, calculate:
    a. P/V ratio
    b. Amount of sales to earn profit of Rs.40,000
    c. Profit on sales Rs.1,20,000

Years	Sales Rs.	Profit Rs.
2006	1,40,000	15,000
2007	1,60,000	20,000

[Ans.:(a) 25% (b) Rs.2,40,000 (c) Rs.10,000]

38. From the following data relating to a company, calculate:
    i. The break-even sales; and
    ii. Sales required to earn a profit of Rs.6,000 per period.

Period Rs.	Total Sales Rs.	Total Cost
1.	42,500	38,700
2.	39,200	36,852

[Ans.: (i) Rs.33,863.64 (ii) Rs.47,500]

39. The following information was extracted from the books of Giridhar Mft.Co.Ltd.

	Rs.
Sales	1,80,000
Less: Variable Costs	1,44,000
Contribution	36,000
Less: Fixed costs	24,000
Net Profit	12,000

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

[Ans.:(a) 20% (b)Rs.1,20,000 (c)Rs.30,000 (d)Rs.2,40,000]

40. By making and selling 7,000 units of its product, accompany would lose Rs.10,000; whereas in the case of 9,000 units it would make a profit of Rs.10,000 instead. Calculate:

(a) The amount of fixed expenses.

(b) Number of units of Break-Even.

(c) Profit or Loss for10,000 units.

(d) Number of units to earn a profit of Rs.40,000.

[Ans.: P.V.Ratio=10%;(a) 80,000 (b)8,000 units (c)Rs.20,000 (d)12,000 units]

41. M/s Haripriya Ltd., sold its products worth Rs.180 lakhs and made a profit of rS.18 lakhs in 2006. But in 2007, the sales cam down to Rs.140 lakhs due to serve competition in the market. The fall in profit was Rs.4 lakhs. Calculate break-even points and profit volume ratios in 2006 and 2007.

[Ans.: BEP=0;P.V.Ratio: 2001–10%;2002–10%]

42. Two competing companies P Ltd. and Q Ltd. produce and sell the same type of product in the same market. For the year ended March 2008, their forecasted profit and loss accounts are as follows:

	Rs.	P.Ltd. Rs.	Rs.	Q.Ltd. Rs.
Sales		3,00,000		3,00,000
Selling Price Expenses	2,00,000		2,25,000	
Fixed Cost	50,000	2,50,000	25,000	2,50,000
		50,000		50,000

You are required to calculate the following:

(a) Profit volume ratio, Break-even Point and Margin of Safety of each business.

(b) Sales volume at which each business will earn a profit of Rs.30,000.

(c) Explain, giving reasons which business is likely to earn greater profits in conditions of (i) heavy demand for the product, (ii) low demand for the product.

[Ans.: (a) P.V. Ratio : P Ltd.33.33%; QLtd.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 demandtheproductofPLtd.,ismoreprofitable,becauseP.V.ratioofPLtd., 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. Followinginformationhasbeenobtainedfromtherevenueaccountof BalajiLtd.forthe year ended 31st December, 2007:

	Rs.	Rs.
Sales		6,00,000
Direct materials	1,80,000	
Direct wages	1,20,000	
Variable overheads	48,000	
Fixed overheads	1,72,000	5,20,000
Profit		80,000

It is proposed to reduce the selling price by 5%.What would be the sales volume if the present level of Profit is to be maintained. Assume no change in cost structure.

[Ans.: Old P.V. Ratio: 42%; New P.V. Ratio : 38.95%;Sales Volume at present level of profit Rs.6,46,938]

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LESSON 7
MARGINAL COSTING – MANAGERIALDECISIONS

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

7.1 MARGINAL COSTING AND DECISION MAKING

Marginal costing techniques may be applied in various fields to aid management in arriving at many important policy decisions. These include:

1. Profit planning
2. Introduction of new product
3. Planning of level of activity
4. Key factor
5. Determination of suitable product–mix
6. Pricing Decisions
7. Foreign Market offer
8. Make or buy decisions

7.1.1 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.

By increasing volume

(i) By increasing selling price

(ii) By reducing variable costs, and

(iii) By reducing fixed costs.

Illu.1:The following are the budgeted data relating to AB Ltd., and CD Ltd., producing identical products.

	Rs.	Rs.	Rs.	Rs.
Sales		**1,50,000**		**1,50,000**
Less: Variable cost	**1,20,000**		**1,00,000**	
Fixed Cost	**15,000**	**1,35,000**	**35,000**	**1,35,000**
Net Profit		**15,000**		**15,000**

a. Calculate break-even points, P/V ratio and margin of safety of each company:

b. State which company is likely to earn greater profits in conditions of (i) heavy demand and (ii) low demand of the product.

Solution:

a.(i)	**B.E.P. Sales**	=	$\frac{F \times S}{S - V}$			
	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
ii.	**P.V. Ratio**	=	$\frac{S - V}{S} \times 100$			
	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%
iii.	**Margin of Safety**	=	Actual Sales	-	BEP Sales	
	AB Ltd.	=	Rs.1,50,000	-	75,000	= Rs.75,000
	CD Ltd.	=	Rs.1,50,00	-	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 breakeven point is low and margin of safety is higher.

7.1.2 Introduction of New Product:

Sometime, a product may be added to the existing lines of products with a view to utilise idle facilities to capture new market or for any other purpose. The profitability of this

new product has to be found out initially. Usually, the new product will be manufactured if it is capable of contributing something towards fixed costs and profit after meeting its variable costs.

Illu.2: A firm manufacturing Product X has provided the following information.

	Rs.
Sales	**75,000**
Direct materials	**30,000**
Direct labour	**10,000**
Variable over head	**10,000**
Fixed overhead	**15,000**

In order to increase its sales by Rs.25,000,the firm wants to introduce the Product Y, and estimates the costs in connection therewith as under:

	Rs.
Direct materials	**10,000**
Direct labour	**8,000**
Variable overhead	**5,000**
Fixed overhead	**Nil**

Advise whether the Product Y will be profitable or not.

Solution:

Marginal Cost Statement

	X Rs.	Y Rs.	Total Rs.
Sales	75,000	25,000	1,00,000
Less: Material cost:			
Direct materials	30,000	10,000	40,000
Direct labour	10,000	8,000	18,000
Variable overhead	10,000	5,000	15,000
	50,000	23,000	73,000
Contribution	25,000	2,000	27,000
Fixed Costs			15,000
Profit			12,000

Commentary: If product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 towards fixed cost and profit. Therefore, Product Y should be introduced.

7.1.3 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.

IIIu.3: Excellent company is currently working at 50% capacity and produces 10,000 units.

At 60% capacity, raw material cost increases by 2% and selling price falls by 2%. At 80% working, raw material cost increase by 5% and selling price falls by 5%. At 50% capacity working, the product costs Rs.180 per unit and is sold at Rs.2.00 per unit.

The unit cost of Rs.180 is made up as follows.

Materials	**Rs.100**
Wages	**Rs.30**
Factory overheads	**Rs.30 (40% fixed)**
Administrative overheads	**Rs.20 (50% fixed)**

You are required to work out the material cost, fixed cost, total cost and profit for three capacity levels.

Solution:

Statement Showing Material Cost, Fixed Cost, Total cost and Profit at three Capacity Levels

Output Capacity		50%	60%	70%
Sales	(A)	20,00,000	23,52,000	30,40,000
Marginal Cost:				
Material Cost		10,00,000	12,24,000	16,80,000
Wages		3,00,000	3,60,000	4,80,000
Factory Overheads		1,80,000	2,16,000	2,88,000
Administrative Overheads		1,00,000	1,20,000	1,60,000
Total Marginal Cost	(B)	15,80,000	19,20,000	26,08,000
Contribution (A-B)	(C)	4,20,000	4,32,000	4,32,000
Less: Fixed Expenses:				
Factory Overheads		1,20,000	1,20,000	1,20,000
Administrative Overheads		1,00,000	1,00,000	1,00,000
Total Fixed Expenses	(D)	2,20,000	2,20,000	2,20,000
Total Cost (B+D)	(E)	18,00,000	21,40,000	28,28,000
Profit / Loss (C-D)	(F)	2,00,000	2,12,000	2,12,000

Note: Statement showing material cost, fixed cost, total cost; and profit per unit at three capacity levels.

Output Capacity		50%	60%	70%
Selling Price	(A)	200	196	190
Marginal Cost:				
Materials		100	102	105
Wages		30	30	30
Factory Overheads		18	18	18
Administrative Overheads		10	10	10
Total Marginal Cost	(B)	158	160	163
Contribution (A-B)	(C)	42	36	27
Less: Fixed Expenses:				
Factory Overheads		12	10	7.50
Administrative Overheads		10	8.33	6.25
Total Fixed Expenses	(D)	22	18.33	13.75
Profit/Loss (C-D)	(E)	20	17.67	13.25

Illu.4:Two companies which have the following operating details decide to merge:

	Company I	**Company II**
Capacity utilisation	**90%**	**60%**
Sales (Rs. Lakhs)	**540**	**300**
Variables cost (Rs. Lakhs)	**396**	**225**
Fixed cost (Rs. Lakhs)	**80**	**50**

Assuming proposal is implemented, calculate:

(a) Break-even sales of the merged plant and the capacity utilisation at that stage.

(b) Profitabilityofthemergedplantat80%capacityutilisation.

(c) Salesturnoverofthemergedplanttoearnaprofitof Rs.75lakhs.

Solution:

Statementofthemergedcompanyat100%and80%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.

$$\text{Sales to earn Rs.205 lakhs contribution} = \frac{205}{25.91\%} = \text{Rs.791.23 lakhs.}$$

7.1.4 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 likewise. However, in actual practice, this seems to be unrealistic as several constraints come in the way of manufacturing as well as selling. Such constraints that come in the way of management's efforts to produce and sell in unlimited quantities are called 'Key factors' or 'limiting factors'.

The limiting factors may be materials, labour, plant capacity, or demand. Management must as certain the extent of influence of the key factor for ensuring maximisation of profit. Normally, when contribution and key factors are known, the relative profitability of different products or processes can be measured with the help of the following formula.

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

Illu.5: From the following data, which product would you recommend to be manufactured in a factory, time being the key factor?

	Per unit of product X Rs.	Per unit of product Y Rs.
Direct material	**24**	**14**
Direct labour at Rs.1 per hour	**2**	**3**
Variable over head at Rs.2 per hour	**4**	**6**
Selling price	**100**	**110**
Standard time to produce	**2hours**	**3hours**

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		2hours		3hours
Contribution per hour		70/2 = **Rs.35**		87/3 = **Rs.29**

Contribution per hour of product X is more than that of product Y by Rs.6. Therefore, product X is more profitable and is recommended for manufacturing.

7.1.5 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.,

IIIu.6: Present the following information to show to them 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 and 2000 units of B**
ii) **1500 units of product 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	1000A+2000B (i)	1500A+1500B (ii)	2000A+1000B (iii)
Total Sales	Rs. (1000 x 20+2000x15) = 50,000 (1000 x 16+2000x13) = 42,000	Rs. (1500 x 20+1500 x 15) =52,500 (1500 x16+1500 x13) =43,500	Rs. (2000 x 20+1000 x 15) =55,000 (2000 x16+1000 x 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.

7.1.6 Pricing Decisions:

Marginal costing techniques helps a firm to decide about the prices of various products in a fairly easy manner. Let's examine the following cases.

(i) Fixation of Selling Price.

Illu.7: P/V ratio is 60% and the marginal cost of the product is Rs.50. What will be the selling price?

Solution: P/V Ratio = $\frac{S-V}{S} = 1 - \frac{V}{S} = \frac{C}{S}$

$\frac{\text{Variable cost}}{\text{Sales}} = 40\% \text{ or } \frac{40}{100}$

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 adise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.

Solution:

Calculation of Marginal Cost:

	Rs.
Direct materials	10,000
Direct labour	1,000
Variable overhead @ Rs.0.50per hour	250
Marginal cost	Rs.11,250

Commentary: Here the minimum price to be quoted is Rs.11,250, which is the marginal cost. By quoting o, 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.

7.1.7 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 over heads (Rs.90,000÷1,20,000)	**0.75**
Total cost	**4.75**
Profit	**0.75**
Selling price	**5.50**

The installed capacity is 1,50,000 pens per month. At present, it is producing and selling, on an average, 1,20,000 pens per month. The company has received an export order for 30,000 pens per month for two years but at a price of Rs.4.50.the management is hesitant to accept this order because it does not cover the total cost. There are no government subsidies to meet the deficit. It is unlikely that the domestic market will expand in the next two years. Advise them with necessary supporting data.

Solution:

Marginal Cost per unit:

	Rs.
Direct material	2.00
Direct labour	1.50
Variable over heads	0.50
Total Variable Cost	4.00

Selling price of the export order Rs.4.50

If the foreign order is accepted for each unit the firm gets a profit. of Rs.0.50 (Rs.4.50 – 4.00). The total profit if the foreign order is accepted = Rs.15,000 (30,000 x 0.50).

So it is better to accept foreign order.

7.2 MAKE OR BUY DECISIONS

A company might be having unused capacity which may be utilised for making component parts or similar items instead of buying them from the market. In arriving at such a 'make or buy' decision, the cost of manufacturing component parts should be compared with price quoted in the market. If the variable costs are lower than the purchase price, the component parts should be manufactured in the factory itself.

Fixed costs are excluded on the assumption that they have been already incurred, and the manufacturing of components involves only variable cost. However, I there is an increase in fixed costs and any limiting factor is operating they should also be taken into account. Consider the following illustration, throwing light on these aspects.

Illu.10: A manufacturing company finds that while the cost of making a component part is Rs.10, the same is available in the market at Rs.9 with an assurance of continuous supply. Give your suggestion whether to make or buy this part. Give also your views in case the supplier reduces price from Rs.9 to Rs.8.

The cost information is as follows:

	Particulars	Rs.
1.	**Material**	**3.50**
2.	**Direct Labour**	**4.00**
3.	**Other Variable expenses**	**1.00**
4.	**Fixed expenses**	**1.50**
		10.00

Solution:

Make or Buy Decision Statement

Purchasing Price	(A)	9
Manufacturing Cost:		
Material		3.50
Direct Labour		4.00
Variable Expenses		1.00
Total Manufacturing Cost	(B)	8.50
Saving in Manufacturing (A-B)	(C)	0.50

Advise:

1. It is better to manufacture rather than buying from outside Market.
2. If the component is supplied at Rs.8 it is better to purchase it rather than manufacturing it. By purchasing, the profit will increase by Rs.0.50 (Rs.8.50 – 8.00) per unit.

Illu.11:Acompanyengagedinthemanufacturingradiosincurs Rs.6.25 per piece for producing part A. But the same part is available for at Rs.5.75 only per piece in the

market. Its supply will also be alright. Particulars of expenses are as follows:

	Rs.
Material per piece	**2.75**
Labour per piece	**1.75**
Other variable expenses per piece	**0.50**
Depreciation and fixed overheads per piece	**1.25**
	6.25

(a) Do you manufacture that part or purchase it in the market?

(b) In case the supplier offers the same at Rs.4.85 only per piece, what is your decision?

Solution:

Make or Buy Statement for Part A

		Rs.
Buying Price	(A)	5.75
Manufacturing Cost:		
Material		2.75
Labour		1.75
Variable Expenses		0.50
Total Manufacturing Cost	(B)	5.00
Saving in Manufacture (A-B)	(C)	0.75

Advise:

a. It is better to manufacture rather than buying this. It is because the buying price per unit is Rs.5.75 and manufacturing price is Rs.5.00. In manufacturing the product the firm has a saving of Rs.0.75 per product.

b. If the computer supply price is Rs.4.85 then it is better to purchase it rather than manufacturing it due to a saving of Rs.0.15 per unit.

Illu.12: ABC company has just been formed. A company has a special process which will enable it to produce a unique product, the demand for which is uncertain. Their estimated costs are:

Material per unit Rs.2
Labour per unit Rs.6
Variable manufacturing expenses per unit Rs.3
Variable selling expenses per unit Re.1
FixedmanufacturingexpensesRs.24,000
FixedAdministrativeandsellingexpensesRs.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 percent of sale?

(b) If the demand for the product is 10,000 units, what price must they charge in order to (i) break-even (ii) make a profit of Rs.24,000 (iii) make a profit of 20 per cent of sales?

Solution:

Total variable Expenses = 2 + 3 + 6 + 1 = Rs.12

Total Fixed Expenses = Rs.24,000 + Rs.72,000 = Rs.96,000

Sales Price Rs.20

(a) (i) B.E.P. = $\frac{F}{S-V} = \frac{96,000}{20-12} = \frac{96,000}{8}$ = 12,000 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 units

(iii) Required sales amount to get a profit of 20% on Sales. Sales units is assumed as S.

Total Sales = 20S; Estimated profit 20% S; $20S \times \frac{20}{100} = 4S$

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 Units

(b) (i) B.E.P. 10,000 units. Selling Price is assumed as S.

10,000 = $\frac{96,000}{S-12}$ = 10,000 S – 1,20,000 = 96,000;

10,000S = 96,000 + 1,20,000 ; 10,000S = 2,16,000;

S = $\frac{2,16,000}{10,000}$ = 21.60; S = 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 = Rs.24

(iii) Selling Price to get profit of 20% on Sales.

Total Sales amount for 10,000 Units = 10,000S

On 10,000S; 20% Profit = 10,000S × $\frac{20}{100}$ = 2,000S

10,000 = $\frac{96,000+2,000S}{S-12}$ = 10,000S – 1,20,000 = 96,000 + 2,000S or

8,000S = 2,16,000; S = Rs.27.

Illu.13: A firm is selling X product, whose variable cost per unit is Rs.10 and fixed cost is Rs.6,000. It has sold 1,000 articles during one month at Rs.20 per unit. Market research shows that there is a great demand for the product if the price can be reduced. If the price can be reduced to Rs.12.50 per unit, it is expected that 5,000 articles can be sold in the expanded market. The firm has to take a decision whether to produce and sell 1,000 units at the rate of Rs.20 or to produce and sell for the growing demand of 5,000 units at the rate of Rs.12.50. Give your advice to the management in taking the

decision.

Solution:

		1,000 units	5,000 units
Selling Price	(A)	20	12.50
Less: Variable cost	(B)	10	10.00
Contribution per unit A-B)	(C)	10	2.50
Total Contribution		10,000	12,500
Less: Fixed Cost		6,000	6,000
Profit		4,000	6,500

The management may be advised to reduce the selling price to Rs.12.50.It is also advised to produce and sell, 5,000 units because it gives an additional profit of Rs.2,500 (Rs.6,500- 4,000)

Illu.14: A Toy manufacturer earns an average net profit of Rs.3 per piece in a selling price of Rs.15 by producing and selling 60,000 pieces at 60% of the potential capacity. Composition of cost of sales is as follows:

	Rs.
Direct Materials	**4.00**
Direct Wages	**1.00**
Factory overhead	**6.00**
	(50% Fixed)
Sales overhead	**1.00**
	(25% varying)

During the current year, he intends to produce the same number of toys but anticipates that:

(a) His fixed charges will go up by 10%.
(b) Rates of Direct labour will increase by 20%
(c) Rates of Direct Material will increase by 5%
(d) Selling price cannot be increased.

Under these circumstances, he obtains an order for a further 20% of his capacity. What minimum price will you recommend for accepting the order to ensure the manufacturer an overall profit of Rs.1,80,500.

Solution:

Calculation of Current year Marginal Cost Statement:

		Rs.
Selling Price	(A)	15.00
Less: Marginal Cost:		
Direct Material [4 + ($4\times\frac{5}{100}$)]		4.20
Direct Wages [1 + ($1\times\frac{20}{100}$)]		1.20
Factory Overheads ($6\times\frac{50}{100}$)		3.00
Sales Overheads ($1\times\frac{25}{100}$)		0.25
Total Marginal Cost	(B)	8.65
Contribution per unit (A-B)	(C)	6.35

Total Contribution for 60,000 units = 60,000 × 6.35 = Rs.3,81,000

Calculation of Total Fixed Cost:

	Rs.
Fixed factory overheads per unit	3.00
Fixed sales overheads per unit	0.75
Total fixed cost per unit	3.75

Total fixed cost for 60,000 units = 60,000 units × 3.75 = Rs.2,25,000

Current year total fixed cost = $2,25,000 \times \frac{10}{100}$ + 2,25,000 = Rs.2,47,500

Current year profit for 60,000 units = Total contribution – Fixed expenses

= 3,81,000 – 2,47,500 = Rs.1,33,500

Calculation of New Selling Price for 20% Capacity:

	Rs.
Given required Profit	1,80,500
Less: Profit earned for 60,000 units	1,33,500
Profit to be acquired for 20% capacity	47,000

When the firm is at 60% capacity the output is 60,000 units.
For additional 20% capacity the required units 20,000
New Selling Price is assumed at 'S' per unit.
For 20,000 units sales amount = 20,000 units x S = 20,000 S
Variable Cost per unit = 8 – 65
Total Variable Cost = 20,000 units x Rs.8-65 = Rs.1,73,000

$$S - V = F + P$$
$$20{,}000S - 1{,}73{,}000 = Nil + 47{,}000$$
$$20{,}000S - 1{,}73{,}000 + 47{,}000$$
$$20{,}000S = 2{,}20{,}000$$
$$S = \frac{2{,}20{,}000}{20{,}000} = Rs.11$$

The minimum recommended Selling Price to the company to accept the order is Rs.11.

Illu.15: Budgeted Results to X Ltd. Include the following.

Sales	Amount (Rs. Lakhs)	Variable cost as % of sales value
A	**5.0**	**60%**
	4.0	**50%**
B	**8.0**	**65%**
C	**3.0**	**80%**
	6.0	**75%**
D	**26.0**	**65.17%**
E		

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
	4	50	2.0	50	2.0
B	8	65	5.2	35	2.8
C	3	80	2.4	20	0.6
D	6	75	4.5	25	1.5
E			17.1		8.9

Calculation of Expected loss:

Total Contribution	8.9
Less: Fixed Expenses	9.1

Expected loss	0.2

b. Assumeonlyoneproductcanbeincreasedatatime.Theamountofsalesofeachproduct to be increased as follows.

$$\text{Sales required} = \frac{\text{Under recovery of fixed costs}}{\text{P.V. Ratio}}$$

			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. $\text{Variable cost} = \text{Sales} \times \frac{\text{Variable Cost Ratio}}{100} = 5 \times \frac{60}{100} = \text{Rs.}3$

ii. P.V. ratio = 100 – Variable Cost Ratio = 100 – 60 = 40

iii. $\text{Contribution} = \text{Sales} \times \text{P.V. Ratio} = 5 \times \frac{40}{100} = 2$

Note: For (b)

Under recovery of fixed expenses=Expected loss = Rs.20,000

Illu.16: The following figures are extracted from there cords of a company.

	Departments				
	A	**B**	**C**	**D**	**Total**
	Rs.	**Rs.**	**Rs.**	**Rs.**	**Rs.**
Sales	**200**	**400**	**600**	**800**	**2,000**
Costs:					
Direct Material	**80**	**200**	**360**	**580**	**1,220**
Direct Labour	**40**	**150**	**180**	**140**	**510**
Direct Expenses	**4**	**6**	**8**	**10**	**28**
Prime Cost	**124**	**356**	**548**	**730**	**1,758**
Overheads:					
Variable	**20**	**30**	**24**	**20**	**94**
Fixed	**10**	**20**	**10**	**8**	**48**

	30	**50**	**34**	**28**	**142**
Total cost	**154**	**406**	**582**	**758**	**1,900**
Profit/Loss	**46**	**(-)6**	**18**	**42**	**100**

On the basis of the above information, the management is inclined to dis continue 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.Ifitiscontinuedthe 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(15,000units)		**1,50,000**
Variable Cost(15,000units)	**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 priceis reduced by 10% and 15%.

		10% Decrease		15% Decrease
New Selling Price per unit	$(10 \times \frac{9}{100})$	Rs.9	$(10 \times \frac{15}{100})$	8.50
Variable Cost Per unit		6		6
Contribution per unit		3		2.50
Required sales to earn profit of Rs.25,000				
$\frac{(F + \text{Desired Profit}}{\text{Contribution per unit}}$	$(\frac{35,000 + 25,000}{3})$	20,000 Units	$(\frac{25,000 + 30,000}{2.50})$	24,000 Units

Illu.18: Assume you are the Management Consultant of XYZ Co. Ltd. The Managing Director of the company seeks your advice on the following problem:

The XYZ Ltd., produces a variety of products each having a number of component parts. Product "B" takes 5 hours to produce on machine No.99 working at full capacity."B" has a selling price of Rs.50 and a marginal costs of Rs.30 per unit. "A-10" a component part could be made on the same machine in 2 hrs. for marginal cost of Rs.5 per unit. The supplier's price is Rs.12.50 per unit. Should the company make or buy "A- 10"?

Assume that machine hour is the limiting factor.

Solution:

In this problem the cost of new product plus contribution lost during the time for manufacturing "A-10" should be compared with the supplier's price to arrive at a decision.

	Rs.
B - Selling Price	50.00
Less: Marginal Cost	30.00
Contribution	20.00

It takes 5 hours to produce one unit of "B"

Contribution earned per hour on Machine No.99 is Rs. 20/5 = Rs 4

"A-10" takes two hours to be manufactured on machine which is producing "B".

If "A-10" is produced, contribution lost will be = 2 hours x Rs.4 = Rs.8

Real cost of"A-10"to the company = Marginal cost of "A-10 "plus contribution lost for using the machine for "A-10".

Rs.5+Rs.8 = Rs.13

This is more than the seller's price of Rs.12.50 and so it is advisable for the company to buy the product from outside.

7.3 SELF ASSESSMENT QUESTIONS

1. Explain the specific decision-making areas where the principles of marginal costing could be applied.
2. What is the signification of Contribution of marginal costing? State its uses in managerial decision making.
3. What is Marginal Costing ? How is it useful to the manufacturing organization?
4. Bring out the significance of imputed costs and out pocket costs for managerial decision making.

7.3 EXERCISES

1. A company is considering expansion. Fixed costs amount to Rs.4,20,000 and are expected to increase by Rs.1,25,000 when plant expansion is completed. The present plant capacity is 80,000 units a year. Capacity will increase by 50 per cent with the expansion. Variable costs are currently Rs.6.80 per unit and are expected to go down by Rs.0.40 per unit with the expansion. The current selling price is Rs.16perunitand 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 Over heads 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 indirect labour cost by Rs.3per unit.
(iii) Reduction invariable administration expenses byRs.3per unit.
(iv) New selling price: Rs.120 per unit.
(v) Increase in production and sales by100%.

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 costofmanufacturingof8,000unitsof'X'productisgivenbelow:
   Direct materials Rs.8,000; labour Rs.64,000; Variable overheads Rs.32,000; Fixed overheadsRs.40,000;FixedoverheadisincludedRs.24,000,thatcontinues 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:

FreightRs.0.50perunitandmaterialreceivedcharges@Rs.1perunit.

From the above information you are required to prepare a statement comparing the

costs of manufacturing the parts, with the costs of purchasing them from the outside supplier and guide management for a make or buy decision.

[Ans.: It is better to purchase 5,000 units instead of manufacturing it due to the saving of Rs.7,440]

6. A company produces variety of products and components. Following components with relevant manufacturing costs are under consideration for purchase outside:

Component	Direct Material Rs.	Direct Labour Rs.	Variable overheads Rs.	Fixed Costs Rs.	Bought out price Rs.
XY	600	200	100	300	800
PR	200	800	200	1,000	2,300
MN	100	300	200	500	1,200

Select the components which should be bought from outside, indicating the reasons for choice.

[Ans.: (a) It is better to purchase XY Product (b) It is better to manufacture PR product (c) It is better to manufacture MN Product.]

7. A manufacturer has planned his level of operation at 50% of his plant capacity of 30,000 units. His expenses are estimated as follows, if 50% of the plant capacity is utilised.

	Rs.
(i) Director materials	8,280
(ii)Direct wages	11,160
(iii)Variable and other manufacturing expenses	3,960
(iv)Total fixed expenses irrespective of capacity utilisation	6,000

The expected selling price in the domestic market is Rs.2 per unit. Recently the manufacturer has received a trade enquiry from an overseas organisation interested in purchasing 6,000 units at a price of Rs.1.45 per unit.

As a professional management accountant, what would be your suggestion regarding acceptance or rejection of the offer? Support your suggestion with suitable quantitative information.

[Ans.:15,000 units: Profit Rs.600;6,000 units: Loss Rs.660;Total 21,000 units :Loss Rs.60; It is not profitable to accept the foreign offer.]

8. A company currently operating at 80% capacity has the following particulars.

	Rs.
Sales	32,00,000
Direct materials	10,00,000

Direct labour	4,00,000
Variable overheads	2,00,000
Fixed overheads	13,00,000

An export order has received that would utilize half the capacity of the factory. The order cannot be split, i.e., it has either to be taken in full and executed at 10% below the normal domestic prices are rejected totally.
The alternative available to the management are:

1. Reject the order and continue with the domestic sales only; (at as present); or
2. Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand; or
3. Increase capacity to accept the export order and maintain the present domestic sales by:
   (a) Buying an equipment that will increase capacity by 10%.This will result in an crease of Rs.1,00,000 in fixed costs; and
   (b) Work over time to met balance of required capacity. In that case, labour will be paid at one and half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.
[Ans.: Profit I Rs.3,00,000; II Rs.5,00,000; III Rs.9,50,000. Alternative III is the best because it results in the highest amount of profit.]

9. Prestige company private limited, manufacturing pressure cookers has drawn up the following budget for the year 2006-07.

	Rs.
Raw materials	20,00,000
Labour, stores, power and other variable costs	6,00,000
Manufacturing overheads	7,00,000
Variable distribution costs	4,00,000
General overheads including selling	3,00,000
Total	40,00,000
Income from sales	50,00,000
Budgeted profits	10,00,000

The General Manager suggests to reduce selling price by 5% and expects to achieve an additional volume of 50%. There is sufficient manufacturing capacity. More intensive manufacturing programme will involve additional costs of Rs.50,000 for production planning. It will also be necessary to open an additional sales office at the cost of Rs.1,00,000 per annum.

The Sales Manager, on the other hand, suggests to increase selling price by 10%, which it is estimated will reduce sales volume by 10%. At the same time saving in

manufacturing overheads and general over heads 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 and1,600 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, Band C and the profits resulting from product mixed (i), (ii) and (iii).

[Ans.: Marginal Contribution per unit; A Rs.6; B Rs.10; C Rs.32; Sales mix (iii) is profitable as it is yields the highest amount of contribution and profit.]

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LESSON 8
PRICING DECISIONS

OBJECTIVES

1. Discuss the three major influences on prices
2. Understand the factors that influence on price
3. Will be known the objectives behind the pricing of the products/services
4. Understand and implement practically the theory of price
5. Able to know how pricing decisions influence the various areas of the business

STRUCTURE

8.1 MEANING

Pricing decisions have strategic importance in any enterprise. Pricing governs the very feasibility of any marketing program because it is the only element in a marketing mix accounting for demand and sales revenue. Other elements are cost factors.

Price is the only variable factor determining the revenues or income. A variety of economic and social objectives came in to prominence in many pricing decision.

Pricing is a process of fixing the value that a manufacturer will receive in the exchange of services and goods. Pricing method is exercised to adjust the cost of the producer's offerings suitable to both the manufacturer and the customer. The pricing depends on the company's average prices, and the buyer's perceived value of an item, as compared to the perceived value of competitors' product.

8.2 DEFINITIONS OF PRICE

Economist defines price as the exchange value of a product or services always expressed in money.

To the *consumer* the price is an agreement between seller and buyer concerning what each is to receive.

Price is the mechanism or device for translating into quantitative terms(Rupees) the perceived value of the product to the customer at a point of time. The buyer is interested in the price of the whole package consisting of the physical product plus bundle of expectations or satisfactions. The consumer has numerous expectations such as accessories, after–sales–service, replacement parts, technical guidance, extra service, credit and many other benefits.

Thus price must be equal to the total amount of benefits (physical, economic, social and psychological benefits).

Pricing is equivalent to the total product offering. This offering includes a brand name, a package, and benefits, service after sale, delivery, and credit and so on. From the marketers point of view, the price also covers the total market offering, i.e., the consumer is also purchasing the information through advertising, sales promotion and personal selling and distribution method that has been adopted. The consumer gets these values and also covers their costs. We can now define price as the money value of a product or service agreed upon in a market transaction. We have a kind of price equation where:

Money (price) = Bundle of Expectations

"Price is the amount of money and/or other items with utility needed to acquire a product.- **Prof. William J. Stanton**

"Price is the only element in the marketing mix that produces revenue, the other elements produce cost. - **Prof. Philip Kotler**

"Price is the exchanged value of the product or service expressed in terms of money"
-**David J. Schwartz**

8.3 OBJECTIVES OF PRICING

8.3.1. Profits-related Objectives:

Profit has remained a dominant objective of business activities.
Company's pricing policies and strategies are aimed at following profits-related objectives:

i. Maximum Current Profit:

- One of the objectives of pricing is to maximize current profits.
- This objective is aimed at making as much money as possible.
- Company tries to set its price in a way that more current profits can be earned. However, company cannot set its price beyond the limit.
- But, it concentrates on maximum profits.

ii. Target Return on Investment:

Most companies want to earn reasonable rate of return on investment.Target return may be:

- fixed percentage of sales,
- return on investment, or
- A fixed rupee amount.

Company sets its pricing policies and strategies in a way that sales revenue ultimately yields average return on total investment. For example, company decides to earn 20% return on total investment of 3 crore rupees. It must set price of product in a way that it can earn 60 lakh rupees.

8.3.2. Sales-related Objectives:

i. Sales Growth:

- Company's objective is to increase sales volume.
- It sets its price in such a way that more and more sales can be achieved.
- It is assumed that sales growth has direct positive impact on the profits.
- So, pricing decisions are taken in way that sales volume can be raised.
- Setting price, altering in price, and modifying pricing policies are targeted to improve sales.

ii. Target Market Share:

- A company aims its pricing policies at achieving or maintaining the target market share.
- Pricing decisions are taken in such a manner that enables the company to achieve targeted market share.
- Market share is a specific volume of sales determined in light of total sales in an industry. For example, company may try to achieve 25% market shares in the relevant industry.

iii. Increase in Market Share:

Sometimes, price and pricing are taken as the tool to increase its market share.
When company assumes that its market share is below than expected, it can raise it by appropriate pricing; pricing is aimed at improving market share.

8.3.3. Competition-related Objectives:

- Competition is a powerful factor affecting marketing performance.
- Every company tries to react to the competitors by appropriate business strategies.

With reference to price, following competition-related objectives may be priorized:

i. To Face Competition:

- Pricing is primarily concerns with facing competition.
- Today‟s market is characterized by the severe competition.
- Company sets and modifies its pricing policies so as to respond the competitors strongly.
- Many companies use price as a powerful means to react to level and intensity of competition.

ii. To Keep Competitors Away:

- To prevent the entry of competitors can be one of the main objectives of pricing.

- The phase „prevention is better than cure" is equally applicable here. If competitors are kept away, no needto fight with them.
- To achieve the objective, a company keeps its price as low as possible to minimize profit attractiveness ofproducts.
- In some cases, a company reacts offensively to prevent entry of competitors by selling product even at aloss.

iii. To Achieve Quality Leadership by Pricing:

- Pricing is also aimed at achieving the quality leadership.
- The quality leadership is the image in mind of buyers that high price is related to high quality product.
- In order to create a positive image that company's product is standard or superior than offered by the closecompetitors; the company designs its pricing policies accordingly.

iv. To Remove Competitors from the Market:

- The pricing policies and practices are directed to remove the competitors away from the market.
- This can be done by forgoing the current profits – by keeping price as low as possible – in order tomaximize the future profits by charging a high price after removing competitors from the market.
- Price competition can remove weak competitors.

8.3.4. Customer-related Objectives:

Customers are in center of every marketing decision.
Company wants to achieve following objectives by the suitable pricing policies and practices:

i. To Win Confidence of Customers:

- Customers are the target to serve.
- Company sets and practices its pricing policies to win the confidence of the target market. Company, byappropriate pricing policies, can establish, maintain or even strengthen the confidence of customers thatprice charged for the product is reasonable one.
- Customers are made feel that they are not being cheated.

ii. To Satisfy Customers:

- To satisfy customers is the prime objective of the entire range of marketing efforts. And, pricing is noexception.
- Company sets, adjusts, and readjusts its pricing to satisfy its target customers.
- In short, a company should design pricing in such a way that results into maximum consumer satisfaction.

8.3.5. Other Objectives:

Over and above the objectives discussed so far, there are certain objectives that company wants to achieve bypricing.
They are as under:

i. Market Penetration:

- This objective concerns with entering the deep into the market to attract maximum number of customers.
- This objective calls for charging the lowest possible price to win price-sensitive buyers.

ii. Promoting a New Product:

- To promote a new product successfully, the company sets low price for its products in the initial stage toencourage for trial and repeat buying.
- The sound pricing can help the company introduce a new product successfully.

iii. Maintaining Image and Reputation in the Market:

- Company‟s effective pricing policies have positive impact on its image and reputation in the market.
- Company, by charging reasonable price, stabilizing price, or keeping fixed price can create a good imageand reputation in the mind of the target customers.

iv. To Skim the Cream from the Market:

- This objective concerns with skimming maximum profit in initial stage of product life cycle. Because aproduct is new, offering new and superior advantages, the company can charge relatively high price.
- Some segments will buy product even at a premium price.

v. Price Stability:

- Company with stable price is ranked high in the market.
- Company formulates pricing policies and strategies to eliminate seasonal and cyclical fluctuations.
- Stability in price has a good impression on the buyers. Frequent changes in pricing affect adversely theprestige of company.

vi. Survival and Growth:

- Finally, pricing is aimed at survival and growth of company‟s business activities and operations. It is afundamental pricing objective.
- Pricing policies are set in a way that company‟s existence is not threatened

8.3.1. Survival

The objective of pricing for any company is to fix a price that is reasonable for the consumers and also for the producer to survive in the market. Every company is in danger of getting ruled out from the market because of rigorous competition, change in customer's preferences and taste. Therefore, while determining the cost of a product all the variables and fixed cost should be taken intoconsideration. Once the survival phase is over the company can strive for extra profits.

8.3.2. Expansion of Current Profits

Most of the company tries to enlarge their profit margin by evaluating the demand and supply of services and goods in the market. So the pricing is fixed according to the product's demand and the substitute for that product. If the demand is high, the price will also be high.

8.3.3. Ruling the Market

Firms' impose low figure for the goods and services to get hold of large market size. The technique helps to increase the sale by increasing the demand and leading to low production cost.

8.3.4. A Market for an Innovative Idea

Here, the company charge a high price for their product and services that are highly innovative and use cutting-edge technology. The price is high because of high production cost. Mobile phone, electronic gadgets are a few examples.

8.4 IMPORTANCE OF PRICING

Price is a matter of vital importance to both the seller and the buyer in the market place.In money economy, without prices there cannot be marketing. Price denotes the value of aproduct or service expressed in money. Only when a buyer and a seller agree on price, we canhave exchange of goods and services leading to transfer of ownership.

In a competitive market economy, priceis determined by free play of demand andsupply. The price will move forward or backward with changing supply and demand conditions.

The going market price acts as basis for fixing the sale price. Rarely an individual seller candishonour the current market price. In a free market economy, we have freedom of contract,freedom of enterprise, free competition and right to private property. Price regulates businessprofits, allocates the economic resources for optimum production and distribution.

Thus price isthe prime regulator of production, distribution and consumption of goods. Economics revolvesaround pricing of resources. Price influences consumer purchase decisions. It reflects purchasingpower of currency. It can determine the general living standards. In essence, by and large, everyfacet of our economic life is directly or indirectly governed by pricing. This is literally true in ourmoney and credit economy.

Pricing decisions inter-connectmarketing actionswith the financial objectives of theenterprise.Among the most important marketing variables influenced by pricing decisions are:

1. Sales volume,
2. Profit margins,
3. Rate of return on investment,
4. Trade margins,
5. Advertising and sales promotion,
6. Product image,
7. New product development.

Therefore, pricing decisions play a very important role in the design of the marketingmix. Pricing strategy determines the firms' position in the market vis-a-vis its rivals.

Marketingeffectiveness of pricing policy and strategy should not suffer merely on account of cost andfinancial criteria.

8.5 THEORY OF PRICE

The theory of price is an economic theory that states that the price for a specific good or service is determined by the relationship between its supply and demand at any given point. Prices should rise if demand exceeds supply and fall if supply exceeds demand.

The theory of price—also referred to as "price theory"—is a microeconomic principle that says the market forces of supply and demand will determine the logical price point for a particular good or service at any given time.

Relationship of Supply and Demand to Price Theory

Supply denotes the number of products or services that the market can provide. This includes both tangible goods, such as automobiles, and intangible ones, such as the ability to make an appointment with a skilled service provider. In each instance, the available supply is finite in nature. There are only a certain number of automobiles available and only a certain number of appointments available at any given time.

Supply may be affected by forces that are beyond a producer's control, such as the availability of raw materials.

Demand applies to the market's desire for tangible or intangible goods. At any time, there is also only a finite number of potential consumers available. Demand may fluctuate depending on a variety of factors, such as whether an improved version of a product is available or if a service is no longer needed. Demand can also be affected by an item's perceived value by the consumer market.

As mentioned earlier, equilibrium occurs when the total number of items available—the supply—can be consumed by potential customers. If a price is too high, customers may avoid the goods or services or find other alternatives. This would result in excess supply and possibly cause producers to lower prices.

In contrast, if a price is too low, demand may significantly outpace the available supply, causing prices to rise again

The traditional theory of pricing that of supply versus demand is developed from economics. As such, it offers a useful intellectual framework for the consideration of pricing issues. Unfortunately, most of the parameters needed to apply this theory have been extremely difficult to measure in practice. Customer needs and market factors tend to dominate the more “practical” marketing theory.New product pricing, whether to “skim” profits or to “penetrate” the market, is a particular form of pricing and poses rather different challenges. However, much of this chapter describes the various practical pricing policies adapted from cost-plus and market-based strategies to selective ones. Discounts and competitive pricing are also investigated.Although fundamentals of pricing remain the same, the proliferation of e-commerce on the internet is also revolutionizing the relationships between buyers and sellers in the market. Both parties have clearer pictures of the cost and price structures in their market exchange. As presented in the vignette at the beginning of this

chapter, in the age of the internet, buyers will probably benefit from lower prices, and sellers will also benefit from more fluid pricing to meet the consumer demand more accurately.

In a free market economy, producers typically want to charge as much as they reasonably can for their goods and services, while consumers want to pay as little as they can to obtain them. Market forces will cause the two sides to meet somewhere in the middle, at price consumers are willing to pay and that producer are willing to accept.

Companies often differentiate their product lines vertically, rather than horizontally, considering consumers' differential willingness to pay for quality. As noted by Michaela Draganska of Drexel University and Dipak C. Jain of INSEAD in the journal Marketing Science, many firms offer products that vary in characteristics like colour or flavour, but that do not vary in quality. Their study found that using uniform prices for all products in a particular product line tends to be the best pricing policy for producers.

For example, Apple Inc. offers several different MacBook Pro laptop computer models, with varying screen sizes, capabilities, and prices. The customer has a choice of two colours: silver and space gray. If Apple charged a higher price for a 13-inch silver MacBook Pro versus an otherwise identical space gray one, demand for the silver model might fall, and the available supply of the silver model would increase. At that point, Apple might be forced to reduce the price of that model.

When the quantity of a good or service that's available matches the demand of potential consumers for it, the market is said to achieve equilibrium. The concept of price theory allows for price adjustments as market conditions change.

Every businessperson starts a business with a motive and intention of earning profits. This ambition can be acquired by the pricing method of a firm. While fixing the cost of a product and services the following point should be considered:

- The identity of the goods and services
- The cost of similar goods and services in the market
- The target audience for whom the goods and services are produces
- The total cost of production (raw material, labour cost, machinery cost, transit, inventory cost etc).
- External elements like government rules and regulations, policies, economy, etc.,

8.6 DETERMINING FACTORS OF PRICES

Determination of Prices means to determine the cost of goods sold and services rendered in the free market. In a free market, the forces of demand and supply determine the prices.The Government does not interfere in the determination of the prices. However, in some cases, the Government may intervene in determining the prices. For example, the Government has fixed the minimum selling price for the wheat.

Factors Influencing Pricing

Pricing of a product is influenced by various factors as price involves many variables. Factorscan be categorized into two, depending on the variables influencing the price.

Internal Factors

The following are the factors that influence the increase and decrease in the price of a product internally −

- Marketing objectives of company
- Consumer's expectation from company by past pricing
- Product features
- Position of product in product cycle
- Rate of product using pattern of demand
- Production and advertisement cost
- Uniqueness of the product
- Production line composition of the company
- Price elasticity as per sales of product

Internal factors that influence pricing depend on the cost of manufacturing of the product, whichincludes fixed cost like labor charges, rent price, etc., and variable costs like overhead, electriccharges, etc.

The factors which affect the price determination of the product are:

External Factors

The following are the external factors that have an impact on the increase and decrease in theprice of a product −

- Open or closed market
- Consumer behavior for given product
- Major customer negotiation
- Variation in the price of supplies
- Market opponent product pricing
- Consideration of social condition
- Price restricted as per any governing authority

External factors that influence price depend on elements like competition in market, consumerflexibility to purchase, government rules and regulation, etc.

Let's discuss some of the important factors having influence on price determination discuss below:

8.6.1. Product Cost:

Product cost is one of the most important factors which affect the price. It includes the total of fixed costs, variable costs and semi-variable costs incurred through the production, distribution, and selling of the product. Fixed costs refer to those costs which remain fixed at all the levels of production or sales. For instance, rent, salary, etc.

Variable costs attribute to the costs which are directly related to the levels of production or sales. For example, the costs of basic material, apprentice costs, etc. Semi-variable costs take into account those costs which change with the level of activity but not in direct proportion.

8.6.2. The Utility and Demand:

Habitually, end user demands more units of a product when its price is low and vice versa. On the other hand, when the demand for a product is elastic, little variation in the price may result in large changes in quantity demanded.

While, when it is inelastic a change in the prices does not affect the demand significantly. In addition, the buyer is ready to pay up to that point where he perceives utility from the product to be at least equal to the price paid.

8.6.3. The extent of Competition in the Market:

The next consistent factor affecting the price of manufactured goods is the nature and degree of competition in the market. A firm can fix any price for its product if the degree of competition is low. However, when there is competition in the market, the price is fixed after keeping in mind the price of the substitute goods.

8.6.4. Government and Legal Regulations:

The firms which have a monopoly in the market, habitually charge a high price for their products. In order to protect the interest of the public, the government intervenes and regulates the prices of the commodities. For this purpose, it declares some products as indispensable products. For example, Life-saving drugs, etc.

8.6.5. Pricing Objectives:

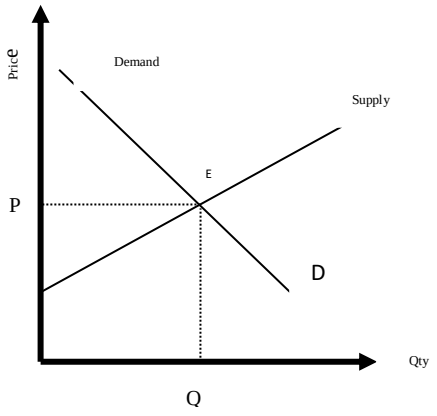
Another consistent factor, affecting the price of an item for consumption or service is the pricing objectives. Profit Maximization, Obtaining Market Share Leadership, Surviving in a Competitive Market and Attaining Product Quality Leadership are the pricing objectives of an enterprise. By and large, firm charges higher prices to cover high quality and high cost if it's backed by the above objective.

8.6.6. Marketing Methods Used:

A range of marketing methods such as circulation system, quality of salesmen, marketing, type of wrapping, patron services, etc. also affects the price of manufactured goods. For instance, an organization will charge sky-scraping revenue if it is using the classy material for wrapping its product

The price that makes demand equivalent to supply is called the equilibrium price. Graphically, it can be said that the equilibrium price is the point where the demand curve and supply curve intersect.

It is the price at which there is no unsold stock left neither is any demand unfulfilled. Thus, it is also known as the market clearing price.



Once the Equilibrium price and quantity are reached, we attain Stable Equilibrium. Stable equilibrium adjusts any disturbance in the demand and supply and restores the original equilibrium.

Other things remaining the same, when the price falls below the equilibrium price, the demand increases and supply decreases. There arises a shortage of goods which in turn increases the price to equilibrium price.

Similarly, when the price rises above the equilibrium price, the demand decreases and supply increases. There arises a surplus of goods which in turn decreases the price to equilibrium price. Thus, the market restores the equilibrium price on its own.

However, the prices are not determined only by the forces of demand and supply.

Other factors such as the price of substitute goods, price of related goods, government policies, competition in the market, etc. also play an important role in the determination of the prices.

Price Elasticity of Demand: The degree to which demand is sensitive to price is called price elasticity of demand. This expression is often shortened to elasticity of demand, although strictly it is difficult to analyze and predict the actual elasticity of demand because economists recognize that demand may also depend on other factors, such as income. The price elasticity of demand refers to the percentage change in the quantity of a good demanded as a result of the percentage change in its price, orPrice elasticity of demand = Percentagechangeindemand/Percentagechangeinprice

8.7 SUMMARY OF THE LESSON

Much of pricing theory is derived from economics, especially from supply and demand theory. This information is encapsulated in the famous demand and supply curves.

The price is set by the point where the curves intersect. The degree to which demand is susceptible to price changes (price elasticity of demand) is another concept borrowed from economics but very useful to marketers.

Again in theory, but rarely in practice, these curves can be obtained from statistical analysis of historical data, survey research, and experimentation. Rather less theoretically, factors affecting the pricing policies of a specific organization include organization factors, product life cycle, product portfolio, product line pricing, segmentation and positioning, and branding. Factors derived from customers are demand, benefits, value, and distribution channels. Of these, perceived value is especially important because it defines what the customer should be prepared to pay

8.8 KEY TERMS

1. Pricing Decision
2. Perceived Value
3. Competition
4. Bundle of benefits
5. Bundle of expectations
6. Marketing mix

8.9 SELF-ASSESSMENT QUESTIONS

1. How does the equilibrium price come about? What is the price elasticity of demand?
2. How may supply and demand curves be established in practice?
3.What organizational factors, derived from related marketing theory, might influence price? How may positioning or branding be used to raise prices?
4. What customer-related factors might, in theory, affect price? Why may perceived value be important?

8.10 FURTHER READINGS

1. Marketing Management by Michael Czinkota and Masaaki Kotabe, Feb, 2022 Chapter 10
2. A Text Book of Cost and Management Accounting by MN Arora, 9th Edition, Vikas Publications, 2010

Dr. David Raju Gollapudi

LESSON 9
PRICING STRATEGIES

OBJECTIVES

1. To provide students with an integrative frame work for making pricing decisions.
2. To provide students with a systematic overview of the factors to be considered when setting price.
3. To facilitate students' understanding of how pricing strategy alternatives can be developed and analyzed
4. Understand how pricing strategies would implement in service industry

STRUCTURE

9.1 PRODUCT PRICING

Sometimes established companies need not adjust their prices at all in response to entrants and their lower prices, because customers frequently are willing to pay more for the products or services of an established company to avoid perceived risks associated with switching products or services.

However, when established companies do not have this advantage, they must implement other pricing strategies to preserve their market share and profits. When entrants are involved, established companies sometimes attempt to hide their actual prices by embedding them in complex prices. This tactic makes it difficult for customers to compare prices, which is advantageous to established companies competing with entrants that have lower prices. In addition, established companies also may use a more complex pricing plan, such as a two-part

pricing tactic. This tactic especially benefits companies with significant market power. Local telephone companies, for example, use this strategy, charging both fixed and per-minute charges.

The next step is to determine the base price of products or services.

Usually, the steps in setting price involve the following procedure:
1. Estimate the demand for the product.
2. Anticipate the competitive reaction.
3. Establish the expected share of the market.
4. Select the price strategy to be used to reach the market target.
5. Consider company policies regarding products, channels and promotion.
6. Select the specific price.

Step 1: Estimate the Demand for the Product

The demand for an established product is easier to be known than for an entirely new product. However, two steps are available for demand estimation.

First: to determine whether there is a price which the customers think the product is worth, i.e., the expected price may range between, say Rs.10 and 20. The seller may determine the expected price by submitting the product to an experienced retailer or wholesaler for appraisal. Producers of industrial products may know the expected price by seeking advice of the technical persons working for the customers.

By showing models or blue prints, necessary information may be gathered as to what theprice would be or he may observe prices or competitive prices, or the potential customers maybe surveyed. The most effective approach is to market the product in a few limited test areas. By quoting different prices under controlled subject, a reasonable range of price may be determined.

Second: to estimate the sales volume at different prices. A product with elastic market demand is usually priced lower than the product with an inelastic demand.

Step 2: Anticipate the Competitive Reaction

Present and potential competition also influences price determination. Competition may come from three existing sources.

First: from directly similar products such as the producer such as the producer may have to compete his vegetable oil product under the name of Dalda with that of Madhuram or Malti or any other new brand or different types of nylon saris.

Second: the competition may be from available substitutes, e.g., butter and ghee, fluid milk and powdered milk.

Third: competition may be from unrelated items seeking the same consumer rupee. The shrewd marketing manager tries to discourage the potential competition, in case of new products, by keeping the prices low so that the competitors may not dare to enter the market.

Step 3: Establish Expected Share of the Market

A firm which wants to win a large share of the market, will price its products differently from a firm which is content with its present share in the market. Attempts towards capturing a large market are manifested in heavy advertisements and other forms of non-price competition. What the share of a particular firm in the market should be, would be influenced by such factors as present production capacity, cost of plant extension and ease of competition

Step 4: Select Pricing Strategy to Reach Market Target

Broadly speaking two alternatives are available for pricing of new products. First, Skimming Pricing and penetrating pricing

Step 5: Consider company marketing policies

This is concerned with the consideration of the product policies, distribution system; and the promotional programs. Product policies involve knowing the economic characteristics of the products so that pricing may be done suitably. Whether a product is of permanent nature or is of perishable nature, influence the pricing policy.

Perishable products have to be disposed of within a limited time to save them from spoilage. Hence, throw-away prices may be set for fruits, vegetables, milk etc. after the days close. But so far as motor-cars, radios, cloth or such other durable products are concerned, their price need not be reduced, for demand exists for these, though it may be postponed for the time being, Change in fashion also compels the seller to dispose of his stock, before the fashion goes old.

Channels of Distribution: The nature of the channels used, and the gross-margin requirements of the middlemen influence the pricing decisions. Pricing discretion differ with the length and complexity of the chain of distribution. A firm selling through wholesalers and also directly to retailers often sets a different factory price for each of these two classes of customers.

Promotional programmers: The larger the promotional methods used, the higher will be the pricing, for expenses incurred will have to be covered from the price set.

Step 6: Select the specific price

After taking all the above facts into consideration, the last stage would be of selecting the specific price for the products by the producer. This will depend upon the cost of the product

9.2 PRICING STRATEGIES

9.2.1 Product Pricing Strategies

Pricing policies are more specific than the objectives and deal with situations in the foreseeable future that generally recurs. Pricing policies provide the framework and consistency needed by the firm to make reasonable, practicable and effective pricing decisions. The correctness of any pricing policy depends on such variables as managerial philosophy, competitive conditions, and the firms marketing and pricing objectives. The following are, however, the policies recognized for pricing.

1. Cost-oriented pricing,
2. Demand-oriented pricing
3. Competition-oriented pricing
4. Selective Pricing

9.2.1.1. Cost-oriented pricing

It is also referred to as cost-plus pricing. This pricing method assures that no product is sold at a loss, since the price covers the full cost incurred. Definitely, costs furnish a good point from which the computation of price could begin. Fixing a tentative price is easier under this method. But the criticism against this policy is that it ignores completely the influences of competition and market demand.

Cost-plus policies are often used by retail traders and in manufacturing industries where the production is non-standardized. The method of pricing here is based on simple arithmetic, adding a fixed percentage to the unit cost. Thus the retail price of a particular item might be the manufacturers cost plus his gross margin plus the wholesalers gross margin, plus the retailers gross margin. This method is known as sum of margins method.

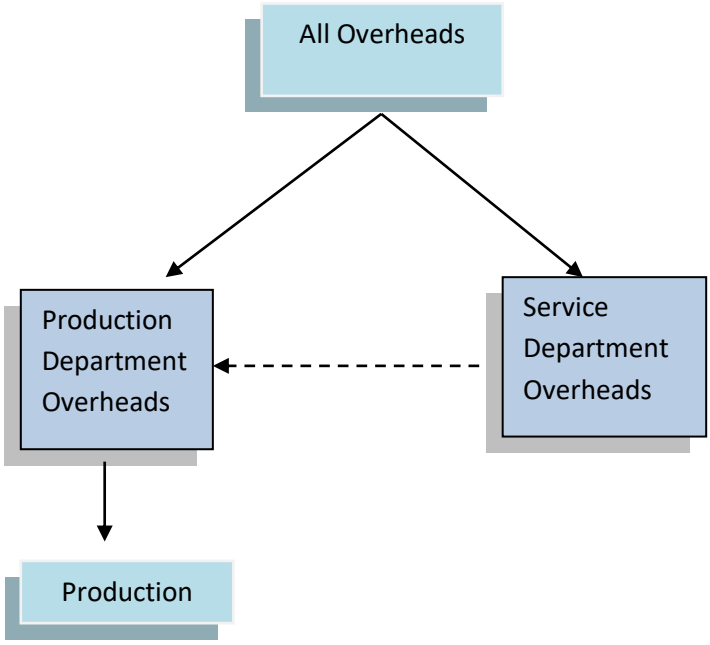
The starting point for most pricing exercises is an examination of the cost of the product or service. In practice, such “cost-plus pricing” is probably the most common approach and may be understandable when the price list contains hundreds of items, although, under those circumstances, it is highly debatable whether the “cost” for each item represents anything more than an estimate.

Paradoxically, cost-plus pricing seems to suggest that inefficiency (which would lead to a higher unit cost) should be rewarded.

The one area in which cost-plus pricing is possibly justifiable is where the supplier has a long-term relationship, almost a partnership, with a customer (often the government and perhaps in the case of industrial buyer). In these circumstances it is sometimes agreed that a certain level of profit, as a percentage of cost, is accept-able. But even here a question has to be asked as to the efficiency of such a pricing policy, for the customer as well as for the supplier, because profit is supposed to be the main incentive. The legal actions taken by government to recover unwarranted profits

made by some defense contractors operating under these pricing policies seem to argue for some dissatisfaction.

The most critical element in this process is often the most arbitrary—that of the allocation of overheads. The process of "absorption" of overheads, whereby indirect overheads are allocated on the basis of "judgment" to production departments and then, combined with direct overheads, "absorbed" into the individual product costs, is often made on the basis of labor content (see the Fig.)



Another common method used under cost-oriented pricing is known as Target Pricing.This is invariably adopted by manufacturers who fix a target return on its total cost.

***Target Pricing*:** In target pricing, the intention is not just to obtain a "profit" over costs but is to obtain a reasonable return on investment (ROI).

Therefore, the price has to be based on both the variable costs (as in cost-plus) and the fixed costs. Fixed costs generally include facility, capital equipment and investment, and other over-head, including top management's salaries. The process of trying to consider investment decisions and pricing decisions simultaneously is a complex one, requiring accurate information. General Motors extensively used target pricing in the 1980s. Facing intense Japanese competition, General Motors was losing customers. To achieve its targeted ROI, the company had to raise prices frequently to compensate for revenues lost to the Japanese automakers and further aggravated its customer losses as a result. Thus, it is not surprising that target pricing is one of the less popular policies, except where it is used often in a theoretical rather than practical context, as part of a justification for a large capital investment program.

Manufacturers these days use Break-Even Analysis for deciding cost-plus pricing. As mentioned earlier one defect of this pricing policy is that it ignores the demand factor. This analysis helps to calculate in advance the likely relationship between the cost, volume and profit over various time periods. It has also proved to be a highly useful technique for the broad planning of manufacturing facilities.

The break-even analysis helps a firm to determine at what level of output the revenues will equal the costs, assuming a certain selling price. For this purpose the cost of manufacture is also divided into two: Fixed and Variable costs. Fixed costs (Rent, Rates, Insurance etc.) theoretically remain constant over all levels of output.

Variable costs (Labour and Material) vary with changes in output level. Fixed costs naturally decrease per unit when production increases.Variable costs, on the other hand, change as production varies i.e., no production, no variable cost.

The break-even point, therefore, is a point where there is neither loss nor profit. This is found out by using the following equation.

BEP = Total fixed costs / Margin of contribution.
Margin of contribution = Unit selling price – Unit variable costs.

Historical Pricing: The normal extension of cost-plus pricing is to base today's prices on yesterday's—thus, "historical" pricing. The annual round of price increases, for example, is based on last year's price raised by something approximating the increase in the cost of living or the true increase in costs—whichever is higher. Also, any adjustment of the historical price should consider market environmental changes such as changes in buying power, competitors' price, regulatory issues, and so forth.

***Product Line Pricing*:** The pricing for a given product may be decided by the range within which it fits. There may thus appear to be an inevitable logic, derived from the rest of the product line. A 12-ounce pack, for example, is expected to have a price somewhere close to the median of the 8-ounce and 16-ounce packs. A premium price on a member of a budget-price product line would pose questions, and, at the other extreme, a budget-price entry into a luxury product line might do severe damage to the quality image of that product line.

A more specific example of product line pricing comes from retailing, where it is often called price lining. In this case there are a limited number of predetermined price points, and all items in a given price category are given a specific price, say $9.99. This type of pricing also illustrates the "psychological" aspect of choosing certain price points on the basis that customers will read $9.99 as $9 rather than the $10 it nearly is! However, there is debate about the effectiveness of such psychological pricing strategies.

9.2.1.2. Demand-Oriented Pricing

As the name suggests, under this method of pricing, the demand is the pivotal factor. Price is fixed by simply adjusting it to the market conditions. A high price is charged when orwhere the demand is intense, and a low price is charged when the demand is low, Price discrimination is usually adopted under such market situations.

"Demand and Supply," market-based pricing is sometimes called "perceived value pricing" because the price charged matches the value that the customer perceives the product or service offers. Clearly, this strategy is nearly ideal because it is likely to be optimal in terms of obtaining the maximum premium on the commodity price. This is also the ideal price in that it matches the "position" of the product to the customer's perceptions. Particularly in the luxury goods markets, the price is an element of the overall "description" of the product and one that is seen as

reflecting its quality. There are many examples of luxury products, such as Harley-Davidson motorcycles, that have performed badly until the price is increased in line with the quality expected.

9.2.1.3. Competition-Oriented Pricing

Most companies set prices after a careful consideration of the competitive price structure. Deliberate policies may be formulated to sell above, below, or generally in line, with competition. One important feature of this method is that there cannot be any rigid relation between the price of a product and the firms own cost or demand. Its own cost or demand may change but the firm maintains its price. Conversely, the same firm will change its price when the competitors change theirs, even if its own cost or demand has not altered. KINDS OF PRICING

Adopting basic principle explained above, firms may choose various kinds of pricing for their products. These are discussed below.

1. Odd pricing: The term odd price is used in two ways. It may be a price ending in an odd number or a price just under a round number. The seller of specialty or convenience goods adopts such a pricing generally; for example, a shoe manufacturer pricing one of his products, at say, Rs. 49.92.

2. Psychological pricing: The price under this method is fixed at a full number. The price-setters feel that such a price has an apparent psychological significance from the view point of buyers. For example, it is stated that there are certain critical points at prices such as 1, 5 and 10. The experiments conducted proved that change of price over a certain range, has little effect until some critical point is reached.

3. Customary prices: Such prices are fixed by custom. For example, sweets manufacturers price their products in such a way that a particular variety of sweets are sold at approximately the same price. Soft drinks are also priced in the same manner. Such a pricing is usually adopted by chain stores

9.2.2 Pricing New Products

An organization is most free to determine the price of its products or services when they are launched. After the price has been set, so has a precedent. In the event of any future changes, consumers will have not only the competitive prices as a comparison, but they will also have the previous prices as a very direct point of reference.

Therefore, making substantial changes to the prices of existing products or services is very difficult. Consumer reactions may be severe if they think the organization is taking advantage of them.

If the new product is entering an existing market, price will be just one of the positioning variables. On this basis, the price will be carefully calculated to position the brand exactly where it will make the most impact—and profit. At a less sophisticated level, the producer of a new brand will decide which of the existing

price ranges-cheap or expensive-the product or service should address. A supplier entering a mass consumer market can simply go to the local super market or specialty store and see what prices are already accepted for similar products.

In industrial markets, obtaining competitive prices may be much more difficult, even where published price lists are available, because these prices are often only the starting point for negotiations that result in heavy discounts.

In the case of a totally new product or service, the pricing exercise will be that much more difficult because no precedents indicate how the consumer might behave, and market research is notoriously inaccurate in this area. In the end, what "perceived value" the consumer will put on the offering will have to be a judgmental decision.

Pricing a new product is an art. It is one of the most important and puzzling marketing problems faced by a firm. Pricing is important in two ways, as far as a new product is concerned.

(a) It affects the quantity of the product to be sold
(b) It determines the amount of the revenue of affirm

New products, when introduced, appeal too many as novel items. But this distinctiveness created by novelty is only temporary. The price factor which may be ignored initially would become important when the product becomes an ordinary one because of being constantly used. Furthermore, competitors may also appear in the market. Therefore, the new products are hard to be priced, especially with a right price. Incorrect pricing will definitely lead to product failure. For setting a price on a new product, three guidelines are to be adopted.

1. Making the product accepted
2. Maintaining the market
3. Retaining the profits

There are two options available for pricing a new product: Skimming and Penetration pricing. If product is entirely new in all respects, skimming method could be used. A strategy of high prices coupled with large promotional expenditure in the initial stages has proved successful in a number of cases. Skimming pricing is recommended on account of the following reasons:

1) Initial sales would be-less,
2) Helps to take the cream of market through high prices,
3) As pointed out people may like to own a new product even at a higher cost,
4) Helps to develop demand as the price is gradually reduced
5) High sales volume on account of higher price.

However, it should be noted that high initial prices may also prevent quick sales. The second option is to adopt penetration pricing. A comparative analysis of these two pricing systems reveals that both these methods are not free from errors.

"Pricing New Products," however, two main approaches are possible for a new product's pricing strategy and to a lesser extent for an existing one: skimming and penetration pricing.

9.2.2.1 Skimming Pricing

One pricing approach is to set the initial price high, to "skim" as much profit as possible, even in the early stages of the product life cycle. This approach is particularly applicable to new products that, at least for some time, have a monopoly of the market because the competitors have not yet emerged or at least the quality of the newly launched product is much better than the existing alternative products and is a pattern often seen in the introduction of new technology. For example, when telephone companies entered Russia with cellular phones, they were priced very high at $2500 for sign-up because they had no competition and appealed to just a handful of wealthy people. Within 2 years, however, the average price of those cellular phones returned to $200 for sign-up due to a demand much larger than expected and threats of eventual competition. Similarly, the price of a mobile phone was much higher when it was first launched in the mid-1990s, in comparison to the price of mobile phones today.

The price is usually reduced, possibly in stages, by the first entrants to gradually expand demand, until it reaches a competitive level just before the competitors enter the market. However, it is interesting to note that in the case of video recorders, latecomers such as Panasonic and Toshiba, with improved technology and competitive prices, actually swept the market originally created by Philips and Sony.

A skimming pricing strategy is highly market-dependent, and before applying it, a company must ensure the following:

1. Many customers are willing to pay a high price.
2. Competitors cannot disrupt the market.
3. The costs of producing a smaller volume are not high.

The rationale behind skimming (sometimes called rapid payback) is normally quite simply that of maximizing profit. But there may occasionally be another motive—that of maximizing the image of "quality." This is a policy that holds in consumer markets such as the upper end of the perfume trade; for example, sales of Chanel No. 5 would probably not increase dramatically if the price were reduced. But this policy can just as easily apply in industrial markets. It is the foolish consultant who asks for a low price; because the client will probably think that the quality is comparably low.

As just indicated, the danger of a skimming policy is that a high price encourages other competitors to enter the market because they see that sales revenue can quickly cover the expense of developing a rival product. Even if your prices are not exorbitant, you may still need, therefore, to plan for a steady reduction in price as competitors appear and you recover some of your launch costs. Such a price reduction will normally be helped by economies of scale. For example, *Dell* began selling sub-$1000 home PCs and plans to have much more presence and

aggressiveness in the lower-priced product segment. Although hardly ground-breaking in an era of $599 machines, Dell's most recent embrace of under-$1000 PCs continues the balancing act of avoiding first-time PC buyers without alienating them from its own line of PCs in its strategy of "skimming the cream" in the low end of the market.

***Zara pricing strategy*:** Zara is a well-known fashion retailer that has outlets all over the world. Zara offers fashion clothing to the masses at affordable prices. Zara's primary strategy is value-based pricing. Zara considers customers' perceptions of prices and offers clothes with up-to-date fashion trends. It promotes fast fashion and charges lower rates than high-end brands like Gucci, Louis Vuitton, etc. Zara analyses sales every day and offers discounts on unsold clothing lines. Apart from these strategies, Zara uses promotional strategies. As a result, you may see long queues in front of Zara outlets on Black Friday or during a summer sale.

Tesco pricing strategy: Tesco, one of the largest grocery retailers in Europe, tries to serve customers at low prices. Tesco follows a cost-based pricing strategy. Tesco works to reduce production and transportation costs by implementing economies of scale. Tesco also uses dynamic pricing via its membership program. Members get some items at a reduced price and collect points while shopping. Tesco claims to be a cost leader because of these strategies.

9.2.2.2 Penetration Pricing

A manufacturer could choose the opposite tactic by adopting a penetration pricing policy. Indeed, this has been the very successful policy behind the move of Japanese corporations into a number of existing markets. Here, an initial low price might make imitating innovations less attractive for would-be competitors, particularly when the technology is expensive; and it encourages more customers to buy the product soon after its introduction, which hastens the growth of demand and earlier economies of scale. The main value of this policy is that it helps to secure a relatively large market share and increase turnover while reducing unit costs; consequently, the price domination can be maintained and extended. Its major disadvantage lies in lost opportunities for higher profit margins.

In recent decades, many software companies have been literally giving away their product in order to build market share and to entice buyers to buy other products. Giving away the product to consumers is common in consumer goods companies. Companies such as Gillette often give away razors to later make huge profits on the blades. Under this broad category, however, there are a number of more specific policies:

Maximizing brand/product share- This justification is sometimes made in terms of maximizing sales growth, particularly in new markets where competitive activity is less evident.

Maximizing current revenue- The assumption is that higher sales automatically lead to higher profits, although in practice most products are more sensitive, in terms of profit, to price than to volume.

Survival- For some organizations, maximizing revenue by price-cutting may be seen as the only way to survive. This is the philosophy of despair.

The circumstances generally favoring the skimming and penetration pricing are summarized in the following table.

Conditions for skimming versus penetration pricing strategy	
Skimming Pricing	**Penetration Pricing**
Prices are likely to be inelastic	Prices are likely to be elastic
The product or service is new and unique	Competitors are likely to enter the market quickly
There are distinct segments	There are no distinct segments
Quality is important	Products will be undifferentiated
Competitive costs are unknown	Economies of scale apply

9.2.3 Pricing of Services

Some suppliers apply different prices for the same product or service. Marketing in Action 10.1 shows how the internet is facilitating this strategy for natural gas suppliers.

***9.2.3.1 Category pricing*:** The supplier aims to cover the range of price categories (possibly all the way from cheap to expensive) with a "range" of "brands" based on the same "product" (repackaged and possibly with some minor changes). This strategy was particularly obvious when Bausch + Lomb marketed Sensitive Eyes 1 oz. eye drops for $5.65 and Sensitive Eyes 12 oz. contact lens solution for $2.79. It may be less obvious when suppliers run high-priced brands while at the same time offering low-priced store brands.

***9.2.3.2 Customer group pricing*:** The ability of various groups to pay prices may be met by having different categories of prices: Entrance fees and fares are often lower for students and senior citizens.

9.2.3.3 Peak pricing: The price is matched to the demand: High prices are demanded at peak times (the rush hours for transport, the evening performances for theaters, or resort hotel rates for off-season months), but lower prices at off-peak times (to redistribute the resource demands by offering incentives to those who can make use of the services off-peak)

9.2.3.4 Yield pricing*:* A variant of peak pricing known as yield management was originally used by airlines to price each seat differently depending on the hourly fluctuating demand conditions. At the Washington National Opera (formerly Washington Opera Co.), located in the nation's capital, the ticket-services man-ager knew—and his computer system confirmed—that the company routinely turned away people for Friday and Saturday night performances, particularly for prime seats. Meanwhile, midweek tickets went begging. He also knew that not all seats were equal in terms of the view and the acoustics, even in the sought after orchestra section. So the ticket manager and his staff played with ticket prices until he arrived at nine levels, up from five. In the end, the opera raised prices for its

most coveted seats by as much as 50% but also dropped the prices of some 600 seats. The gamble paid off in a 9% revenue increase during the next season.

Yield management emphasizes an aggressive micro market approach to maximizing sales. It assures that companies will sell the right product to the right consumer at the right time for the right price.

4.2.3.5 Service-level pricing: The level of service chosen may determine the price. At its simplest, the buyer may pay for immediate availability rather than having to wait (or may pay more for the guarantee of a seat). This may be extended to levels of "delivery"; the product may be available immediately, and gift wrapped, in an expensive store, or it may arrive some weeks later by mail from a cheaper mail order house. There may also be levels of "quality" in delivery; for instance, seats in different parts of a theater may have differing levels of access to the performance, although the basic "product" may be identical. In addition to the confirmed service (e.g., guaranteed seats in stadium as the seasonal ticket scheme), many service providers (i.e., immigration departments in many countries) offer quicker service with additional price.

The last four of these selective pricing strategies are particularly prevalent in the service industries, where the supplier is in direct contact with the customer.Above all, the main temptation to avoid is the assumption that price is the most important variable in the marketing mix. Sometimes it may be, and you will obviously need to recognize that. In most situations, however, it is not, and in many it may be a very minor consideration. Under these "typical" circumstances, it is important to attend to the other elements of the marketing mix first and then deal with price in this context.

9.3 SUMMERY OF THE LESSON

Pricing new products offers a different set of challenges. In general, the two main opposing strategies are:

Skimming—High price, to skim off the short-term profit

Penetration—Low price, to maximize long-term market share
Practical pricing policies for existing brands may include cost-plus pricing, target pricing, historical pricing, product line pricing, competitive pricing, market-based pricing, and selective pricing. The price can also be a major factor in determining a product's or service's image, ranging from quality price to budget price.

A wide range of discounts may be offered: trade, quantity, cash, allowances, seasonal, promotional, and individual.

Prices may also be set at levels that are judged to be "psychologically" appropriate ($9.95, for instance). Other ways of achieving a price effect may lie with other parts of the offer, such as product bundling, at one extreme, and charging separately for "options," at the other. Alternatively, price may be negotiated, as it often is in capital goods markets.

Organizations may resort to price competition for several reasons, including volume sales, other stimuli, and minor brands. On the other hand, the dangers of initiating a price war include low-quality image, temporary advantage, and profit loss.

9.4 SELF-ASSESSMENT QUESTIONS

1. The most important decision in marketing is _____.
(a) Price (b) Product (c) Place (d) Promotion

2. What is a major problem posed by the traditional economic approach to pricing?
(a) Supply is difficult to determine. (b) Demand is difficult to determine.
(c) Supply is inelastic to price. (d) Demand is inelastic to price.

3. Inelastic demand is characterized by
(a) Demand sensitive to price change (b) Demand insensitive to supply change
(c) Demand sensitive to supply change (d) Demand insensitive to price change

4. All the following are theoretical ways to measure the demand curve EXCEPT
(a) Regression analysis (b) Survey research
(c) Experiment (d) Product life cycle analysis

5. All the following are factors that affect prices and are under direct control of the organization EXCEPT
(a) Product life cycle (b) Product portfolio
(c) Product line pricing (d) Product competition

6. If price competition is severe, the firm should undertake which of the following to offer a degree of protection?
(a) Segmentation (b) Differentiation (c) Penetration (d) Collaboration

7. Which of the following is NOT a strategy to cope with geographical pricing?
(a) Uniform (b) FOB (c) Zone d) Peak

8. Which of the following is NOT a benefit of penetration pricing?
(a) Growth of demand (b) Earlier economies of scale
(c) Increased market share (d) Higher profit margins

9. Market-based pricing is also called _____.
(a) Quality pricing (b) Customer group pricing (c) Perceived value pricing
(d) Competitive pricing

10. All the following are dangers of initiating a price war EXCEPT
(a) Low-quality image (b) Temporary advantage
(c) Decreased profitability (d) Excess capacity

11. Many firms enter a market as price leaders, but their strategy changes as they dominate the lower end of the market. What are some of the challenges these firms face? What strategies have and have not been successful?

12. What opposing pricing policies may be applied to new products, and how do they work?

13. List the pricing policies used in practice. What are the drawbacks of cost-plus pricing?

14. How is competitive pricing different from market-based pricing? What selective pricing policies may be employed?

15. What discounts may be offered? What is psychological pricing? What are the differences between product bundling and charging for options?

9.5 KEY TERMS

1. Category pricing
2. Customer group pricing
3. Equilibrium price
4. Free on board (FOB) pricing
5. Peak pricing
6. Price elasticity of demand
7. Service-level pricing
8. Skimming& Penetrating Pricing
9. Uniform pricing
10. Yield pricing
11. Zone pricing

9.6 FURTHER READINGS

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LESSON 10
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

10.1 INTRODUCTION

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.

10.1.1 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 tobe pursed 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 at 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 isa short-term operational plan used as a tool by management for planning as well as controllingthe 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.

10.1.2 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 ofa 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 controlis 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."

10.1.3 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 purchaseforecast	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.

10.2 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.

10.2.1 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 utilizeresources judiciously;
3. To motivate organizational members to perform well; and
4. To exercise control on cost through comparison of actual results with budgeted ones andinitiating rectificational steps promptly.

10.2.2 Distinction between Budgeting and Budgetary Control:

Budgeting and Budgetary control are accounting exercises which act as a tool ofmanagement 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 expressedin monetary terms	Budgetary control is the very essence offinancial 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 in employed by a budget committee or controller.

10.3 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 tofind 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 bequantified and clearly stated. These goals should be set within the framework of corporate objectives and strategies. A well defined corporate policies and strategies arepre-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 mustbe 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

budgetsare 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 timeof 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 feedb ack 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.

10.4 BUDGETARY CONTROL ORGANISATION

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

10.4.1 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.

10.4.2 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 posses through 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 companydirectly.

Budget Committees: The Budget Controller may have a budget committee under himto 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.

10.4.3 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.

10.4.4 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

fulfillment. 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 importrestrictions.
(e) Management: Limited availability of expertise, technical and managerial.

10.4.5 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 forthe variances so that proper corrective action may be taken.

10.5 ADVANTAGES OF BUDGETARY CONTROL

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 aidto management through planning, coordination and control.

10.5.1 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.

10.5.2 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.

10.5.3 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 indullge in buck-passing when budget figures are not met. By pin-pointing responsibility for inefficient performance, budgeting helps management trace weak spots 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 isput 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, theyare made to earn their rewards by showing superior performance.

10.6 LIMITATIONS OF BUDGETARY CONTROL

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 loose 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 smallconcerns 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.

10.7 SELF ASSESSMENT QUESTIONS

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 ystem.
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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LESSON 11
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

11.1 TYPES OF BUDGET

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 basisof classification are generally followed in practice.

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

11.1.1 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 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 achievethe 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 requirementsof 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 threemonths ending 31st December, 2002.

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

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 ¼ months, overheads – ½ months.**

iii. **Cash and Bank Balance on 31st 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 1st October; (b) Preference share dividend @ 5% on Rs.50,000 are to be paid on 1st December; (c) Calls on 250 equity shares @ Rs.2 per share expected on 1st November; (d) Dividends from investments amounting to Rs.250 are expected on 31st December; (e) Income tax (advance) to be paid in December Rs.500**

Solution:

Cash Budget

Period: 3 months ending 31st 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:

¼ Wages of September and ¾ wages of October

Thus (¼ × 750) = 187.50 + (¾ × 800) Rs.600 = 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 forsix months ending 31st December, 2001.

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

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 asthey had increased over the budgeted price.**
iii. **Labour charges are expected to increase by 50 paise per hour above the actualrate 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 30th 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	Raw Materials 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

11.1.2 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 thebudget for the next year from the following information:

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

Solution:

Master Budget

		Rs.	Rs.
A.	**Sales Budget:**		
	Budgeted Sales:		
	Product A		3,00,000
	Product B		5,00,000
			8,00,000
	Less: Administrative, selling and distribution expenses		14,000
	Net sales value		7,86,000
B.	**Product Cost Budget**		**4,80,000**
	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
			5,49,000
	Fixed : Indirect labour:		
	Works manager	6,000	
	Foreman	4,800	
	Depreciation	12,600	
	Sundries	3,600	27,000
			5,76,000
C.	**Expected Profit (A-B)**		**2,10,000**

11.1.3 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 firmover 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.

11.1.4 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.

11.2 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 fora 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.

11.2.1 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 thebusiness 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.

11.2.2 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 tochanges 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 thebasis of the following information.

Production at 50% capacity	**5,000 units**
Raw Material	**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 (variable)**

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, increaseby 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:

Flexible budget

	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 yearlyperiod.

	Rs. (lakhs)
Fixed Expenses	
Wages and Salaries	**9.5**
Rent, Rates and taxes	**6.6**
Depreciation	**7.4**
Sundry administration expenses	**6.5**
Semi-variable expenses (at 50% of capacity)	
Maintenance and repairs	**3.5**
Indirect labour	**7.9**
Sales department salaries	**3.8**
Sundry administrative expenses	**2.8**
Variable expenses (at 50% of capacity)	
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% and100% 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 administrativeExpenses	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 offeryour critical comments. At 60% working material cost increases by 2% and selling pricefalls 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 perunit. The unit cost is Rs.180 is made up as follows:

	Rs.
Material	**100**
Labour	**30**
Factory overhead	**30 (40% fixed)**

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
Factory overheads						
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
Administrative overheads						
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

11.3 CURRENT DEVELOPMENTS IN BUDGETING

11.3.1 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 the adjusting them for finding out the future level of activity and preparation of budgets there from. ZBB forcesmanagers 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 tantamount 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.

11.3.2 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 accomplishmentin terms of services, benefits etc.

11.3.3 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 devision of units of an organisation under specified authority of a person are developed as a responsibility centre and evaluated individually for their performance.

11.4 SELF ASSESSMENT QUESTIONS

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.

11.5 EXERCISES

1. A company manufacturers 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 finishedunits 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 castshis 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 1st January Rs.8,000. It has been decided by the Management that:

i. In case of deficit fund within the limit of Rs.10,000 arrangements can be made with bank.

ii. In case of deficit fund exceeding Rs.10,000 but within the limits of Rs.42,000 issue of debentures is to be preferred.

iii. In case of deficit fund exceeding Rs.42,000, issue of shares is preferred (considering thefact 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 tomeet the deficit arising in each month.

5. Prepare Cash budget of a company for April, May, June 2002 in a columnar form usingthe 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:

a. 10% of purchase and 20% of Sales are for cash.
b. The average collection period of the Company is ½ month and credit purchases arepaid off regularly after one month.
c. Wages are paid half monthly and the rent of Rs.500 excluded in expense is paidmonthly.
d. Cash and Bank balance on April 1, was Rs.15,000 and the company wants to keep iton 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' andone 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 31st 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 enable 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 31st 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 endof every month (including June, 2001)

iv. Budgeted production and production costs for the year ending December, 2001are 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 onlycommodity manufactured by them for a costing period as under:

	Rs.
Raw material	2.52 per unit
Direct labour	0.75 per unit
Direct xpenses	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 asfollows:

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 segragating fixed and variable cost in total and per unit. At80% 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]

11.6 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
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9. Dr. Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP Jain & KL Narang. Advanced Cost and Management Accounting

(401CO21)

Model Question Paper
M.Com. (Accountancy).
Semester –1V
Paper 1 - Advanced Management Accounting

Time : Three hours **Maximum : 70 marks**

SECTION A — (4 × 5 = 20 marks)
Answer any FOUR of the following.

1. (a) Concept of Management Accounting
   (b) Cost Control
   (c) Uses of Activity Based Costing
   (d) Differentiate between product cost and period cost
   (e) What is Cash break-even point
   (f) Pricing decisions
   (g) Meaning and essential features of a budget
   (h) Zero Based Budgeting

SECTION B — (5 × 10 = 50 marks)
Answer the following questions.

2. (a) Explain briefly the tools and techniques of Management Accounting?

   Or

   (b) 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.

3. (a) Briefly explain the concept of Cost Reduction & Control.

   Or

   (b) A manufacturer has supplied the following information relating to one of his product.

   Total variable costs Rs.30,000 — Total sales Rs.60,000
   Units sold 20,000 — Total Fixed Costs Rs.18,000

   Calculate: a. Contribution per unit — b. Break-even point
   c. Margin of Safety — d. Profit
   e. Volume of sales to earn a profit of Rs.24,000

4. (a) Discuss the steps in applying Activity Based Costing?

   Or

   (b) 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 - Rs. 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.

5. (a) explain the Pricing of Services.

Or

(b) 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%.

6. (a) Briefly write about types of Budgets.

Or

(b) 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
