Manonmaniam Sundaranar University, Tirunelveli
Directorate of Distance and Continuing Education
M.Com I Year
Paper – IV Accounting for Financial Decision Making
Syllabus

Unit – 1

Management Accounting – Definition – Scope – Objectives – Advantages – Limitations, Management Accounting versus Financial Accounting and Cost Accounting.

Unit –2

Interpretation of Financial Statements – Ratio Analysis- Inter Firm and intra firm comparison

Unit – 3

Budget and Budgetary Control – Functional budgets leading to the preparation of master budget; capital expenditure budget, fixed and flexible budget responsibility accounting – standard costing and variance analysis – material labour and overheads, reporting of variances.

Unit – 4

Marginal costing – break even Analysis, cost – volume – profit analysis, break even charts contributing margin and various decision – making problems like make or buy own or lease, retain or replace; repair or renovate , now or later; change versus status, slower or taster, sell or scrap or retain export versus local sale; shut – down or continue; expand or contract.

Unit – 5

Capital budgeting and techniques for evaluation of capital projects like pay back period, rate of return and discounted cash flow – techniques for control for capital budgeting – Risk – evaluation and Sensitivity Analysis, simulation for risk evaluation. Measurement of cost of capital and determining rate of return for project decision concept of cost of capital and its application in capital budgeting decisions – Social cost and Social Benefit analysis of projects – Linear programming and capital budgeting decisions – Reporting to Management.

Unit – 6

Management of working capital – Management of cash and Marketable Securities – Motive for holding cash – Factors affecting cash balances – cash velocity – Technique of expediting collection – concentration banking – Lock box system – playing on the fleat – Investment characteristics. Management of inventory – Inventory costs – Management of Accounts Receivable – Credit Analyisis – Fund flow and cash Flow Analysis

Unit –7

Dividend policy – Interrelationship of Dividend Rate, Share Prices and Growth of a firm – Garden model – Miller Modigliani model – Determinants of Dividend Policy – Working capital Requirements and Form of Dividend – Script Dividends – Debenture – Dividends – Stock Splits – Property Dividends – Bunus Shares- Depreciation Policy including depreciation accounting for replacement cost – Management of Investment Portfolio.

Books Recommended

1. S. Nagarathnam Management Accounting Financial Management and Holding Company Accounts (S.Chand & Co., New Delhi)

Index

LESSON 1
MANAGEMENT ACCOUNTING

Management means Getting things done by people in an organisation. The art of management can be prasticed effectively only if periodical, timely and reliable information is available to the manager. In a sole proprietary concern, the proprietor does not have elaborate organization to collect information for making decisions. As organizations became complex, responsibilities and authorities get distributed over different managers. Things become more important. Management turns to a reliable and regular source of information for gaining knowledge to manage better.

In recent years, changes in technology have had a pronounced effect on all fields of knowledge. Devełopments in the field of science and mathematics have found applications practically in every field of life. The impact in the field of accounting have also been significant.

Areas of Accounting

Many accountants view different fields of accounting viz. financial accounting, cost accounting, government accounting co-operative accounting, management accounting etc., as different areas of accounting. But accounting is one comprehensive and cohesive system. In the context of modern business and industry, accounting has to be a versatile system serving a large number of varying goals simultaneously. The goal requirements of taxation, credit worthiness, earning power, resources control managerial efficiency, shareholders satisfaction, government policy, industrial peace and public image are different and some times conflicting. Hence, a single system capable of hanging voluminous and varied information has to be created to achieve the objects.

Accounting Functions

Accounting is the process of identifying measuring, recording and communication economic information capable of being expressed interms of money atleast particularly to help users of the information. If the transactions are mostly financial in nature, the accounting system will be termed as financial accounting. It they relate to costing information, the system will be known as cost accounting. The financial accountings is meant to serve all parties external to the firm such as creditors, investors, employees and public in general. On the other hand, accounting which is primarily concerned with providing information relating to the conduct of the various

aspects of a business, like cost or profit associated with some portions of a business operations is called, "Management Accounting".

Concet of Financial Accounting

Financial accounting is defined as the science and art of recording and classifying business transactions and making significant summaries for the determinations of the profit or loss of the year and their effect on the owner's capital assets and liabilities. The American Institute of certified Public Accountants has defined financial accountings. The art of recording, classifying and summarisings in a significant manner and in terms of money, transactions an events which are, in part at least, a of financial character and interpreting the results thereof.

Thus financial accounting is concerned with the compliation and communication of financial information. An analysis of the definitions brings out clearly the objectives and functions of financial accountings. The following may be listed out as the main objectives and functions of financial accountings. The following may be listed out as the main objectives of **Management Accounting.**

a. To ascertain the operating results of the enterprises.
b. To reveal the financial position of the business, and
c. To enable control over the operation as well as the resource of the business.

Functions of Financial Accounting

a. Recording

It is considered as the primary function of accounting. It takes care to see that all transactions of a financial character are recorded in an orderly manner. The primary records used for the purpose are the journal and subsidiary books

Classifying and summarising

Classifications in concerned with the systematic analysis of recorded data by grouping them into items of a similar nature. The transactions are posted into a larger under different ledger accounts. The they are summarized the presented in a significant manner. In this process the following statements are prepared (1) Trial Balance (2) Profit and Loss Account, and (3) Balance Sheet. These statements will reveal only information which are financial in nature.

c. Interpreting

This is the most important function of financial accounting. It helps to know the financial position and profitability of operations. Accounting interpretation takes the form of the selection of data to be recorded and analytical reports prepared. The data so collected and complied, is used for future planning and policy formulations.

d. Communications

Accounting is the language for communicating the financial facts about an enterprise to those who have an interest in using interpreting them. The recorded data loses much of its utility if the facts are not available to those who require them.

Accounting concepts

The accounting concepts are the basic conditions upto which the accounting system is based. Some of the important accounting concept are

1. Business Entity Concept
2. Going Concern Concept
3. Money Measurement Concept
4. Cost Concept
5. Dual – Aspects Concept
6. Realisation Concept
7. Accrual Concept

Accountants treat a business as distinct from the proprietor. Without such a distribution, the activities of the firm will be mixed up with the private affairs to the proprietor and the true picture of the business will not be available.

It is assumed that a business unit has a perpetual successions or continue existence and transactions are recorded from this point of view. It is only on this assumption that a distribution is made between capital expenditure and revenue expenditure.

Under the money measurement concept, only those transactions which are expressed in monetary terms are recorded in the accounting books, hence, non-monetary transactions are either omitted or recorded separately.

When transactions are recorded in the books only against the amounts actually involved it is called cost concept. This concept prevents arbitary values being used for recording purposes, mainly those resulting in the purchase of assets.

The Dual Aspect Concept refers to the recording of the debit and credit aspect of a transaction. The assumption is that always the total claims of outsiders and proprietors will be equal to the total assets of the firm. This is, External Liabilities + Capital = Total Assets, Total Assets = Total Liabilities. This is called accounting equation.

Realisation Concept

Accounting is a historical record of transaction. It does not attempt to meant the adverse effects of events that even already been recorded. This is important to prevent business concerns from inflating, their profit for instance, profit on sales will be taken into account only when money is realised.

Accrual Concept

Normally, all transactions are settled it cash but even if cash settlement has not yet taken place, it is proper to bring the transaction into the books and accounts. Expenditure incurred during the year but no paid and income earned but not received are called accrued items. According to this concept these items will be taken into consideration while arriving at profit or loss.

Limitation of Financial Accounting

Financial accounting was able to cope up with the needs of business in the initial stages when business was not so complex, But the growth and complexities of modern business have made financial accounting highly inadequate. The inadequacies of financial accounting are as follows.

a) Change in Nature of Business

Business activities have undergone a radical change and have become more complex. It fails to provide the required information. Some of the business expenditure incurred today may bring benefits to the business only in future and may not get any immediate return. Hence, the management needs a lot of varied information to decide whether it will be justifiable to incur a particular expenditure or not. Financial accounting fail to provide such information.

b) Post-mortem record

Business decisions are made, today, to influence the future. The problem is how to use the records of the past a guide to the future so that it may meet the needs of management. From the point of view, financial accounting furnishes only a past-mortem record of business transaction as completed events alone are the subject of accounting process. Hence, Financial accounting speaks only about the past and nothing about the future. In the modern business world under competitive conditions. Management are in need of accounting information not about the past but about the present and future. Management Accounting is related to an accounting that facilitates informations that facilitates the management functions of planning.

c) Effect of Government Interference

The demand for an integrated national economy has led to increased government interference in the economic life of the people. Management has to take account of government decision which are not capable of being quantitatively expressed. Financial accounting, being concerned with objectively quantifiable information, is unable to take them into account.

d) Need – Different Levels of Management

Financial accounting fails to meet the information needed by different levels of management. The information needs of the different levels of management are widely vary with regard to subject – matter and amount of details Top managements as the policy market, is interested in information such as soundness of plans, proper structure of organization, delegation of authority etc. The middle level management would like to know about the occurrence of business event. The lower level management, as operating supervisor, would like to know about

the effectiveness of its operations. Financial accounts has not build- in system to provide such information.

e) Elementary Information

In provides only elementary information in consolidated form, the rapid change in technology and fast growth of business units have made in the tale of modern management highly complicated, particularly in areas relating to planning and control of operations. For the purpose of planning and control, a very detailed break-up all types of information connected with all aspects of the business is necessary. But the financial accounting provides only elementary information and that too in consolidated form.

Management accounting is free from the above limitations of the financial accounting. But management accounting makes use of information that is drawn from financial accounting for making inferences and estimating for the future.

Management Accounting – Meaning

The term Management Accounting is composed of two words

1. Management and
2. Accounting

Hence a clear understanding of these two words will help us in understanding what is 'Management Accounting'.

Management is principally a task of planning. Co-ordinating motivating and controlling the errors or other towards a specific objectives. The principal aim of all management is materials. Man-power machines and skill. There may be different level of management such as top management, Middle and lower level management. Top management is primarily concerned with formulating policies, setting targets, exercisities of a business with a view to securing economic and generally concerned with the day-to-day operations within the framework of the plans, policies and objectives set by the top management. A business, bit or small, can never afford to proceed on'guess work's or adopt'hit or miss' method of work. Its main objectives are to study the operating problem on the basis of facts and to work out the best use and application of human and material resources. Therefore, Management Accounting is a science which aims to science which aims at achieving these objectives.

The other word is 'Accounting'. It is an art of analysis and interpreting the transactions in terms of time (1) Financial Accounting (2) Cost Accounting and (3) Management Accounting. Financial Accounting pertains to the periodical representation of the financial statements. It helps to protect the interest of those who have primarily a financial state in the organisations affairs shareholders, creditors, investors, employees, regulatory bodies and public in general. Cost Accounting help to find out the exact cost of manufacture view to maximise the output at the minimum cost. Management Accounting is primarily concerned with providing information like cost or profit associated with some portions of business operations.

The term 'Management Accounting' is recent origin. It was first coined by the British Team of Accountant visited the U.S.A. under the sponsorship of Anglo – American Productivity Council in 1950 with a view to highlighting utility of Accounting as an effective management tool. It is used to describe the modern concept of accounts as a tool of management in contrast to the conventional periodical account prepared mainly for information to proprietors. The objective is to expand the financial and statistical information so as to throw light on all phases of the activities of the organisations.

Misconceptions About Management Accounting

There are certain misconceptions about the Management Accounting. According to some persons. Management Accounting is nothing but old wine in new bottle. Is it the same old wine served in a new bottle? The answer is a definite 'No' Financial Accounting merely deals with the presentation of the financial data after a particular period, usually at the end of the year an no managerial control is possible thereafter But under Management Accounting the various data relating to finance, sales, purchasing, person etc, are periodically presented before the

management and proper control can be exercised by it in case of divergence from the set standards.

On the other hand, other believe that Management Accounting is allied to Cost Accounting. This noting also is incorrect. Although cost Accounting is an essential phase of Management According the emphasis has been shifted from distinction between cost accounting and Management Accounting.

As Little on has pointed out that many important data for managerial use are beyond the purview of traditional accounting for example, market demand, personnel information, legal limitation etc. We are all well aware that management has to take day-to-day , hour to hour and even minute decisions, thanks to changing conditions of business environment, Thus, Management Accounting has been originated to fulfill managerial needs by providing the above mentioned data which traditional accounting failed to supply.

Definition of Management Accounting

Before attempting to define Management Accounting, it may be noted that there is no unanimity among management accountants as to its precise definition.

Management Accounting may be defined s 'the presentation of accounting information in such a way as to assist the management in the creation of the policy and day-to-day operations of undertaking.

This definition is given by the Management Accounting of the Anglo-American Council on productively. Perhaps this is the most authoritative description of Management Accounting.

Let us examine a few more definitions.

The Institute of Chartered Accountants of England has defined.

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

Antony's sweet and simple definition does not shed much ligh on all phase of the Management Accounting.

According to American Accounting Association

"Management Accounting – Planning includes the methods and concept necessary for effective planning for choosing among alternative business actions of performance".

This definition is fairly illustrative.

Shillinglaw

Describes nearly the essential differences between financial and managerial accounting which "stems from the fact that, financial accounting is concerned almost exclusively with history where as managerial accounting with that will or may happen in the future".

Keller emphasies the use of management accounting for profit control. According to his "Management Accounting for profit control includes income Accounting. Cost Accounting, and Budgetory Planning and Control.

Some authors prefer the phrase "Management Accountancy" which is described by James Batty as blending together into a coherent whole, financial management. He has this term to include the accounting methods, systems and techniques which coupled with special knowledge and ability, assist management its task of maximising profits or minimizing losses.

Now, we feel that we have various definitions of Management. Accounting given by different scholars and experts in the subjects as well as different professional bodies of the world. All these definitions bring out the mechanistic concept of Management Accounting. They do not touch the spirit of the system. As a matter of compromise we can say that all accounting operations which are oriented towards resources of the enterprises constitute Management Accounting. Thus, all accounting which directly or indirectly leads the organisation to increase its productivity is "Management Accounting".

In the absence of an internationally accepted concepts and definition, authors, have used the followed terms to express the same concepts.

1. Managerial Accounting
2. Control Accounting

3. Responsibility Accounting
4. Decision Accounting
5. Forward Accounting
6. Management Accounting
7. Management Accountancy

Objectives of Management Accounting

The basic objective of management accounting is to assist the management in carrying out its duties efficiently

The Objectives of management accounting are

1. The compliation of plans and budgets covering all aspects of the business e.g. production, selling, distribution research and finance.
2. The systematic allocation of responsibilities for implementation of plans and budgets.
3. The organisation for providing opportunities and facilities for performing responsibilities
4. The analysis to all transactions, financial and physical, to enable effective comparisons to be made between the forcasts made and actual performance.
5. The statistical interpretation of such statement in a manner which will be of utmost assistance to management in planning future policy and operation.
6. Supply of the statistical information to management, at frequent intervals information in the form of operating statement.

Scope of Management Accounting

The scope of Management Accounting is wide a broad based. It encompasses within its fold searching analysis and branches of business operations. However, the following facts of Management Accounting indicate the scope of the subject.

1. Financial Accounting
2. Cost Accounting
3. Budgeting & Forecasting
4. Cost Control Procedures
5. Statistical Methods
6. Legal provisions
7. Organisation & Method

1. Financial Accounting

This includes recording of external transactions covering receipts and a payments of cash, recording of inventory and sales and recognition of liabilities and setting up of receivables. It also covers preparation of regular financial statements. Without a properly designed accounting system, management cannot obtain full control and co-ordination.

2. Cost Accounting

It acts as a supplement to financial accounting. It is concerned with the application of cost to job, product and process and operation. It plays an important role in assisting the management in the creation of policy and the operation of undertaking.

3. Budgetory & Forecasting

These are concerned with the preparation of fixed and flexible budgets, cash forecasts, profit and loss forecasts, etc., in cooperation with operation and other departments. Management is helped by them.

4. Cost Control Procedure:

It is concerned with the establishment and operation of internal control and the preparation of internal report in order to convert the budget into operating services. Management is helped by them by measuring actual results against budgetary standards of performance.

5. Statistical Methods

These are concerned with generating statistical information and analysed in the form of graphs, charts etc. and supplied to all departments of the organisation. Management need not

waste time in understanding the facts and more time and energy can be utilized in drawing sound plans conclusion.

6. Legal Provisions

Many management decisions depend upon the provision of various law and statutory requirement. For example, the decision to make a fresh issue of shares depends upon the permission of controller of Capital issues. Similarly, the form of published accounts, the external audit, the authority to float loans, the computation and verification of income, filing tax returns, making tax payments of excise, sales, payroll, income etc., all depend on various rules and regulations passed from time to time.

7. Organisation & Mass Methods

They deal with organisation, reducing the cost and improving the efficiency of accounting as also of office operations, including the preparation and introduction of accounting and other manuals where these will prove useful.

Functions of Management Accountant

In the U.S.A. the management accountant is called controller or comptroller. He is considered to be part of the management team. He was the responsibility for collecting vital information, both from within and outside the company. He has to design a framework for the management accounting system. Hence, he safeguards the accuracy of information and develops devices required for their organisation and interpretation. The functions of the controller have been laid down by controler's Institutes of America. The following are the typical of the functions of any Management accountant.

1. The establish, co-ordinate and administer and adequate plan for the control of operations. Such a plan would provide for capital investments and for financing sales forecasts
2. The compare performance with operating plan and standards and to report and interpret the results of operation to all levels of management and to the owners of the business. This function includes the formulation and administration of accounting policy and the compliation of statistical records and special reports, if any, required.
3. To consult with all sections of management responsible for policy or action concerning any stage of the operation of business as it relates to the achievement of objectives.
4. To administer tax policies and procedures.
5. To supervise and co-ordinate preparation of reports to government agencies.
6. To assure fiscal protection for the assets of the business through adequate internal control and proper insurance coverage
7. To continuously appraise economic and social forces and government invludences and interpret their effect upon business.

The above seven functions of a controllers are broad enough to include all phases of policy and organisation within the controllers jurisdiction. This has elevated the position of a controller to the top management cadre to the level of Vice-President or Director for Finance.

Function of Management Accounting

A considerable amount of work has to be done to make the basic information fit for utilization in decision making areas. It is also necessary to correlate this information with other relevant information, which does not come out from the books of accounts. The collection and utilisation of accounting information correlated with relevant financial and economic information as well as other environment factors such as political and social, can be called the theme of management accounting. Among other things, management has the functions of planning, control and decision making.

The specific function of accounting in the service of management are.

1. To acts as the storehouse of accounting and other economic information
2. To make available the relevant data after suitably pruning them to adopt the same to the purpose and to analyse them meaningfully for effective planning decision making.
3. To communicate the plans to all levels of management
4. To act as the score board of actual events and to communicate the actual fats both within and outside the organisation periodically this leads to better control and.
5. Expert analysis of working results to highlight prominent facts

Control Functions

Control is the process through which the accountant helps to translate the given objectives and strategy into specific goals for attainment by a specified time and secure effective accomplishment of these goals in a efficient manger. The typical services performed by accounting to assist controller are.

1. Communication of the goas as approved by the management to individuals made responsible for achievement in the proper perspective so, that they understand the responsibility as the management means it to be understood
2. Make all the managers and various other persons, leading their units, aware of their responsibility and assist them in achieving their goals as efficiently as possible
3. Look after the co-ordination of various activities of all the organisation units as so to optimise results.
4. Evaluate the performance and the degree of achievement of various responsibility centers as compared to the goals set for them asses their efficiency.
5. Identity areas of unsatisfactory performance for the benefit of the performing people as well as the top management and assist in the formulation of corrective measures at both ends, or change in the goals set in order to make them more realising.

Control action is left to the managers. Accounting only assists managers to control. Exercise of proper control is possible only through the formulation of an integrated system where in there are no clashes among various organisation units and minimum of information is transmitted from and to various points to yield the maximum benefit. In fact, control is the systematic feasible structure where in all components are cohesively related to each other. It has to be understood well and fully by all the participents in the organisation leading to a common understanding of responsibilities and actins which responsibilities and actions which responsibilities and actiosn would result in disciplined efficiency.

Planning Function

Accounting department assist managers in planning which is the most difficult area in accounting. The accountant has to rely on a large volume of information gathered outside the accounting records as well as the information system maintained within the firm. The process of planning includes long-term decisions as well as short-term actions. The business environment outside as well as conditions within the firm keep on changing and taking decision under such fast – changing circumstances is difficult. The accounting department assists the managers with the requisite information to plan and take decision.

Finance Functions

Finance is the legiblood of a business. Procuring and judicious use of finance are the two important activities under financial management. Just as production and sale are major functions in an enterprise. Finance also is an independent specilised function. Thus, Financial Management is a separate management area.

The prime need of a business is to obtain and disburse funds. Each firm treats this as a special problem. Each firm has its own goals aiming at a certain extent of profit generation. It is not necessary for a firm to have the goal of profit maximisation as the only objective in the short run or even in the long run.

The management might have its own limitation of efficiency and capacity, levels of satisfaction and appraisal of future. Moreover, social responsibilities and to the attraction of goals in various directions. The typical problems that are facted by an accountant dealing with financial function are as follows.

1. Type of expenditure to which a firm should get itself involved in a commitment to spend.
2. The volume of funds that so should be committed by a firm on various types of expenditure.
3. The financing pattern that is considered desirable.
4. The ways and means by which the existing funds committed as well as non-committed could be utilised for getting the maximum benefit for the firm.
5. The course of action to be taken whenever the expectations do not materials and a function is to be averated.
6. Methods of meeting to promise of repaying, reimbursing the funds that have been borrowed or raised from outside or meeting the expectations of the suppliers of funds in order to keep the channels of inflow of funds clear.

The decisions in all these areas are conditionally by the objectives and goals a firm desires to seek and are influenced by the environment prevailing outside to firm, Irrespective of the objectives, goals and strategies, the relationship between costs of funds, sources and carning from funds from an integral part of the finance functions.

Financial Accounting Vs. Management Accounting.

The following are the major difference between Financial Accounting and Management Accounting.

1. Objectives

Financial Accounting is designed to supply information in the form of Profit and Loss Account and Balance Sheet to the external parties like shareholders, Creditors, Loans, Investors and Government. Information is supplied periodically and is usually of such type in which management is not much interested. While the management accounting is designed principally for providing accounting information for internal use by the management.

Financial Accounting is primarily an external reporting process, while Management Accounting is primarily an internal reporting process.

2. Analysing Performance

Financial Accounting portrays the position of business as a whole. The statements like income statement and Balance Sheet report on overall performance of the business. Whereas the management accounting directs its attention to the various divisions, departments of the business and reports about the profitability performance etc. of each of them.

Financial Accounting deals with the aggregate and, therefore, cannot reveal what part of the management action is going wrong. But management accounting provides detailed analytical data for these purposes.

Data Used

Financial Accounting is concerned with the monetary record of past events. It is a past-morterm analysis of past activity and therefore, out of date of management action. On the other

hand the management accounting is accounting for future and, therefore it supplies data both for present and future duly analysed and in detail in the management language so that it becomes a base for management action.

Monetary Management

In financial Accounting only economic events find place which can be described in terms of money. However, the management is equally interested in non-monetary economic events such as technical innovations and changes in the value of money. These events affect management decision and therefore, Management Accounting cannot afford to ignore them.

Perodicity of Reporting

The period of reporting is much longer in financial accounting while the management accounting takes a shorter period for reporting. The income statement and balance sheet are usually prepared year or in some case half-yearly. Management requires information at frequent intervals and, therefore, financial accounting fails to cater to the needs of the management. In Management accounting there is more emphasis on furnishing information quickly and at comparatively short intervals as per the requirements of the management.

Precision

There is less emphasis on precision in case of management accounting as the information is meant for internal consumption. Whereas in the case of financial accountings more precision is required as the data will be used by many outsiders.

Nature

Financial Accounting is "more objective" while management accounting is "more subjective" This is because, management accounting is fundamentally based on judgement rather than on measurement.

Legal Compulsion

Financial Accounting is more less has become compulsory for every business on account of the legal provisions of one or the other Act. However, a business is free to install or not to install, a system of management accounting.

Qualities of a Management Accountant

A successful accountant has to create in himself abilities to perform a variety of functions. He is therefore, expected to have the following qualities.

1. A very good grasp of the economic environment in which the firm is placed
2. An understanding of the methods of forecast economic activities under expected varying conditions, He will find that appreciation of mathematical and statistical tools will be of great assistance to him in his work.
3. Knowledge of the means of recording the company's history and describing its current conditions for the purpose of management review and control and to provide information to interested parties.
4. An understanding of the elements that determine, the values offered by alternative uses of resources and the means of comparing promised alternative values of one of the other.
5. A knowledge of the ways to forecast the funds movements associated with alternative activities under consideration.
6. A understanding of the ways in which various means of raising funds can be combined to produce greater values for the enterprise.
7. An appreciation of the stock of funds already at the company's disposal and of the ways to use this stock more efficiently.
8. An analytical mind which can see through implications of alternate courses.

9. The ability to get along with people at all levels.

With the above abilities, an accountant can render adequate services expected of him. However, these new dimensions of accounting and a growing number of useful analytical techniques are not expected to supplant the activity of keeping accounts. But the keeping of accounts becomes a relatively minor task in the challenging job of a management accountant by whatever name called.

Utility of Management Accounting

Management Accounting provides invaluable services to management in all of its function. The basic functions of management are (i) Planning (ii) Controlling, (iii) Co-ordinating (iv) Organising, (v) Motivating and (vi) communicating.

Management accounting helps in performance of each of these functions efficiently as explained below.

i. Planning

It involves formulation of policies, setting up of goals and initiating necessary programmes for achievement of the goals. Management accounting makes an important contribution in performance of this function. It makes available the relevant data after analysing them suitability for effective planning and decision making.

ii. Controlling

It involves evaluation of performance keeping in view that the actual performance coincides with the planned one, and remedial measures are taken in the event of variation between the two. The techniques of budgetory control, standard coating and departmental operating statements greatly help in performing this function. As a matter of fact the entire system of control is designated and operated by the management accountant designed as controller.

iii. Co-ordinator

It involves inter linking of different division of the business enterprises in a way so as to achieve the objectives of the organisation as a whole, Thus, perfect co-ordination is required among production, purchase, finance personnel, sales etc. departments, Effective co-ordination achieved through department budgets and reports, which from the much of management accounting.

iv. Organizing

It involves grouping of operative action in a way as to identify the authority and responsibility within the organisation. Management accounting here also plays a prominent role. The whole organisation is divided into suitable cost or profit system of internal control and internal audit for each of the cost or profit centres helps in organizing and establishing a sound business structure.

v. Motivation

It involves maintenance of a high degree of morals in the organisation. Conditions, should be such that each person givens him best to realize the goals of the enterprises. The superior should be in a position to find out whom to demote or promote or to reward or penalise. Periodically departmental profit and loss accounts, budgets and reports go a long way in achieving these prepared objectives.

vi. Communicating

It involves transmission of data, result etc.... both to the insiders as well as outsiders. The orders of the superiors should be communicated to the subordinates while the results achieved by

the subordinates should be reported to the superiors. Moreover, the management owes a duty to the creditors, prospective investors, shareholders, etc, to communicate to them about the progress, financial position etc., of the enterprise Management accounting helps the management in performance of this function by developing a suitable system of reporting which emphasis and highlights the relevant facts.

Management accounting is thus helpful to the management in every field to activity. This is the reason why management accountant is considered not only a service arm to management but also a part of management.

Exercise

1. What are accounting concepts and conventions? Explain them clearly
2. Explain how management accounting helps to eliminate the limitations of financial accounting.
3. What are the qualities of a management accountant?
4. How does management accounting help planning and control functions in an organization?
5. Explain the scope of management accounting in providing information to the management for the evaluation and control of business operations.

Lesson 2
INTERPRETATION OF FINANCIAL STATEMENTS

SYNOPSIS

Meaning of financial statements Basic Statements. Limitation analysis and Interpretation steps involved –Method used in analysis Illustrations.

Accounting Ratios – Meaning – Merits – demerits. Types of Ratios – Illustrations – computation of items of financial statements from the accounting ration – illustrations - exercise.

Financial statements are account balance arranged in such a to understand and interpret the financial aspects of a business firm. It will give a service of activities over a period of time.

The term financial statement refers to two basic statements.

1. The Income Statement and
2. The Balance Sheet

1. Income Statement

In explains the happenings (Operations) between two balance sheet datas. It analysis in details the cost and revenues.

2. Balance Sheet

It reveals all assets owned by a firm on a particular data. It also shows the equities of the owners and the dues to the outsiders.

The major difference between the income statement and the balance sheet is that the income statement is for a period, but the balance sheet is prepared for a particular data. But both are complementary to each other.

Persons interested in financial statements

The Public Limited Company is owned by the share holders. The public is general shows much in financial results shown by reports and accounts of companies. Many persons and bodies are interested in knowing financial aspects of a business.

1. Banks
2. Investors
3. Employees

4. Income Tax Department
5. Public Accounts Committee
6. Debenture Holders
7. Investors in the society

Limitations of Financial Statements

1. Financial statement are interim reports because actual profit or loss can be ascertained only when the business is closed down.
2. Financial statements are prepared by using traditional accounting concepts and conventions which may not give realistic yield in the modern era.
3. The personal judgement of accountant influences the result of financial statements. For example, Method of depreciations, treatment, of deferred revenues expenditure etc.
4. Financial statement do not include those qualitative data which are not expressed in-terms of money Ex, Reputation of the business, Loyalty of workers, integrity of management etc.

Analysis of interpretation of financial statements

The term analysis means methodical classification of data given in the financial statements.

The figures in the financial statements should be put in a simplified form

The term interpretation means explaining the meaning and significance of the data so simplified.

Analysis and interpretation are complimentary to each other. Interpretation needs analysis and analysis is useless without interpretation. But most of the authors have used the term analysis only to cover the meanings of both analysis and interpretation.

Steps involved in analysis and interpretation

1. Analysis of each transaction to determine the accounts be debited and credited.
2. Preparation of journal, ledgers and work sheet
3. Preparation of financial statements
4. Analysis and interpretation of statements to have a clear idea for parties inside and outside the company.

Methods and Devices used in analysing financial statements

1. Comparative Financial Statements

In these statements comparative figures for two or more periods are placed side by side to facilitate comparison, In this method we can have a comparative income statement and a comparative balance sheet.

a. Comparative income statement

In discloses the absolute figures for two or more periods and if desired, the change in terms of percentage from one period to another can be calculated. This statement gives meaningful conclusios.

b. Comparative balance sheet.

Comparative balance sheet as on two or more different datas can be used to compare the assets and liabilities and also find out any increase or decrease on the items. It is very useful to study the trend in an enterprise.

Illustrations

From the following profit and loss accounts and the balance sheet of M.Ltd., for the year ended 31st December 1990 and 1991. You are required to prepare a comparative income statement and a comparative balance sheet.

Profit and Loss Account of M.Ltd.

Liabilities	1990 Rs.	1991 Rs.	Assets	1990 Rs.	1991 Rs.
To cost of goods Sold	6000	7500	By Net sales	8000	10000
To operating Expenses	200	--			
Administrative expenses	---	200			
Selling expenses 300					
To Net profit 1500	400				
		1900			
Total Rs.	8000	10000		8000	10000

Balance sheet as on 31st December 1990 & 1991

Liabilities	1990 Rs.	1991 Rs.	Assets	1990 Rs.	1991 Rs.
Bills payable	500	750	Cash	1000	1400
Sundry creditors	1500	2000	Debtors	2000	3000
Tax payable	1000	1500	Stock	2000	3000
6% debentures	1000	1500	Land	1000	1000
6% preference			Building	3000	2700
Capital	3000	3000	Plant	3000	2700
Equity capital	4000	4000	Furniture	1000	1100
Reverses	2000	2450			
Total Rs.	13000	15200	Total Rs.	13000	15200

Solution M.Ltd

Comparative Income statements for the year Ended 31st December 1990 & 1991

	1990	1990	Absolute increase or decrease 1991	Percentage of increase or decrease 1991
Net sales	3000	10000	+2000	+25
Cost of goods	6000	7500	+1500	+25
Gross profit	2000	3500	+500	+25
Operating expenses				
Administration expenses	200	200		
Selling expenses	300	400	+100	33.33
Total operation expenses	500	600	100	+20
Operating profit	1500	1900	+400	+26.67

M.LTD COMPARATIVE BALANCE SHEET AS ON 31ST DECEMBER 1990 AND 1991

	1990	1990	Absolute increase or decrease 1991	Percentage of increase or decrease 1991
Current Assets				
Cash	1000	1400	400	+40%
Debtors	2000	3000	1000	+50%
Stock	2000	3000	1000	+50%
Total Current Assets	5000	7400	2400	+50%
Fixed Assets				
Land	1000	1000	---	---
Building	3000	2700	-300	-10%
Plant	3000	2700	-300	%
Furniture	1000	1400	-400	+40%
Total	8000	7800	200	-2 ½ %
Total Assets	13000	15200	2200	17%

Liabilities & Capital

CURRENT LIABILITIES

Bills payables sundry creditors	500	750	+250	+50%
Taxes payable	1500	2000	+500	+33.3%
	1000	1500	+500	+50%
Total Current Liabilities	3000	4250	+1250	+42%
Long term liabilities 6% Debentures	1000	1500	+500	+50%
Total Liabilities	4000	5750	+1750	+44%
Capital & Reserves				
6 & Pref. Capital	3000	3000	----	---
Equity Capital	4000	4000	---	---
Reserves	2000	2450	+450	22.5%
Total Share				
Holders Fund	9000	9450	+450	+57%
Total Liabilities and Capital	13000	15200	2200	+17%

Comparative Statements bring fruitful results for decisions making if two years are compared. If it is more than two years, trend percentage are more useful.

2. Common six statements

In this statement the figures recorded are convered into percentages to some common base. In the balance sheet the total assets and liabilities is taken as 100 and all the figures are expressed as a percentage of this total. In the income statement the sales figure is assumed to be 100 and the remaining figures are expressed as a percentage of sales.

Common sized statement are most useful in making comparison between the companies in the same industry.

Illustration – 2

On the basis of data given illustration 1 prepare a common size Income statements and Baiance Sheet.

Solution M.Ltd.,

Common size income statement for the year ended 31st December 1990 & 1991

	Figures in Percentage	
	1990	1991
Particular	100	100
Cost of goods sold	75	75
Gross profit	25	25
Operating		
Administration expenses	2.50	2
Selling expenses	3.75	4
Total operating expenses	6.25	6
Operating profit	18.75	19

Interpretation

The cost of goods sold has gone up, the percentage is constant at 75%. That is why, the gross profit continues at 25%. Absolute administration, cost remains the same, but the percentage comes down by 5% selling overheads, gone up by 0.25%. All these lead to increase in net profit by 0.25%

M. Ltd.,

Common sized balance sheet as on 31st December 1990 & 1991

Assets	**1990 % 100**	**1991 % 100**
Current Assets		
Cash	7.70	9.21
Debtors	15.38	19.74
Stock	15.38	19.74
Total Current Assets	38.46	48.69
Fixed Assets		
Building	23.07	17.76
Plant	23.07	17.76
Furniture	7.70	9.21
Land	8.07	6.68
Total Fixed Assets	61.54	51.31
Total Assets	100	100
Liabilities and Capital	**1990 % 100**	**1991 % 100**
Current Liabilities		
Bills payable	3.84	4.93
Sundry Creditors	11.54	13.16
Taxes payable 7.69	7.69	9.86
Total Current Liabilities	23.07	29.75

Long Term Liabilities		
6% Debentures	7.69	9.86
Capital and reserves		
6% preference share capital	23.10	19.72
Equity share capital	30.76	26.32
Reserves	15.38	16.15
Total share holders funds	76.93	72.05
Total liabilities and capital	100	100

Interpretation

The percentage of current assets to Total assets has gone up. Similarly the percentage of current liabilities has also raisen. The working capital position has improved.. There is a limited fall in debt equity ratio of course it is sound.

The share holder's funds in relation to the total liabilities has shown a decreased figure.

3. Trend Percentage

It is very useful in making a comparative study of statements or many years in this method. Their percentage relationship of each item bears to same in the base year is calculated. It is usual to take the earliest year as the base year. However, intervening year may also be taken as the base year. This method is useful to highlight the important changes,

Illustration – 3.

From the following date relating to assets of K.Ltd., for the period 31st December 1985 to 1998. Calculate the trend percentage taken 85 as the base year.

Assets	**Rs. In lakhs**			
	1985	1986	1987	1988
Cash	100	140	80	100
Debtors	200	260	320	400
Stock	300	500	250	500
Land	400	500	500	500
Building	800	1000	1200	1400
Plant	1000	1000	2000	2000
Total	2800	3400	4350	4900

Solution

Comparative Balance Sheet as on 31st December

Current Assets	December 31st Rs. in Lakhs				TrendPercentage Base year 1985			
	1985	1986	1987	1988	1985	1986	1987	1988
Cash	100	140	80	100	100	140	80	100
Debtors	200	260	320	400	100	130	160	200
Stock	300	500	250	500	100	166.67	83.33	66.67
Total	600	900	650	1000	100	150	108.3	166.67

Long Term Liabilities		
6% Debentures	7.69	9.86
Capital and reserves		
6% preference share capital	23.10	19.72
Equity share capital	30.76	26.32
Reserves	15.38	16.15
Total share holders funds	76.93	72.05
Total liabilities and capital	100	100

Interpretation

The percentage of current assets to Total assets has gone up. Similarly the percentage of current liabilities has also raisen. The working capital position has improved.. There is a limited fall in debt equity ratio of course it is sound.

The share holder's funds in relation to the total liabilities has shown a decreased figure.

3. Trend Percentage

It is very useful in making a comparative study of statements of many years in this method. Their percentage relationship of each item bears to same in the base year is calculated. It is usual to take the earliest year as the base year. However, intervening year may also be taken as the base year. This method is useful to highlight the important changes,

Illustration – 3.

From the following date relating to assets of K.Ltd., for the period 31st December 1985 to 1998. Calculate the trend percentage taken 85 as the base year.

Assets	Rs. In lakhs			
	1985	1986	1987	1988
Cash	100	140	80	100
Debtors	200	260	320	400
Stock	300	500	250	500
Land	400	500	500	500
Building	800	1000	1200	1400
Plant	1000	1000	2000	2000
Total	2800	3400	4350	4900

Solution

Comparative Balance Sheet as on 31st December

Current Assets	December 31st Rs. in Lakhs					TrendPercentage Base year 1985		
	1985	1986	1987	1988	1985	1986	1987	1988
Cash	100	140	80	100	100	140	80	100
Debtors	200	260	320	400	100	130	160	200
Stock	300	500	250	500	100	166.67	83.33	66.67
Total	600	900	650	1000	100	150	108.3	166.67

2. Ratios are calculated from the data which has been shown in financial statements, we know that financial statements suffer from number of limitations.
3. One particular ratio is not sufficient to review the operations of the business.
4. Assets and liabilities are not grouped under money value.
5. Ratios alone are not adequate to judge the efficiency of the concern. Other tools are also to be used.
6. If the effects of changes in price level are not taken into account then ratios will give misleading results.

Kinds of Ratios

Accounting ratios are be classified as follows,

I. Balance Sheet ratios

a. Current ratio
b. Acid Test Ratio or Liquidity Ratio
c. Capital geating ratio
d. Properietory ratio
e. Asset proprietory ship ratio
f. Debt equity ratio

II. Profitability Ratios

a. Gross profit ratio
b. Net profit ratio
c. Operating ratio
d. Stock turnover ratio
e. Expenses ratio
f. Return on share holders funds
g. Earning per share
h. Return on capital employed

III. Composite ratio

a. Debtors velocity
b. Creditors Velocity

Balance Sheet Ratios

Current Ratio

In analysis the relation between current assets and current liabilities, current asset are those which can be convered into cash within a year. In includes, cash in hand and bank, stock bill, receivable, debtors, prepaid amount.

Current liabilities include those dues to be settled within a short period. One year. Eg. Sundry Creditors, bill payable outstanding expenses, provision, for taxation and proposed divident, Bank OD.

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

Current Assets = Current Liabilities = Working Capital

2:1 is normal ratio

It measures the ability of the company in discharging the short term obligations. High ratios indicate both under trading and over capitalisation and low ratios indicate over trading and under capitalisation.

b. **Liquidity ratio**

It brings relationships between liquid assets and current liabilities

Liquid assets : Current assets = (Stock and prepaid expenses)

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

Liquid liabilities = Current Liabilities = Bank of overdraft

According to them bank OD is a permanent arrangement except when the business is called upon to pay immediately

The standard ratio is 1:1

C. Capital Gearing Ratio

This ratio bring relationship between Equity share capital on one side and fixed interest bearing securities including preference shares on the other.

$$\text{Capital gearing Ratio} = \frac{\text{Equity Capital}}{\text{Fixed Interest bearing securities}}$$

D. Properietory Ratio:

It shows how much of the total assets is owned by the proprietors, It is calculated as below.

$$= \frac{\text{Proprietor funds}}{\text{Total tangible Assets}}$$

E. Assets proprietorship ratio

This is further analysed into:

1. Ratio of fixed assets to proprietors funds

$$= \frac{\text{Fixed Assets}}{\text{Proprietors funds}} \times 100$$

2. Ratio current assets to proprietors funds

$$= \frac{\text{Current Assets}}{\text{Proprietors funds}} \times 100$$

3. Ratio of fixed assets to current assets

$$= \frac{\text{Fixed Assets}}{\text{Current Assets}} \times 100$$

F. Dept Equity Ratio

It brings the relationship between the funds provided by the owners and the companies obligation to the creditors.

It is calculated as below.

$$= \frac{\text{Current Assets}}{\text{Proprietors funds}} \times 100$$

Profitability Ratios

a) Gross Profit Ratio

It indicate the efficiency of the production / Trading operations

$$= \frac{\text{Gross profit}}{\text{Net sales}} \times 100$$

b) Net profit Ratio

In indicates the net margin earned on a sale of Rs. 100/-

$$= \frac{\text{Net operating profit}}{\text{Total tangible Assets}}$$

Net operating profit = Gross Profit – Operating expenses

c) Operating Ratio

$$= \frac{\text{operating cost}}{\text{Net sales}} \times 100$$

Operating cost include, material cost, labour and other overheads. Interest and provision for taxation are generally excluded from operating cost.

The operating ratio should be low to give a fair return to the investors.

d) Stock Turnover ratio

It is also known as stock velocity or inventory ration

It shows the number of times the stock is turned during the period under study.

$$\frac{\text{Cost Goods sold}}{\text{Average stock}}$$

Cost of goods sold / Average stock

It is expressed in times

$$\text{Average stock} = \frac{\text{Operating stock} + \text{Closing stock}}{2}$$

Cost of goods sold = Sales = Gross profit

Some tiines instead of average stock, the closing inventory may be taken

It serves as a check on control over inventory. It also shows whether the business is indulging in over trading or under trading.

e) Expenses ratio

Each of the expenses are expressed as a percentage on sales

1. $\frac{\text{Selling expenses}}{\text{Net sales}} \times 100$
2. $\frac{\text{Office expenses}}{\text{Net sales}} \times 100$
3. $\frac{\text{Material expenses}}{\text{Net sales}} \times 100$
4. $\frac{\text{Non-operating expenses}}{\text{Net sales}} \times 100$

F. Return on share holders funds

It measures the success of business and the efficiency of management.

1. In case we need the profitability of the company, from the stand point of share holders, then the ratio will be.

$$\frac{\text{Net profit after interest and tax}}{\text{Shareholders funds}} \times 100$$

2. The profitability from the view point of equity share holders can be judged using the following

$$\frac{\text{Net profit after interest, tax and preference Divident}}{\text{Equity shareholders funds}} \times 100$$

g) Earning per share

This relationship gives even a common man about the over all profitability of the business concern.

$$\text{Earning per share} = \frac{\text{Profit available for equity shareholders}}{\text{Equity shareholders funds}} \times 100$$

It help in determining the market price of equity share of the company, with this ratio we can estimate the companies capacity to pay dividend to the equity shareholders.

h. Return on capital employed

It is also called as return on investments (ROI)

It reveals the percentage earnings on the total capital employed in a company. The formula is

$$\frac{\text{Operating Profit}}{\text{Capital employed}} \times 10$$

Capital employed = (share Capital +Reserves + Long term loans) – (Non Business assets + Fictious assets).

Operating profit donotes profit before interest and tax.

COMPOSITE RATIOS

A. Debtors velocity

Debtors occupy an important area in the current assets. It is other wise called as debtors turnover ratio.

$$\text{Debtors turnover ratio} = \frac{\text{Creditors sales}}{\text{Average accounts receivable}}$$

Average receivable includes debtors and bills receivable

It is express in times (OR)

$$\frac{\text{Debtors + Bills receivable}}{\text{Credit sales}} \text{ (365 days) or 12 months}$$

It is expressed in days or months is as the case may be

This ratio reveals the extent to which the debts have been collected in time. It shows the average debt collection period.

b. Creditors Velocity

In indicates the turnover of payables in the credit purchases Creditors turnover ratio.

$$= \frac{\text{Credit purchase}}{\text{Average accounts payable}}$$

Average accounts payable includes creditors and Bills payables. It is expresses in times Or.

Debt payment period

Sundry Creditors + Bills payable
---------- x 365 days or 12 months
Credit purchases

Debt payment period = Sundry Creditors + Bills payable / Creditors
Purchase * 365 days or 12 months
It is expresses in days or months as the case may be

The above ratios indicate the promptness of otherwise in making payment of credit purchase. A higher creditors velocity or lower debt payment period shows, that the company is prompt in paying for credit purchases.

Illustration 4

From the following details calculate G.P. Ratio

Sales Rs. 115000; Sales return Rs. 5000/- Opening stock Rs. 2000/- purchase Rs. 50000/- (closing stock Rs. 3000/-

Solution : G.P.

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

Gross profit = Sales – Cost of Good sold.
Cost of good sold = Opening stock + purchase = closing stock
C.G.S. = Rs. 20000 +50000 –30000 = 67000
G.P. 110000 – 67000 – 43000
G.P, Ratio 43000 / 11000 X 100 = 39.09%

Illustration : 5

From the following details calculate debtors turnover ratio
Total turnover ratio
Total sales for 1988 Rs. 5000/- Cash Sales for 1988 Rs. 10000/-
Debtors on 1.1.1988 Rs. 5000/- Debtors on 31.12.88 Rs. 75000/-
Bills receivable as on 31.12.1988 Rs. 6250/-

Solution

$$\text{Debtors turnover ration} = \frac{\textit{Credit Sales}}{\textit{Average accounts receivable}}$$

$$\frac{\text{Rs. 40,000}}{\text{Rs. 11,250}} = 3.56 \text{ times}$$

½ of (Rs. 8750 + 13750)

Illustration : 6

A company's credit purchase is Rs. 1400000/- The total sundry creditors and bills payable are Rs. 175000/- and Rs. 25000/- respectively. Calculate creditors velocity Ratio or Debt payment period.

Solution

$$\text{Debt Payment Period} = \frac{\textit{Sundry Creditors + BP}}{\textit{Credit purchase}} \times 365$$

$$= \frac{175000 + 25000}{1400000} \times 365 = \frac{200000}{1400000} \times 365$$

$$= 52.14 = 52 \text{ (app) days}$$

Illustration : 7

From the following details compute the current ratio and liquidity ratio

Debtors	40,000	Sundry Creditors	20,000
Prepaid	20,000	Debenture	100,000
Short term			
Investment	10,000	Inventors	20,000
Loose tools	5,000	Outstanding	
Bills payable	10,000	Expenses	20,000

Solution

Current Ratio = Current assets / Current Liabilities
= 90000 / 50000 = 1.8

Liquidity ratio = Liquid assets / Current Liabilities

Liquid assets = Current assets (Stock + Prepaid expenses)
= 90000 – (20000 + 20000)
= 50000
= 50000/ 50000 = 1

Illustration 8

Calculate Net profit ratio sales Rs. 80,000/-
Gross profit Rs. 20,000/- Office expenses Rs. 10,000/-
Selling Expenses Rs. 2,000/-
Income from investments Rs. 3,000/-

Solution

Net profit Ratio = Net operating profit / Net sales X 100
= 80000 / 80000 X 100 = 10%

Illustration 9

Following is the P & L account and Balance Sheet of Mano Ltd., Redraft is suitably for analysis and compute the following ratios.

1. G.P Ratio
2. Return on capital employed
3. Current Ratio
4. Debt equity ratio
5. Liquidity ratio
6. Stock velocity

Profit and Loss Account

Opening stock finished goods	10,000	Sales	1,00,000
Opening stock raw materials	5,000	Closing stock of raw material	15,000
Purchase of raw materials	30,000	Closing stock of finished goods	10,000
Manufacturing expenses	10,000	Profit on sale of shares	5,000
Office expenses	5,000		
Selling expenses	5,000		
Loss on sale of plant	5,500		
Interest on debentures	1,000		
Net profit	38500		
Total Rs.	1,30,000	Total Rs.	1,30,000

Balance Sheet

Liabilities		Assets	
Share capital		Fixed assets	25,000
Equity share capital	10,000	Stock of raw materials	15,000
Preference share capital	10,000	Stock of finished goods	10,000
Resever and surplus	10,000	Sundry debtors	10,000
Debentures	20,000	Bank balances	5,000
Sundry creditors	10,000		
Bills payable	5,000		
Total Rs.	65,000	Total Rs.	65,000

Solution

Income statement

Sales			1,00,000
Less : Cost of sales			
Raw materials consumed	20,000		
Direct wages	20,000		
Production expenses	10,000		
			50,000
Add. Opening stock of finished goods			50000 +10000
Less. Closing stock of finished goods			60000 -10000
Cost of goods sold			50,000
Less : operating expenses :			50,000
Office expenses	5,000		
Selling expenses	5,000		10,000
Net Operating Profit			40,000
Add : Non-Operating income – gain on sale of share			5,000
			45,000
Less : Non Operating Losses – loss on sale of plant	5,500		
Profit (Before interest and tax)			39,500
Less : Interest : Interest (Debentures)			1,000
Net profit before tax, Rs.			38,500

BALANCE SHEET (STATEMENT FORM)

Cash at Bank		5,000
Sundry Debtors		10,000
Liquid assets		15,000
Stock Raw Materials		15,000
Finished Goods	10,000	
		25,000
Current Assets		40,000
Less: Current Liabilities		10,000
Bills payable	5,000	
Working Capital	25,000	
Add : Fixed Assets		25,000
Capital employed	50,000	
Less : Debentures		20,000
Share holders net worth		30,000
Less : Preference share capital		10,000
Equity shareholders' net work Rs.		20,000
Equity share holder's net worth is represented by		
Equity share capital		10,000
Reserves and surplus		10,000
		20,000

Ratios :

1. G.P. Ratio $= \frac{\textit{Gross profit}}{\textit{Net Sales}} \times 100$

$= \frac{50000}{100000} \times 100 = 50\%$

2. Return on capital employed

$= \frac{\textit{Operating Profit}}{\textit{Capital employed}} \times 100$

$= \frac{40000}{50000} \times 100 = 80\%$

3. Current Ratio = $\frac{\text{Current assets}}{\text{Current liabilities}} = \frac{40,000}{15,000} = 2.67$

4. Debt equity Ratio = $\frac{\text{Debt}}{\text{Equity}} = \frac{35,000}{30,000} = 1.17$

5. Liquidity Ratio = $\frac{\text{Liquid assets}}{\text{Current liabilities}} = \frac{15,000}{15,000} = 1$

6. Stock Velocity = $\frac{\text{Cost of goods sold}}{\text{Average stock}} = \frac{50,000}{20,000} = 2.5$

COMPUTATION OF ITEMS OF FINANCIAL STATEMENTS FROM THE ACCOUNTING RATIOS

ILLUSTRATION 10.

a. Working capital Rs. 90,000; Current Ratio 2.5 calculate current assets and current liabilities

b. Opening stock Rs. 31,000; Closing Stock RS. 19,000 Sales 4,00,000 Gross Profit Ratio 25%; calculate stock velocity

Solution

a. Current Ratio 2.5 given
Current Ratio = CA / CL
Working capital CA-CL
Take current Liability as 1 than current Assets are 2.5
Working Capital 2.5 – 1 = 1.5 90,000
If 1.5 = 90,000
The CA = 2.5 = Rs. 1,50,000 @ 2.5 X 90,000 / 1.5
CI = 1 = 60,000

b. G.P. Ratio 25%
$\frac{\text{Gross Profit}}{\text{Net sales}} \times 100 = 25$
Then CA = 2.5 = Rs. 1,50,000 @ 2.5 X 90,000 / 1.5
CL = 1 = 60,000

c. G.P. Ratio = 25%
$\frac{\text{Gross Profit}}{\text{Net sales}} \times 100 = 25$
That is gross profit is Rs. 1,00,000
Cost of goods sold = Net sales = Gross profit
= 4,00,000 – 1,00,000 = 3,00,000

$$\text{Stock velocity} = \frac{\textit{Cost of sales or cost of goods sold}}{\textit{Average Stock}}$$

$$\text{Average Stock} = \frac{\textit{Opening stock} + \textit{Closing stock}}{2}$$

$$= \frac{31{,}000 + 19{,}000}{2} = 25{,}000 = \frac{3{,}00{,}000}{25{,}000} = 12 \text{ Times}$$

Illustration. 11.

From the following details prepare Balance Sheet with as many details as possible Stock Turnover Ratio 6. Capital Turnover Ratio 2; Fixed Assets Turnover Ratio 4; Gross profit Ratio 20%. Debtors Velocity 2 months; Creditors velocity 73 days; Gross profit Rs. 60,000; Reserves Rs. 20,000; Closing stock was Rs. 5,000 in excess of opening stock.

Solution

a. Gross profit Ratio $= \frac{\textit{Gross profit}}{\textit{Net sales}} \times 100$

$$20\% = \frac{60{,}000}{\textit{Sales}}$$

That is sales = 60,000 X 100/20 = Rs. 3,00,000

b. Cost of Goods sold = Sales – Gross profit

= 3,00,000 – 60,000

CGS = 2,40,000

c. Stock velocity $= \frac{\textit{Cost of goods sold}}{\textit{Average Stock}}$

$$6 \text{ times} = \frac{2{,}40{,}000}{X}$$

X = 40,000

Average stock = Opening Stock + Closing Stock / 2

Closing Stock = 40,000 + 5,000 / 2 = 42,500

Opening Stock = 37,500

d. Debtors velocity ratio = 2 Months

$$= \frac{\textit{Debtors}}{\textit{Credit Sales}} \times 12$$

$$\frac{2}{12} = \frac{x}{3{,}00{,}000} \quad \text{Debtors} = 300000 \times \frac{2}{12} = 50000$$

e. Purchase = CGS + Closing stock = Opening Stock

= 2,40,000 + 42,500 – 37,500

= 2,45,000

Creditors velocity = 73 Days

$$\text{Creditors velocity} = \frac{\text{Creditors}}{\text{Purchases}} \times 365$$

$$\frac{73}{365} = \frac{x}{2,40,000}$$

$$365 \times = 2,45,000 \times \frac{73}{365} \text{ Rs. } 49,000$$

f. Fixed Assets Turnover Ratio

$$= \frac{\text{Net sales}}{\text{Fixed Assets}}$$

$$\text{Times} = \frac{3,00,000}{x}$$

Fixed Assets = 75,000

g. Capital Turnover Ratio

$$= \frac{\text{Net sales}}{\text{Capital}}$$

$$2 \text{ times} = \frac{3,00,000}{x}$$

Capital = 1,50,000

BALANCE SHEET AS ON.....

Liabilities	Rs	Assets	Rs.
Capital	1,50,000	Fixed Assets	75,000
Creditors	49,000	Stock	42,500
		Debtors	50,000
		Cash on hand	31,000
	1,99,000		1,99,000

Illustration 12

From the following ratios and other details prepare a Trading Account, profit and loss account and balance sheet of Mrs. Ashok

a. G.P. Ratio 25%
b. Net profit Ratio 20%
c. Stock Velocity 10
d. Fixed Assets Rs. 10,00,000
e. Closing Stock Rs. 1,00,000
f. Net Profit / Capital 1/5
g. Capital to total liabilities ½

h. Fixed Assets / Capital 5/4

i. Fixed Assets / Total Current Assets 5/7

Solution

a. Fixed Assets Rs. 10,00,000

$$\frac{\text{Fixed Assets}}{\text{Capital}} \quad \frac{5}{4} \quad \frac{1000000}{x} = \frac{5}{4} \text{ (x) capital} = 8,00,000$$

b. Capital to Total Liabilities $= \frac{\text{Capital}}{\text{Total liability}} = \frac{1}{2}$

That is liability = 8,00,000 X 2 = 16,00,000

c. $\frac{\text{Net profit}}{\text{Capital}} \quad \frac{1}{5} \quad \frac{x}{8,00,000} \quad \frac{1}{5}$

That is Net profit = Rs. 1,60,000

d. Net profit Ratio = 20% of sales

Sales in 100% @ 1,60,000 X $\frac{100}{20}$ = Rs. 8,00,000

e. Gross profit ratio is 25%; that is Gross profit is Rs. 2,00,000

f. Stock velocity = $\frac{\text{Cost of goods and}}{\text{Average stock}} = 10$

Cost of goods sold = Sales – Gross Profit = $\frac{6,00,000}{X} = 10$

That is average stock is Rs. 60,000

Closing Stock is Rs. 1,00,000

g. 1,00,000 + X/2 Opening Stock Rs. 20,000

h. Fixed Assets ? Total Current Assets = 5/7 $\quad \frac{1,00,000}{X} = \frac{5}{7} \text{ x} = \frac{7,00,000}{5}$

X = 14,00,000

Out of Total current Assets, Stock is Rs. 1,00,000. The balance may be other current Assets.

TRADING AND PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED...

To opening stock	20,000	By Sales	800000
To purchase (B.F.)	6,80,000	By Closing Stock	100000
To Gross Profit	2,00,000		
	9,00,000		9,00,000
Total expenses (B.F.)	40,000	By Gross Profit	2,00,000
To Net profit	1,60,000		
	2,00,000		2,00,000

	Balance Sheet As on..		
Capital	6,40,000	Fixed Assets	10,00,000
Add : Net profit	1,60,000	Closing Stock	1,00,000
	8,00,000	Other Current Assets	13,00,000
Liabilities	16,00,000		
	24,00,000		24,00,000

A total classification of the ratio's has already been given. However a more detailed analysis is shown below for the b benefit of the students.

Liquidity Ratios

a. Current Ratio
b. Liquidity Ratio
c. Working capital / Net sales

Profitability Ratios

a. Cross Profit Ratio
b. Net Profit Ratio
c. Operating Ratio
d. Return on Investment
e. Earning per share

Asset Utilisation Ratio

a. Net Sales / Fixed Assets
b. Net sales / Current Assets

Financial Stability Ratio

a. Net worth / Debt
b. Net worth / Fixed assets
c. Net worth / Net sales
d. Net worth / Total outside liabilities

Exercises

1. The following are the Balance sheet of a company for the year 1981 and 1982. Prepare a comparative Balance Sheet and study the financial position of the concern

Liabilities	1981	1982	Assets	1981	1982
Share capital	600	800	Buildings	370	270
Reserves	330	222	Machinery	400	600
Debentures	350	500	Furniture	45	55
Bills payable	50	45	Cash	20	80
Creditors	105	130	Debtors	350	340
			Stock	250	352
	1,435	1,697		1,435	1,697

2. The income statement of a concern are given for the year ending 31st Dec. 1977 and 1978. Prepare the comparative income statement and study the profitability position of the concern

	1977	1978
		(Rs. Ir. thousands)
Net sales	785	900
Operating expenses	450	500
Géneral Expenses	70	72
Selling expenses	80	90
Non operating Expenses		
Interest paid	25	30
Income Tax	70	80

3. Calculate trend percentage from the following figures of A Ltd. Taking 1984 as base your and interpret them

Year	Sales	Stock	Profit before tax
1984	18	7	3
1985	23	8	4
1986	27	8	4
1987	30	9	5
1988	37	11	6

4. From the following balance sheet of Alavey Industries Calculate solvency Ratios

Balance Sheet as on 31.12.1981

Liabilities	Rs.	Assets	Rs.
Creditors	6,000	Cash	5,000
Bills payable	10,000	Investments (Govt.)	
Outstanding Expenses	1,000	Securities	15,000
Provision for Tax	13,000	Debtors	20,000
6% Debentures	70,000	Stock	30,000
7% Pref. Share capital	10,000	Fixed Assets 1,30,000	
Equity Share capital	50,000		
Reserves	40,000		
	2,00,000		2,00,000

5. X. Ltd., operate two shops A and B. Their operating results are follows

	A (Rs.)	A (Rs.)
Sales	4,00,000	4,00,000
Total Investment	40,000	2,00,000
Net Income	8,000	40,000

Comment on their profitibility

6. Prestige Limited gives the following information for 1984

Trading and Profit and Loss A/c

To opening stock	13,000	By Sales	1,20,000
To purchase	94,000	By Closing Stock 11,000	
To Gross profit	24,000		
	1,31,000		1,31,000

To Interest	2,000	By Gross Profit 24,000	
To Administration Exp	5,600		
To salaries	2,300		
To other selling exp	6,100		
To Net profit	8,000		
	24,000		24,000

Balance Sheet As on 31.12.1984

Liabilities	**Rs.**	**Assets**	**Rs.**
Share Capital	50,000	Fixed Assets	48,000
Rserves	20,000	Stock	11,000
5% Debentures	40,000	Debtors	35,000
Creditors	20,000	Cash	30,000
		Prepaid Expenses	5,400
	1,30,000		1,30,000

Calculate (a) Stock Turnover Ratio (v) Debt / Equity Ratio (c) Operating Ratio (d) Gross Ratio (e) Fixed Assets Turnover ratio (f) Current Ratio

7. From the following information you are required to prepare a balance sheet

Current Ratio	1.75
Liquid Ratio	1.25
Stock Turnover	
(Closing Stock)	9
Debt Collection Period	1 ½ Months
Reserves and surplus to capital	0.2
Turnover to fixed assets	1.2
Capital Gearing ratio	0.6
Fixed asset to net worth	1.25
Sales for the year	RS. 1,22,000/-

8. From the following information of a textiles company compute the performa balance sheet if its sales are Rs. 32,00,000

Sales to the Net worth	2.3 times
Current Debt to Net worth	42%
Total Debt to Net worth	75%
Current Ratio	2.9 times
Net sales to inventory	4.7 times
Average collection period	64 days
Fixed Assets to net worth	53.2 days

PERFORMA BALANCE SHEET

Net worth	?	Fixed Assets	?
Long term debt	?	Cash	?
Current debt	?	Stock	?
	?	Sundry debtors	?
	?		?

9. From the following you are required to comment upon the long term as well as short -term solvency of the company

Liabilities	**Rs.**	**Assets**	**Rs.**
Share capital	5,00,000	Fixed Assets	6,00,000
Fixed Liabilities	2,50,000	Liquid Assets	3,00,000
Current Liabilities	2,50,000	Stock in trade	1,00,000
	10,00,000		10,00,000

From the following particulars, prepare the balance sheet of X Ltd., which has only one class of share capital

i)	Sales for the year	Rs. 20,00,000
ii)	Gross profit ratio	25%
iii)	Current Assets ratio	1.50%
iv)	Quick Assets (cash and debtors) ratio	1.25%
v)	Stock turnover ratio	15
vi)	Debts collection period	1 ½ Months
vii)	Turnover to fixed assets	1.5
viii)	Ratio of reserves to share capital	0.33 (i.e. 1/3)
ix)	Fixed assets to networth	0.83 (ie 5/6)

INTER-FIRM AND INTRA-FIRM COMPARISON

Meaning of Inter-firm comparison

Inter-Firm comparison means a comparison of two or more firms with the motive of providing information regarding competitive position, profitability and productivity of participating companies. It explains the efficiency of the management in achieving the common objective. The results provide necessary information to the managing director to take decisions on cost, stock turnover and other key factor.

Meaning of Intra-Firm comparison

It means the comparison to two or more department or divisions, belonging to the same firm to make constructive analysis. To increase the efficiency of divisions or department.

Requires for Inter-Firm or Intra-firm comparison

The following are the basis requisities to have effective inter-firm and intra-form comparisons.

1. Similarly of firms. It basically necessary that the firms to be compared are completely alike, That is, similar companies with regard to age, character of production and the market should be compared. For example, a textile firm which produces export quality cloth should not be compared with a textile firm that produces course cloth only.

2. Use of accounting ratio : Absolute figures should not be compared various accounting ratios be used to express the areas of strength and weakness
3. Similarities in accounting policies. The first selected for inter-firm comparison should have uniform accounting policies regarding depreciation, p.f. and premiums, inventory policies. If not the accounting ratios will give misleading results.
4. Adjustment for inflation : Before making any comparison, it is necessary that the effects of inflation are to be adjusted. The accounting ratio usually do no take into account, the effect of inflation following are important accounting ratios which can be used.

a. debt equity ratio
b. Current ratio
c. Profit on total capital employed

5. Advantages of inter-firm and intra-firm comparison
   i. It provides comparative data to the business to assess the performance regarding profitability and productivity
   ii. In identifies the area in the business which need special attention.

Limitations of Inter-firm and Intra firm comparisons

The following are some of the important drawbacks of the Inter-firm and Intra firm comparison

1. The success of this comparison depends on the co-operation extended by the members firms, In case there is lack of co-operation, the comparison will not give meaningful results.
2. In case of Inter-firm comparison, the member firms are assured the data collected will be kept confidential In spite of this assurance some organisation may not give actual data. This is a major problem not applicable in intra-form comparison

Lesson – 4
Functional Budgets

Though budgets can be classified according to various points of view, the following bases of classification are generally in vague:

a) Classification according to time factor.,
b) Functional classification
c) Classification according to flexibility factor

A) Classification according to Time Factors:

In terms of time factory, budgets are broadly of the following three types:

1. Long term budgets : They are concerned with planning the operations of a firm over a prospective of five to ten year. They are usually in the form of physical quantities.
2. Short-term budgets : They are usually for a period of an year or two and are in the form of production plan in monetary terms
3. Current budgets : They cover a period of a month or so and are for short term and get adjusted to current conditions or prevailing circumstances. Some times, within the frame work of short – term budget, there are quarterly plans which are prepared by recasting it for a a still shorter period on the basis of the performance of immediate past. In a way, these quarterly budgets are meant to be an eleboration of the annual budget.

B) Functional classification:

According to this basis of classification, budget correspond, and are co-terminous, with a particular function and are integrated with the master budget of the business. These are called "functional budget" whose number depends on the size and nature of the business. The usual functional budgets of a business are:

1. Sales budget : This is a forecast of total sales classified according to group of products, salesman and geographical locations.
2. Selling and distribution and cost budget : It is concerned with an estimate of the cost of selling and distribution of goods.
3. Production budget : It is a forecast based on sales, productive capacity and requirements of inventories. etc/
4. Production cost budget : This is related to the cost of production including correct materials cost, correct labour cost and expenses fixed, variable and semi-variable.
5. Purchase budget : Corrected with sales forecast and production planning, it deals with purchases that are required for planned production,. Purchase would include both direct and indirect materials and goods.
6. Personal budget : This has reference to the utilization of men and would include labour employed in productive activity. This would be split up between direct and indirect labour.
7. Research budget : It relates to improvement in the quality of the products or research for new products.
8. Cash budget : It is a sum of the requirements of cash in respect of various functional budgets as well as of anticipated cash receipts.
9. Plant utilisation budget : This is intended to cover the plant and machinery requirements to meet the budgeted production during the period. Schedules will be produced showing the available load in each department expressed in standard hours or units.
10. Office and administration budget : This budget represents cost of all administrative expenses, such as management director's salary, staff salaries and expences of office management like lighting and clearing.
11. Capital budget : It is a forecast of outlay on fixed assets as also of the sources of capital. Capital budget may differ from that of other budgets such as expenditure is frequently planned a number of years in advance.
12. Master budget : The ultimate integration of separate budgets by the accountant provides the master budget which includes estimated profit and loss account for the future period and an estimated balance sheet at the end thereof.

C) Classification according to Flexibility :

1. **Fixed budget :** It 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 actual figures. Though it is true that a fixed or static budget as it is sometimes called can be revised whenever the necessity arose; it smacks of rigidly and artificiality so far as control over costs and expenses in relation to sales can be quite accurately ascertained.

2. **Flexible budget :** The figures used in this form of cost and expense budget are made adaptable to any given set of operating conditions within any month of the fiscal year. The figures range from the lowest to the highest probable percentages of operating activity in relation to the standard operating performance. From this point of view, a flexible budget prepared for an expense group can be used for the entire fiscal year or as long as there is no need of material changes in the standards. Thus the flexible budget possess a distinct advantage over the static budget particularly with any great degree of accuracy.

Preparation of Budgets

(A) Sales Budget : The sale budget is a forecast of total sales expressed and incorporated in quantities and / or money. A sales budget may be prepared by expressing turnover under any more or combination of the following.

1. Product of product group;
2. Territories, areas and countries ;
3. Type of customer, e.g. national government, export, home, wholesale or retail;
4. Salesmen agents or representatives ; and
5. period such as quarters, months, weeks, etc.

A sales budget may be prepared with the help of any one or more the following methods.

1. Analysis of past sales with adjustments for current conditions;
2. Field estimates by own sales staff;
3. Analysis of the potential market for the firms products;
4. Studying the impact of other sundry factors affecting sales budget.

Analysis of past sales : Analysis of past sales for a number of years. Say 5 to 10 years. Viz., long-term trend, seasational trends, cyclical trend, other sundry factors. The long-term trend represents the movements of the fortunes of a business over many years. Seasonal trend may effect many types of business and hence this factor must be taken into account when studying figures for consecutive months over a number of years. The cyclical trend represents the fluctuations in the business activity due to effect of the trade cycle. In order to study the cyclical trend it is desirable to disregard the effect of the long-term and seasational trends. Other sundry factors include events such as strike in the industry of a serious fore or flood. From such analysis it will be possible to suggest future trends. In analysing such sales, considerable help can be obtained from statistical reports produced by the trade units and commercial intelligence units, government publications, etc.

2) Field estimates by own sales staff : The sales man in each area should have an intimate knowledge of the factors likely to affect his sales in the next few months or years. He can probably make a guess about the unsold stock in the shop of his customer. He is then in a position to make an estimate of future sales. When such estimates are available for a number of years, the actual sales and a correction factor calculated to allow for each salesman's tendency to over estimate.

3) Analysis of the potential market : Market research personal may report on the state of the market population in the area, fashion trends. The type of product design required by customers, purchasing power of the people, activities of competitors and the prices the consumers are likely to pay.

4) **Studying the impact of factors affecting sales :** Any change in the company policy or methods should always be considered. For example, introduction of special discounts, special

salesmen a new design of the product, new or additional advertising campaigns, improved deliveries after states service should have some marked effect on a sales budget. While preparing such forecasts the sales manager must consider the opinion of divisional managers and other sales staff, the budget officer and the accountant. It will be observed that the preparation of a sales budget involved many factors and calls for a high degree of knowledge of conditions and of ability to deduce from the known facts and various estimates, the probable source of sales over the budget period. If sales be the principal budget factor, then sales budget is prepared first. If production is the key factor, production budget should be built up first and the sale budget must be drawn up within the limits imposed by the production budget.

Example 1

AB Co Ltd manufactures two products A and B and sells then through two divisions – North and south. For the submission of sales budget to the budget committee the following information has been made available.

Product	North	South
A		4,000 at Rs. 96,000 at Rs. 9
B	3,000 at Rs. 21	5,000 at Rs. 21

Actual sales of the current year were :

Product	North	South
A		5,000 at Rs. 97,000 at Rs. 9
B	2,000 at Rs. 21	4,000 at Rs. 21

Adequate market studies reveal the product A is popular but under – priced, It is observed that if the price of A is increased by Re.1, it will still find a ready market. On the other hand, B is over – priced to customers and the market could absorb more if selling price of B be reduced by Re.1. The management has agreed to give effect to the above price changes.

From the information based on these price changes and reports from salesmen, the following estimates have been prepared by the divisional managers.

A	+10%	+5%
B	+20%	+10%

With the help of an intensive advertisement campaign, the following additional sales over the estimated sales of divisional managers are possible.

Additional sales above the estimated sales of divisional managers;

Product	North	South
A	600 units	700 units
B	400 units	500 units

You are required to prepare a budget for sales incorporating the above estimates and also show the budgeted and actual sales of current year.

Sales Budget

This budget may be modified according to salesmen or period such as months, quarters, etc.

Production budget

Like the sales budget, the production budget is built up in terms of quantities of money. The quantities are entered at the beginning and, when the remainder of the budgets have been built up and the costs of production calculated, the costs are entered to compile a production cost budget. In preparing the production budget consideration should be given to the following.

1. Principal budget factor, e.g. if sales be the budget factor then sales budget, otherwise other budgets
2. Production planning and determination of optimum factory capacity
3. The opening stocks and stocks required to be carried at the end of the period.
4. The policy of the management regarding manufacture or purchase of components

The production budget may be classified under the following heads ;

a. Products
b. Manufacturing departments
c. Months, quarters, etc

Example 2 :

Prepare production budget of AB Co., Ltd., based on the sales budget of Example 1 and the following estimated stocks at the beginning and end of the future budget period.

Product	*Estimated stock*		*Sales as per*
	1st January	*31st December*	*Sales as per*
A	1000	1000	12000
B	1000	2000	10000

Solution

Production Budget AB Co., Ltd.,
For the year 19 X 7

Items	**A**	**B**
	Units	**Units**
Sales during the period	12000	10000
Required stock on 31st December Total	1000	2000
Total	13000	12000
Less: Estimated opening stock	1000	1000
Estimated production	12000	11000

In case of normal loss on distribution, the quantity, to be produced will be corresponding increased. The total yearly production may be segregated to show monthly or quarterly production.

Production Cost Budget

A production cost budget summaries the materials budget, labour budget and factory overhead budget and may be expressed and analysed by departments and / or products. A production cost budget shows the estimated cost of carrying out the production plans and programmes set out in the production budget. It shows the following.:

1. Material s cost from materials budget
2. Labour cost from labour budget
3. Factory overhead – subdivided into flexed, variable and semi-variable costs from factory over head budget.

These analysed by departments and/or products according to convenience

Production Cost Budget
Ab Co., Ltd
For the year 19 X 7

	A	B	Total
	Rs.	Rs.	Rs.
Units to be produced			
Elements of cost			
Material cost (from Materials budget)			
Labour cost (from labour budget)			
Factory overheads (from Factory overhead budget)			
Total			

Preparation of cash budget

A complete system of budgetary control makes the construction of cash budget. It is one of the functional budgets which is prepared along with other budgets. There are three recognised methods of preparing a cash budget.

a. The Receipts and Payments methods:
b. The Adjusted Profit and Loss method ; and
c. The Balance Sheet method

(a) Receipts and Payments Method

Under this method, all actual possible items of cash receipts and payments for the budgeted period are considered. Sources of information are the various other budgets. For example,

1. Sales from the sales budget
2. Materials, Labour, Overhead expenditure and Capital expenditure, etc. from the concerned budgets.

Steps to be adopted

Cash Receipts Forecast - Cash receipts from sales, debtors, income from investment if any, sales of assets and investments and probable borrowings should be forecast and brought into cash budget.

Percentage increase in sales over current budget is

Any lag in payment by debtors or by others shall be considered for ascertaining further cash inflows.

Cash requirements forecast

Total cash outflows are taken out from operating budgets for the elements of cost and from capital expenditure budget for the purchase of fixed assets. Adjustments are to be made for any lag in payment.

Care must be taken to ensure that outstandings or accruals are excluded from the cash budget since this method is based on the concept of actual cash flows.

Example 3 :

A newly started Quick Co., Ltd., wishes to prepare cash budget from January. Prepare a cash budget for the first six months from the following estimated revenue and expenses.

Month Rs.	Total sales Rs.	Materials Rs.	Wages Rs.	Overheads	
				Production Rs.	Selling & distrn
Jan	20000	20000	4000	3200	800
Feb	22000	14000	4400	3300	900
Mar	24000	14000	4600	3300	800
Apr	26000	12000	4600	3400	900
May	28000	28000	4800	3500	900
June	30000	16000	4800	3600	1000

Cash balance on 1st January was Rs. 10000 A new machine is to be installed Rs. 30000 on credit, to be repaid by two equal instalments in March and April

Sales commission @5% on total sales is to be paid within the month following actual sales Rs. 10000 being the amount of and call may be received March. Share premium amounting to Rs. 2000 is also obtainable with 2nd call.

Period of credit allowed by suppliers … 2 months
Period of credit allowed to customer … 1 month
Delay in payment of overheads … 1 month
Delay in payments of wages … ½ month

Solution

Cash budget quick Co., Ltd

Details	For the period Jan, to June 19 X 7					
	Jan Rs.	Feb Rs.	Mar Rs.	Apr Rs.	May Rs.	June Rs.
A. Bal B/d	10000	18000	29800	20000	6100	8800
B. Receipts Cashsale 50%	10000	11000	12000	13000	14000	15000
Debtors	--	10000	11000	12000	13000	14000
Capital	--	---	10000	---	---	---
Share premium			2000	---	---	---
Total (A+B)	20000	39000	64800	45000	33100	37800

ments

Materials	---	---	20000	14000	14000	12000
Wages	2000	4200	4500	4600	4700	4800
Production overheads selling & Distnr	----	3200	3300	3300	3400	3500
Overhead commission	----	800	900	800	900	900
Capital	----	1000	1100	1200	1300	1400
	----	---	15000	15000	---	---
Total (C)	2000	9200	44800	38900	24300	22600
Balance B/d (A+B-C)	18000	29800	20000	6100	8800	15200

Sometimes it is required to forecast cash or working capital and this can be computed in the usual way as described above and further consideration is necessary in respect of lag in payments and lag of realistion.

(b) Adjusted Profit and Loss Method:

Comparing with the previous method, this method is less detailed and more difficult to comprehend. It is particularly useful for long-term forecasts, say for a period of over three years. It is so called since it transforms and profit and loss account into a cash forecast. The basic assumption in this method is that any increased or decrease in cash balance is due to profit or loss of the business. All non cash items such as depreciation, write ups and write-offs, etc; are mainly adjusted to the net profit for the year. The theory, under this method, is based on the elementary assumption that profit is cash. If there were no credit transactions, capital transactions of profits, the balance of profits on the profit and loss account should be equal to the balance of cash in the cash book, Such a situation, however, will never exist in practice in any business. Hence all adjustments with regard to above items are to be made in the cash forecast. Sources of information are the firms profit and loss account and balance sheet.

Example 4 :

Balance Sheet As at 1.1.1991

Liabilities	Rs.,	Assets	Rs.
Share capital	50000	Land & Buildings	30000
Capital reserve	5000	Plant & Machinery	20000
Profit & Loss A.c	9000	Furniture & Fixtures	5000
Debentures	10000	Closing stock	4000
Creditors	28800	Debtors	26000
Accrued Expenses	200	Bank	18000
	103000		103000

Forecast, Trading and Profit & Loss A/c

For the year Ending 31/12/1991

Particulars	Rs.	Particulars	Rs.
Opening stock	4000	Sales	80000
Purchases	60000	Closing Stock	10000
Gross profit /cd	26000		90000
	90000		
Salary & Wages 2500		Goss profit /d	26000
Outstanding 500	3000	Interest received	100
Depreciation	2000		
Plant & Machinery	1000		
Furniture & Fixtures Administrative Expenses	3500		
Selling Expenses	2500		
Net profit c/d	141000		
	26100		26100
Dividends paid	10000	Balance b/d	9000
Balance c/d to balance sheet	13100	Net profit b/d	14100
	23100		23100

The following are the additional information for the year 1991. Share capital issued RS. 10000; Debentures issued RS. 2000

On 31.12.1991, the accrued expenses were Rs. 500; Debtors Rs. 20000; Creditors Rs. 30000; and land and buildings Rs. 40000

Solution :

Cash Budget – Adjusted Profit & Loss Method

	Rs.	Rs.	Rs.
Cash Balance on 1.1.1991			18000
Additions to cash ; Income – Net profit for the year		14100	
Depreciation : Plant and Machinery	2000		
Furniture & Fixtures	1000		
		3000	
Accrued Expenses (difference)	300		
Reduction in Debtors	6000		
Increase in creditors	1200		
Issue of share capital	10000		
Issue of Debentures	2000		
		19500	
			36600
Cash available deduction from cash; dividends paid	10000		54600
Increase of stock	6000		
Purchase of land & Building	10000		26000
Cash balance as on 31.12.1991			28600

(c) Balance Sheet Method

The same theoretical assumption of the adjusted profit and loss method holds good in this method also. Under this method, a budgeted balance sheet is prepared showing all items of assets and liabilities except cash balance. If there is excess of liabilities over assets, the balance is ordinary cash balance; if there is excess of assets over liabilities, the balance is assumed to be bank over draft. Of these three methods, the first method is mostly preferred because it is a short term forecast and is much more detailed than the other two methods which are normally used as long term forecasts.

Example 5 :

Using the data of Example 4, prepare a cash forecast showing cash at bank on 31-12-1991 under balance sheet method.

Solution :

The balancing figure or Rs. 2800 represents cash at bank on 31.12.1991. This is obtained by completing the balance sheet from the information obtained from example 4 as follows.

Forecast balance sheet as at 31.12.1991

Liabilities	Rs.	Assets	Rs.
Share capital	60000	Land & Buildings	40000
Capital reserve	5000	Plant & Machinery	18000
Profit & Loss A/c	13000	Furniture & Fixtures	4000
Debenture	12000	Closing Stock	10000
Creditors	30000	Debtors	20000
Accrued Expenses	500	Bank (Balancing figure)	28600
	120600		120600

Flexible Budgets

In those industries where the pattern of demand is stable, a fixed budget may be adequate, especially where the budget period is comparatively short. In such business it is possible to forecast sales with a considerable degree of accuracy. There are many undertakings where stable conditions are absent. In such concerns fluctuations in output might lead to violent deviations from the budget. In such concerns it is usual to adopt the flexible budgetary technique. A flexible budget is a budget which is designed to change in accordance with the level of activity actually attained. If flexible budgeting is adopted a series of budgets would be compiled to cover the range of levels of activity possible. In such budgets divisions of costs and expenses into flexed and variable is extremely important.

The need for a flexible budget can be simply illustrated as follows: The owner of an automobile knows that the more he uses his car per year the more it costs him to operate it; he also knows that the more he uses his car the less it costs per mile. The reason for this lies in the nature of the expenses, some of which are fixed while others are variable and semi-variable. Insurance, taxes, registration, and garaging are fixed costs. They remain the same whether the car is operated 1000 or 2000 miles. The costs on tires, gas, oil and repairs are variable costs and depend largely upon the miles driven. Obsolesence and depreciation result in a combined type of cost that, although fluctuating to some degree, depend upon the usuage of the car, is semi-variable, for it does not vary directly with the usuage. The cost of operating the automobile per mile depends on the number of miles the car is used. Mileage constitutes the basis for judging the activity of the automobile. If the owner prepares an estimate of total costs and compares his

actual expenses with the budget at the end of the year, he cannot tell how successful he nad been in keeping his expenses within the allowed limits unless he takes the mileage factor into account.

The underlying principle of flexible budget is that for any given volume of business there should be some norm of expenditure and that norm should be known before hand to provide a guide to actual expenditure. To recognize this principle is to accept the fact that every business id dynamic, ever-changing, and never static. It is erroneous, if not futile, to except a business to conform to a fixed, pre-conceived pattern, Preparation of flexible budgets results in the construction of a series of formulas, one for each department or cost centre. The formula for each account indicates the fixed amount and/or a variable rate. The fixed amount remains constant regardless of activity. The variable portion of the formula is a variable rate expressed in relation to a base such as direct labour hours, direct labour cost, or machine hours.

Originally the flexible budget was applied principally to the control of departmental factory overhead. In recent years, however, the idea has been applied to the entire budgets so that production budgets as well as selling and administrative budgets are prepared on a flexible basis. The construction of a flexible budget is identical with that of a fixed budget except that a budget is calculated for each volume ranging from a possible 60 percent to 100 percent of capacity. When actual figures are available, estimates previously determined for the level attained are compared with actual results, and differences are noted. This end of period comparison the level attained are compared with actual results, and differences are noted. This end of period comparison is used to measure the performance of each department of head. It is this readymade comparison that makes the flexible budget a valuable instrument for cost control., The flexible budget assists in evaluating the effects of varying volumes of activity on profits and on cash position.

Example 6 :

The following data are available in a manufacturing company for the half year period ending 30th June 1974.

	Rs. (Lakhs)
Fixed Expenses :	
Wages and Salaries	8.4
Rent, Rates and Taxes	5.6
Depreciation	7.0
Sundry Administrative Expenses	8.9

	29.9
Semi-Variable expenses (@50% of capacity)	
Maintenance and Repairs	2.5
Indirect Labour	9.9
Sales Department Salaries etc	2.9
Sundry Administrative Expenses	2.6

	17.9
Variable Expenses (@ 50% of capacity) :	
Materiai	24.0
Labour	25.6

Other Expenses 03.8

----- 53.4

It is assumed that fixed expenses remain constant for all levels of production semi-variable expenses remain constant between 45% and 65% of capacity, increasing by 10% between 65% and 80% of capacity and by 20% between 80% and 100% of capacity.

Sales at the various levels are :

60% capacity Rs. 100.00 lakhs
75% capacity Rs. 120.00 lakhs
90% capacity Rs. 150.00 lakhs
100% capacity Rs. 170.00 lakhs

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

Solution:

Flexible Budget for the Half year ending 30th June 1974

(Showing, the forecast for profits at different levels)

Elements of cost	Operating Capacity			Standard	
	Rs.	Rs.	Rs.	Rs.	Rs.
A. Fixed Expenses : Wages & Salaries	8.4	8.4	8.4	8.4	8.4
Rent, Rates & Taxes	5.6	5.6	5.6	5.6	5.6
Depreciation	7.0	7.0	7.0	7.0	7.0
Sundry Expenses	8.9	8.9	8.9	8.9	8.9
	29.9	29.9	29.9	29.9	29.9
B. Semi-variable Expenses :					
Maintenance & Repairs	2.5	2.5	2.75	3.00	3.00
Indirect Labour	9.9	9.9	10.89	11.88	11.88
Sales Dept salaries	2.9	2.9	3.19	3.48	3.48
Sundry Adm,. Expenses	2.6	2.6	2.86	3.12	3.12
	17.9	17.9	19.69	21.48	21.48
C. Variable Expenses : Material	24.0	28.80	36.00	43.20	48.0
Labour	25.6	30.72	38.47	46.08	51.2
Other Expenses	3.8	4.56	5.70	6.84	7.6
	53.4	64.08	80.17	96.12	106.8
Total cost of production (i.e. Total of A,B & C)	101.2	111.88	129.76	147.50	158.18
Profit (+) or Loss (-)		-11.88	-9.76	+2.50	+11.82
Sales		100.00	120.00	150.00	170.00

The consolidation of Budgets

A co-ordinating authority is necessary to resolve difficulties and disputes which arise between the departmental heads in relation to the budgets. The aim of budgeting is to produce a complete forecast of how all the various sections of business should behave and therefore, adjustments are often necessary. Decisions of this nature are the functions of the managing director. He will normally appoint a committee of the departmental heads to advise him,. If, however vital matters of policy are involved, the decision must be made by the Board of

Directors. The Chief Accountant should prepare statement summarising the various budgets and bring out the points which need clarification and decision by the Managing Director.

Master Budget

When the necessary decisions have been taken by the Managing Director to harmonise the different sectional budgets, a Master Budget will be prepared. This will set out, in considerable detail, the plan of operation for all departments of the budget period and will be placed before the Board of Directors, for their acceptance. After acceptance, the Master becomes the authority for the necessary executive action to be taken to implement it. A Master Budget is basically a summary budget as it embodies the summarised figures the details of which are incorporated in other principal budgets. It represents the overall plan of the enterprise. A specimen of Master Budget is given below.

Example 7 :

Master budget 1. Revenue Budget 3 months to March 31, 1974

Products	P Rs.	Q Rs.	R Rs.	Total Rs.
	582000	260000	230000	1072000
Materials	475552	205020	176256	856828
Labour	8959	5917	3675	18552
Factory overheads	26015	18900	8580	53495
	510526	229837	188512	928875
Administration over heads : Fixed				20000
Variable				10000
Selling and Distribution:				11000
Variable				18000
Budget profit on production c/d				987875
				84125
				1072000
Budgeted profit on production c/d				84125
Deduct Director's Fees				2000
				82125
Profit per capital movements budget, March 31, 1974				
2. Capital movements budget 3 months to March 31, 1974				
Capital Expenditure				18500
Increase in stocks				50000
Increase in debtors				36000
Reduction in creditors				
Taxation			200000	
Dividend			60000	260000

				364500
Proceeds of shares issue				100000
Increase in Depreciation provision				8110
Increase in creditors				32915
Reduction in cash at bank				141350
Budget profit				82125
				364500

Exercise

1. Explain the terms 'Budget', Budgeting and budgetary control?
2. What are the merits and limitations of budgetary control?
3. Describe how the budgets could be classified?
4. Write short notes on :
   a. Budget manual
   b. Principal budget factor
5. Define a production budget. Explain the principal considerations involved in budgeting production
6. Write a note on 'flexible budgets'
7. Describe briefly the method of preparation of a sales budget.
8. Prepare a production budget of Ibcon Limited for 1973-74 from the following information:

	Products sales as per sales Budge (in units)	Estimated stocks in units	
		1st July	30th June
P	488000	10000	12000
Q	375000	20000	45000
R	600000	50000	25000

9. Make out cash Budget for April – June 1970. from the following information:

1. Actual and Budgeted sales :

	Actual Rs.		Budgeted Rs.
January	80900	April	90000
February	80000	May	85000
March	75000	June	80000

2. Actual and Budgeted Purchases :

	Actual Rs.		Budgeted Rs.
January	40000	April	50000
February	40000	May	45000
March	42000	June	35000

3. Actual and Budgets wages and expenses :

	Actual Wages	Actual Expenses		Budgeted Wages	Budgeted Expenses
January	20000	5000	April	24000	7000
February	18000	6000	May	20000	6000
March	22000	6000	June	18000	5000

4. Special
   Advance income tax in May Rs. 4000
5. Rent Rs. 3000 payable each month, not included in expenses
6. 10% of purchases and sales are on cash terms
7. Credit purchases are paid after one month and credit sales are collected after two months. Time lag in wages and expenses ½ Month.
8. Cash and Bank balance on April 1 : Rs. 30000

(Ans) C.A. Final, Nov. 1970)

	April	May	June
Receipts including op. Bal.	94000	87400	94100
Payments	82600	82300	68800
Closing Balance	11400	5100	25300

Lesson 5
Standard Costing And Variance Analysis

Synopsis

Introduction – standard cost – standard costing - definition – advantages – limitations – types of standards – setting the standard.

Introduction

The importance of standard costing has been recognized by the accountants since the beginning of the present century. It is one of the effective tools of cost control. The defects of historical costing are done away with by the introduction of standard costing.

Standard cost

The term standard cost has been defined by ICMA as "A pre determined cost which is calculated from management's standard of efficient operation and the relevant necessary expenditure.

Standard costing

Standard costing is defined as "The preparation and the use of standard cost, their comparison with actual cost and the analysis of variances, to their causes and points of incidence".

From the above definition we observe that

a. Standard costing is a technique of costing based on the preparation and use of standard cost.
b. The purpose of standard costing is to compare actual cost wit the standard cost and to find out variances/.
c. To analyse the variance and finding out the causes for the difference, so that the weak points may be corrected.

The standard cost represent the planned cost based on technical estimate on material, labour and over heads.

Advantages of standard costing

1. Standard costing and variance analysis is a useful tool for cost control cost reduction, which improves profitability.
2. The wastage is checked
3. The information about cost is readily available which is useful in fixing selling price, valuation of work in progress etc.
4. Delegation of authority becomes very effective.
5. "Principles of management by exception" can be introduced as the management need to concentrate only important areas of problems.
6. Standard costing provides uniform basis to measure the operational efficiency of workers and other members of the staff.
7. Valuation of closing stock is made simple as the standard costing system
8. The costing procedure is simplified as the standards are set for every element of cost.
9. It helps in budgetary control and in decision making
10. The standards once set work for a considerable time. So the production and pricing policies can be decided well in advance (i.e.) even before production starts.

Disadvantages of standard costing

1. It is very expensive
2. Too much forms and procedures are involved
3. The non-achievement of standard which are of high level may affect the morale of workers and employees.
4. It is suitable to those industries which produces and sell standardi2ed products only.
5. It is not practically possible to fix very accurate standards
6. Ineffecient staff is incapable of operating this system
7. It is difficult to apply this method where production takes more than one accounting period.
8. Periodic revision of standard is a costly thing and very difficult also.

Types of standard

1. **Ideal Standard**
   It is a theoretical standard, which can be attained under the most favourable conditions. It assumes that there is no wastage, inefficiency etc. However, this type is not practically seen.
2. **Basic Standard**
   It is standard established for a long time use without alterations. From this standard changes in current standard and actuals can be measured. But it is not helpful for cost control and cost ascertainment.
3. **Current Standard**
   It is a short term standard which is revised at periodical intervals, It takes into account the current conditions. It is a realistic method, useful for cost control. However, for studying the long term trend of costs. It is not useful
4. **Normal Standard**
   It is an average standard which is prepared considering the normal conditions that prevail over a long period of trade cycle. It is of no use when there is a wide fluctuation in past performances. It is very difficult to apply in practice.

5. **Expected Standard**

It is a practical standard ICMA defines it as "The standard, which it is enticipated, can be attained during the future specific budget period", All excepted conditions are given proper weightage. It is a realistic standard.

Setting standard

The success of standard costing depends upon the establishment of correct standards. So reasonable care should be exercised in fixing the standards. The Standards should be fixed for each element of cost. They are :

a. **Direct material**

It includes, the determination of standard and the standard material prices,

The quantity can be fixed by consulting Engineers, Designers, Chemists, and study practitioners etc. Normal wastage allowance is also made. When different kinds of materials are used, a standard material mixed is also determined

Material standard price is set by cost accountant, and purchase manager, which is normally applicable for one year. The prices are fixed considering past quotations, trade discount, actuals in the past periods etc.

b. **Direct labour**

In connection with labour the standard time and standard rate per hour has to be fixed. Standard time is fixed by Time and motion study past records and estimates. Standard rates per hour is fixed by the cost account and after consulting he personnel manager trade union etc. Such rate also depends on the method of wage payment prevailing in the concern.

c. **Overheads**

Overheads are divided into fixed, variable, semi-variable. Standard overhead rate has to be determined for fixed and variable cost on the basis of past records and future trend of prices.

$$\text{Standard rate per unit} = \frac{\textit{Budgeted fixed overheads}}{\textit{Budgeted production}}$$

Standard hour

It refers to the amount of work that should be done in one hour under standard conditions. It is useful in ascertaining overhead variances when there are many products, it can be used for calculation of production cost for a period.

Variance Analysis

Synopsis : Meaning for variance – uses – cost variance classified – material variances – illustrations – Labour variances – Illustration – overhead variances – illustrations – sales variances – illustration – profit variances.

Variance

The deviation of the actual from the standard is known as variance; when actual cost incurred is more than the standard cost, there is an unfavourable variance or adverse variance. When the actual cost incurred is less than the standard cost, then it is a favourable variance. The favourable variance is a sign of efficiency of the organization and adverse variance reveals the inefficiency of the organization. However, in case of sales and profit variance, if the actuals are higher, it is a favourable variance and if the acutals are low it is an adverse variance.

Use of variance analysis

1. It is an important tool of cost control and cost reduction
2. Comparing the standard and actuals reveal the efficiency of the organization. It helps the managements to apply the principles of management by exception.
3. Future planning and programs can be drawn on the basis of variance analysis
4. It is fact finding analysis, which is useful in fixing responsibilities
5. The management can maximise the profit by analysing the controllable and uncontrolable variance.

	Cost variances	
Direct material	Direct labour	overhead cost
Cost variance	cost cariance	variance
(DMCV)	(DLCV)	(OCV)

Material cost variance

It is the difference between the standard cost of materials used for actual production and actual materials used. This can be calculated using the following formula.

[Standard Quanity For actual production x Standard price _ Actual quantity Actual price]

2. Material Price Variance

It is difference between the standard price and the actual price for the actual quantity used.

(Standard price – actual Price) X actual quantity

If the actual price is more, it is unfavourable

Price variance arise due to the following reason

1. Variance in market price
2. Change in market trend
3. Government interference
4. Transportation cost
5. Substitute of cheaper materials
6. Emergency purchase

3. Material usage or Quantity Variance

It is difference between the standard quantity for actual production and the actual quantity at the standard price.

(Standard Quantity – Actual quantity) X standard price

If the standard is high it is unfabourable

It arises due to the following reasons :

a) Poor condition of plant and machinery
b) Lack of skilled employees
c) Incorrect processing of materials
d) Poor inspection and supervision
e) Rough handling of materials
f) Incorrect setting of standards
g) Excess waster, scrap, spoilage, leakage etc.

h) Change in product mix
i) Accounting errors
j) Non standard material used
k) Materials lost in theft etc.

MCV = MPV + MUV

Material usage variance can further be classified into material mix variance and material revised usage variance.

Material mix variance

It arises only when different raw materials are actually mixed to produce a product. It is the difference between the standard mix and the actual mix of materials

MMV = (Revised standard Quantity – actual quantity) SP

$$RSQ : \frac{\text{Total weight of actual / Mix}}{\text{Total weight of standard mix}} \times \text{Standard Quantity.}$$

When the actual quantity is less than the revised one, there is a favourable variance. It arises due to wrong mixing of material.

Material revised usage variance

It is the difference between the standard quantity and the revised standard quantity at standard price. MRUV = (Standard Quantity – revised standard quantity) X S.P.

It arises due to revision in standard quantity

MUV= MMV + MRUV

Material yield variance

The result obtained fro MRUV can be calculated by preparing yield variance. It is the difference between the standard yield on actual input and the actual yield at the average standard price. It may be due to abnormal reason such as chemical reactions, heavy spoilage etc.

M YV = (Standard Yield – actual yield) X Average standard price

If the actual yield - - actual yield) X average standard price

If the actual yield is more, it is a favourable variance

$$\text{Average standard price} = \frac{\text{Total standard value}}{\text{Standard Unit (good)}}$$

The yield variance can be calculated considering the standard loss and the actual loss also.

(Standard loss – actual loss) X Average standard price

If the actual loss is more, it is unfavourable

MRUV = MYV

Illustration : 1

Calculate possible material variance from the following details; Standard quantity allowed for manufacturing a unit is 20kg @ s. 2 per kg. On completion of 1o units it was found that 220 kgs were consumed @ Rs. 1.80 per KG.

Solution

Materials cost variance = -(SP X SQ) (AP X AQ) = (2X200)-(1.80x220)=400-396 = 4(+)

Materials price variance = (SP AP) AQ = (2-1.80) 220 = 44 (+)

Material usage variance = (SQ-AQ) SP = (200 – 200) 2 = 40 (-)
MCV = MPV + MUV
4(F) = 44(F) + 40 (A)

Illustration 2

From the following information calculate all possible materials variances.

Material	Standard	Actual		
	Qty	Price	Qty	Price
A	10	4	12	3.50
B	15	5	18	6.0
C	15	3	10	3.00
	40		40	

Illustration 4

Given the following information calculate material variances

Materials	Standard		Value	Actual		Value
	Qty (Kgs.)	Rate	Rs	Qty (Kgs.)	Rate	Rs
A	200	5	1000	200	5	1000
B	500	3	1500	500	3	1500
	700		2500	700		2500
Less Normal Loss	75			100		-
Production	625		2500	600		2500

Solution

(Hint) As the standard production and actual production varies, we have to calculate standard quality for actual production.

SQ of "A" = 625 – 200 = 600 - ? @ 600 X $\frac{200}{625}$ = 192

"B" = 625-500 = 600-? @ 600 X $\frac{500}{625}$ = 480

MCV = (SP X SQ) – (AP X AQ)
A = (5X192) – (5X200) = 40(A)
B = (3X480) – (3X500) = 60(A)

= 100 (A)

Solution : MCV = (SP X SQ) – (AP X AQ)

A = (4X10) –(3.50 X 12) = 40-42 = 2 (A)
B = (5 X 15) – (6.00 X 18) = 75 – 108 = 33 (A)
C = (3 X 15) – (3.00 X 10) = 45-30 = 15(F)

=12(A)

Use of variance analysis

1. It is an important tool of cost control and cost reduction
2. Comparing the standard and actuals reveal the efficiency of the organization. It helps the managements to apply the principles of management by exception.
3. Future planning and programs can be drawn on the basis of variance analysis
4. It is fact finding analysis, which is useful in fixing responsibilities
5. The management can maximise the profit by analysing the controllable and uncontrolable variance.

	Cost variances	
Direct material	Direct labour	overhead cost
Cost variance	cost cariance	variance
(DMCV)	(DLCV)	(OCV)

Material cost variance

It is the difference between the standard cost of materials used for actual production and actual materials used. This can be calculated using the following formula.

[Standard Quanity For actual production x Standard price − Actual quantity Actual price]

2. Material Price Variance

It is difference between the standard price and the actual price for the actual quantity used.

(Standard price – actual Price) X actual quantity

If the actual price is more, it is unfavourable

Price variance arise due to the following reason

1. Variance in market price
2. Change in market trend
3. Government interference
4. Transportation cost
5. Substitute of cheaper materials
6. Emergency purchase

3. Material usage or Quantity Variance

It is difference between the standard quantity for actual production and the actual quantity at the standard price.

(Standard Quantity – Actual quantity) X standard price

If the standard is high it is unfabourable

It arises due to the following reasons :

a) Poor condition of plant and machinery
b) Lack of skilled employees
c) Incorrect processing of materials
d) Poor inspection and supervision
e) Rough handling of materials
f) Incorrect setting of standards
g) Excess waster, scrap, spoilage, leakage etc.

h) Change in product mix
i) Accounting errors
j) Non standard material used
k) Materials lost in theft etc.

MCV = MPV + MUV

Material usage variance can further be classified into material mix variance and material revised usage variance.

Material mix variance

It arises only when different raw materials are actually mixed to produce a product. It is the difference between the standard mix and the actual mix of materials

MMV = (Revised standard Quantity – actual quantity) SP

$$RSQ : \frac{\text{Total weight of actual / Mix}}{\text{Total weight of standard mix}} \times \text{Standard Quantity.}$$

When the actual quantity is less than the revised one, there is a favourable variance. It arises due to wrong mixing of material.

Material revised usage variance

It is the difference between the standard quantity and the revised standard quantity at standard price. MRUV = (Standard Quantity – revised standard quantity) X S.P.

It arises due to revision in standard quantity

MUV= MMV + MRUV

Material yield variance

The result obtained fro MRUV can be calculated by preparing yield variance. It is the difference between the standard yield on actual input and the actual yield at the average standard price. It may be due to abnormal reason such as chemical reactions, heavy spoilage etc.

M YV = (Standard Yield – actual yield) X Average standard price

If the actual yield – actual yield) X average standard price

If the actual yield is more. it is a favourable variance

$$\text{Average standard price} = \frac{\text{Total standard value}}{\text{Standard Unit (good)}}$$

The yield variance can be calculated considering the standard loss and the actual loss also.

(Standard loss – actual loss) X Average standard price

If the actual loss is more, it is unfavourable

MRUV = MYV

Illustration : 1

Calculate possible material variance from the following details; Standard quantity allowed for manufacturing a unit is 20kg @ s. 2 per kg. On completion of 1o units it was found that 220 kgs were consumed @ Rs. 1.80 per KG.

Solution

Materials cost variance = -(SP X SQ) (AP X AQ) = (2X200)-(1.80x220)=400-396 = 4(+)

Materials price variance = (SP AP) AQ = (2-1.80) 220 = 44 (+)

Material usage variance = (SQ-AQ) SP = (200 – 200) 2 = 40 (-)
MCV = MPV + MUV
4(F) = 44(F) + 40 (A)

Illustration 2

From the following information calculate all possible materials variances.

Material	Standard	Actual		
	Qty	Price	Qty	Price
A	10	4	12	3.50
B	15	5	18	6.0
C	15	3	10	3.00
	40		40	

Illustration 4

Given the following information calculate material variances

Materials	Standard		Value	Actual		Value
	Qty (Kgs.)	Rate	Rs	Qty (Kgs.)	Rate	Rs
A	200	5	1000	200	5	1000
B	500	3	1500	500	3	1500
	700		2500	700		2500
Less Normal Loss	75		-	100		-
Production	625		2500	600		2500

Solution

(Hint) As the standard production and actual production varies, we have to calculate standard quality for actual production.

SQ of "A" = 625 – 200 = 600 - ? @ $600 \times \frac{200}{625} = 192$

"B" = 625-500 = 600-? @ $600 \times \frac{500}{625} = 480$

MCV = (SP X SQ) – (AP X AQ)
A = (5X192) – (5X200) = 40(A)
B = (3X480) – (3X500) = 60(A)

= 100 (A)

Solution : MCV = (SP X SQ) – (AP X AQ)

A = (4X10) –(3.50 X 12) = 40-42 = 2 (A)
B = (5 X 15) – (6.00 X 18) = 75 – 108 = 33 (A)
C = (3 X 15) – (3.00 X 10) = 45-30 = 15(F)

=12(A)

Materials Price variance (Sp – AP) AQ.

A = (4-3.50) X 12 = 6 (F)
B = (5 – 6.00) X 18 = 18 (A)
C = (3 – 3.00) X 10 = 0

= 12 (A)

Materials Usage variance = (SQ – AQ) SP

A = (10-12) 4 = 8 (A)
B = (15-18) 5 = 15 (A)
C = (15-10) 3 = 15 (F)

= 8 (A)

MCV = MCU + MPV

20(A) = (8(A) +12(A))

MMV = (RSQ – AQ) SP RSQ = $\frac{\text{Total actual mix}}{\text{Total standard Mix}}$ X SQ

In this problem as the total standard mix and total actual mix being the same, RSQ will be equal to SQ so the result of MMV is equal to material usage variance

RSQ for 'A' 10/40 X 40 = 10
B 15 / 40 X 50 = 15
C 15 / 40 X 40 = 15

MMV 'A' (10 –12) 4 = 8 (A)
'B' (15 –18) 5 = 15 (A)
'C' (15 – 10) 3 = 15 (F)

= 8 (A)

MRUV (SQ-RSQ) SP

As the "SQ" and "RSQ" are one and the same, there is no result for MRUV

@ MUV = MMV + MRUV 8(A) = 8(A) + 0

Illustration 3.

From the following information calculate the following variances (A) MCV, (B) MPV, (C) MUV, (D) MMV, (E) MRVU

Material	Standard Qty	SP	AQ	Ap.
A	10	4	12	3.75
B	15	5	18	4.50
	25		30	

Solution MCV = (SP X SQ) – (AP X AQ)

'A' (4 X 10) – (3.75 X 12) = 40 – 45 = 5 (A)
'B' (5 X 15) – (4.50 X 18) = 75 – 81 = 6 (A)

= 11 (A)

MPV (SP-AP) AQ

A = (4-3.75) 12 = 3 (F)
B = (5-4.50) 18 = 9 (F)
---
12 (F)

MUV (SQ – AQ) SP

A = (10-12) 4 = 8 (A)
B = (15-18) 5 = 15 (A)
---
23 (A)

11 (A) = 12 (F) + 23 (A)
MMV = (RSQ – AQ) SP
RSQ = A = 10 / 25 X 30 = 12
B = 15 / 25 X 30 = 18
MMV = A = (12 – 12) 4 = 0
B = (18 – 18) 5 = 0

= 0

MRV = (SQ – RSQ) SP.

A = (10-12) 4 = 8 (A)
B = (15-18) 5 = 15 (A)
---
23 (A)

23 (A) = 0 + 23 (A) @
MUV = MMV + MR (VU)
MPV = (SP – AP) AQ
A = (5 – 5) 200 = 0
B = (3 – 3) 500 = 0

= 0

MUV = (SQ – AQ) SP
A = (192 – 200) 5 = 40(A)
B = (480 – 500) 3 = 60 (A)

= 100 (A)

100 (A) = 0 + 100 (A)
MMV = (RSQ – AQ) SP
A = 200 / 700 X 700 = (200 – 200) 5 = 0
B = 500 / 700 x 700 = (500 – 500) 3 = 0
MRUV = (SQ – RSQ) SP
= (192 – 200) 5 = 40 (A)
= (480 – 500) 3 = 60 (A)

= 100 (A)

For 1000 Units Rs. 6000/-
@ for 50 Hours = Rs. 6000

$$\text{Therefore per hour} = \frac{6000}{50} = \text{Rs. } 120/-$$

Actual Rate per hour
For 40 hours Rs. 8000/-

$$\text{Therefore 1 hours} = \frac{8000}{40} = \text{Rs. } 200/-$$

Standard Hour for actual production
For 1000 Units standard output = 50 Hours

$$\text{For 1200 Unit s actual output} = 1200 \times \frac{50}{1000} = 60 \text{ hours}$$

1. Labour cost variance : (SH X SR) – (AH X AR)
   = (60 X 120) – (40 X 200)
   = 7200 – 8000 = 800 (A)
2. LRV (SR – AR) AH = (120 – 200) 40 = 3200 (A)
3. LEV = (SH – AH) SR = (60 – 40) 120 = 2400 (F)

800 (A) = 3200 (A) + 2400 (F)

Overhead variances

Overheads can be classified into two

1. Fixed over head
2. Variable overhead

Accordingly overhead cost variance can be segregated into variable over head cost variance and fixed overhead cost variance. This can be explained by the following chart.

Total Overhead cost variance

Fixed overhead cost variance		Variable overhead cost variance
Expenditure or Budget variance	Volume Variance	
Capacity variance		Efficiency variance
Revised Capacity Variance	Calendar Variance	

Overhead Cost variance

It is the difference between the standard cost of overheads for actual output and the actual overheads incurred. It arises due to over or absorbtion of overheads.

Fixed overhead cost variance

It is the difference between the fixed overheads allowed for the actual production or hours and the actual fixed overheads.

Fixed O H cost variance = (Standard Rate per unit X actual production) – Actual fixed over head

$$\text{S.R. \ Unit} : \frac{\textit{Budgeted fixed overheads}}{\textit{Budgeted production}}$$

If the actual fixed overheads are higher than the standard it is noted as "Adverse"

Variable overhead cost variance

It is the difference between the actual variable overheads incurred and the allowed variable overheads based on actual hours worked.

Variable OH cost variance = (SR / Unit X Actual Production) – Actual variable over heads

$$\text{S.R. \ Unit} : \frac{\textit{Budgeted fixed overheads}}{\textit{Budgeted production}}$$

Budget variance

It is the difference between Budgeted and actual fixed overheads

Budget variance = (Budgeted fixed overheads – Actual fixed overheads)

Volume variance

It is the difference between the budgeted production and actual production multiplied by the predetermined absorbption rate. It arises due to over or under absorbtion of overheads.

Overhead volume variance = [Budgeted Production – Actual Production] S.R. / Unit

If the actual production is more we take it as "Positive".

Efficiency Variance:

It is the difference between the standard production in actual hours and the actu production multiplied by absorbtion rate.

OHEV = [Budgeted production – Actual production] S.R. / Unit

Capacity variance

It is the difference arise due to more or less working a capacity than the standard capacity.

OH Capacity Variance =

[Budgeted Production – Standard Production] S.R. / Unit

If standard production in actual hours is more, we take it as "Favourable)

Revised capacity variance

It arises when the budgeted number of working days and actual number of working days are not similar.

OH Revised capacity Variance = Standard Production – Revised Budgeted S.R. / Unit Production

If the actual number of working days or revised Budgeted production is more, we take it as "Favourable".

O H Calendar Variance

It also arises when the actual working days is more or less than the budgeted working days;

OH Calendar variance =

[Revised budgeted production – Budgeted production] S.R. / Unit

Revised Budgeted production is calculated on the basis of actual number of working days. It is higher than Budgeted production, we record it as "Favourable".

Hints

All the above mentioned formula will worked when number of units in terms of actual, standard and budget are given. But when the problems runs with hours, the following set of formula can be used.

(a) Variable OH Cost Variance

(Standard Rate / Hour / X Standard Hours) – Actual variable overheads

$$\text{S.R. / Hour} = \frac{\textit{Budgeted Variable OH's}}{\textit{Budgeted Hours}}$$

Standard > Actual then it is '+'

(b) Fixed OH cost variance

(S.R. / Hour X Standard Hours) – Actual fixed OHs

$$\text{S.R. / Hour} = \frac{\textit{Budgeted Fixed overheads}}{\textit{Budgeted Hours}}$$

If actual fixed overheads are more, it is '___'

(c) Expenditure variance (Budgeted OHs – Actual OHs)

(d) Volume Variance

(Budgeted Hours – Standard Hours) SR / Hour

Budgeted Hours > S Hrs then it is '____'

E. OH Efficiency variance

(Standard hours – Actual hours) SR/ Hours

If actual hours are more than it is (---)

F. O.H. Capacity variance

(B Hrs – Actual hours) S.R. Hour

If actual hours are more than it is '+'

G. OH Revised capacity variance

(Revised Budgeted hours – Actual Hours) SR / hour

If actual hours are more than it is '+'

H. OH Calendar variance

(Revised Budgeted Hours – Actual Hours) SR / hour

If revised hours are more than it is '+'

Illustration 7

In Department 'X' the following data are submitted for the week ended 8th February 1994. Standard output for 40 hours per week – 1400 Units

Standard fixed overheads – RS. 1400

Actual output = 1200 units

Actual Hours worked – 32

Actual fixed overheads – Rs. 1500/-

Calculate (a) OHCV (b) OHEV (c) OH Volume variance
(d) OHEV (e) OH Capacity Variance

Solution

$$\text{SR / Unit} = \frac{\textit{Budgeted Fixed Hos}}{\textit{Budgeted Production}} = \frac{1400}{1400} = \text{Rs.1 per unit}$$

OHCV = (SR / Unit X Actual Production) – Actual OHs
= (1X 1200) – 1500 = 300 (A)

Overhead expenditure variance
Budgeted OHs - Actual OHs
= 1400 – 1500 = 100 (A)

OH Volume variance = (Budgeted Production – Actual Production) S.R. /. Unit
= 1400 – 1200) 1 = 200 (A)

OHCV = (OHEV + OHVU)
300 (A) = 100 (A) + 200 (A)

OH Efficiency Variance (Standard Production – Actual Production) S.R. / Unit
Standard production in actual Hours
i.e. For 40 Hours the production is 1400 Units
Therefore 32…….. $\frac{32X\ 1400}{40} = 1120$ Units

(1120 – 1200) 1 –= 80 (F)

OH Capacity Variance = (Budgeted Production – Standard Production) S.R. / Unit
(1400 – 1120) 1 = 280 (A)

OH volume Variance = OHEV + OH Capacity variance
200 (A) = 80 (F) + 280 (A)

The same problem is worked out, when the standard rate / hour is used.

$$\text{S.R/ Hour} = \frac{\textit{Budgeted OH's}}{\textit{Budgeted Hours}} = \frac{1400}{40} = 35.00$$

OH Cost Variance = (SR / Hour X Standard Hours) –0 Actual OHs

Standard Hours for actual production
@ For 1400 Units the hours allowed is 40

Therefore for 1200…… $\frac{1200\ X\ 40}{1400} = \frac{240}{7}$

$$= \left[35\ X \frac{240}{7}\right] \text{ -- } 1500 = 300\ (A)$$

OH Expenditure variance = Budgeted OHs – Actual OHs
1400 – 1500 = 100 (A)

OH Volume Variance (Budgeted Hours) – Standad Hours) X SR Unit

$$= \left[40 - \frac{240}{7} \right] \text{ -- } 1500 = 200 \text{ (A)}$$

OH Efficiency variance = (Standard Hours – Actual Hours) SR / Hour

$$= \left[\frac{240}{7} - 32 \right] \text{ -- } 35 = 80 \text{ (F)}$$

OH Capacity variance
= (Budgeted Hours – Actual hours) SR / Hour
= (40-32) 35 = (280 (A)

Illustration 8

From the following details compute

a. OH Revised capacity variance
b. OH Calendar variance

Standard Data

Standard Hours for the period – 2400
Standard number of days – 25
Standard Fixed OHs – RS. 1200/-
Standard production – 1500 Units

Actual data

Hours worked – 2500 hours
Days worked – 27
Overhead cost – RS.1300
Actual Producton – 1600 Units

Solution

SR/ Unit

$$\frac{\textit{Budgeted overheads}}{\textit{Budgeted production}} = \frac{1200}{1500} = 0.80$$

$$\text{S.R. / Hr} \quad \frac{\textit{Budgeted overheads}}{\textit{Budgeted Hours}} = \frac{1200}{2400} = 0.50$$

Standard production in Actual hours
@ 2400 hours = 1500 units

$$2500 = \frac{2500 \text{ X } 1500}{2400} \quad 3125 / 2$$

Standard hours for actual production

1500 Units – 2400 hours

$$1600\text{Units} = \frac{1600 \text{ X } 2400}{1500} = 2560 \text{ hours}$$

Revised Budgeted production
Production in 25 days is 1500 units

$$\text{Production in 27 days is } 27 \times \frac{1500}{1500} = 1620 \text{ Units}$$

Revised Budgeted Hours
In 25 days the hours are 2400

$$\text{In 27 days the hours } 27 \times \frac{2400}{25} = 2592 \text{ hours}$$

When permit unit is used
OH Revised capacity variance
(Standard production – Revised Budgeted production) SR / Unit

$$= \left[\frac{3125}{2} = 1620 \right] .80 = 46 \text{ (F)}$$

O H Calendar variance
SR / Unit (Revised Budgeted production – Budgeted production)
= (1620 – 1500) .80 = 96 (F)
When SR / Hour is used
(Revised Budgeted Hours – Actual Hours) SR / Hour
= (2592 – 2500) .50 = 46 (F)
Overhead calendar Variance
(Revised Budgeted Hours – Budgeted Hours) SR / Hour
= (2592 – 2400) .50 = 192 X .50 = 96 (F)

Sales variance

Sales variance is the difference between the standard value of the sale and the actual sales achieved during the budget period. Sales variances may be explained by the following chart.

Sales value variance

Sales volume variance Sales price variance

Sales Mix variance Revised sales volume variance

Sales value variance

It is the difference between the standard value of sales and the actual value of sales:

Sales value variance = (Standard quantity sold X standard selling price) - (Actual quantity sold X Actual selling price)
Standard > Actual then it is "Adverse".

Sales price variance

It is the difference between the actual selling price and the standard selling price, for the actual quantity sold.

Sales price variance =(Standard selling price – Actual selling price) X AQ

If actual price is more then it is '+'

Sales Volume variance

It is the difference between the standard quantity to be sold and the actual quantity sold at the standard selling price.

SVV = (SQ – AQ) SP

Standard selling price, if actual quantity sold is more we take its is "Favourable".

Sales mix variance

It is the difference between the proportion of various goods actually sold and the standard proportion in which they were to be sold

S.M.V. = (Revised Standard – Actual
Quantity Quantity) S.P.

(R.S.Q is calculated in the same manner as it was calculated in materials)

If actual quantity is more, it is '+'

Sales revised volume variance

It is the difference between the revised quantity and standard quantity and standard quantity at the standard price.

S Revised volume variance = (RSQ – SQ) SP.

If R.S.Q. is more then it is '+'

Illustration 9

From the budgeted and actual sales for July 1994, in respect of three products given below, you are required to calculate sales variances

Product	Budget		Actual	
	Units	Selling price	Units	Selling price
X	5000	7	7000	6
Y	4000	5	3000	5
Z	6000	2	2000	3
	15000		12000	

Solution

a. Sales value variance

+(SQ X SP) – (AQ X A Price)

A = (5000 X 7) - (7000 X 6) = 7000 (+)
B = (4000 X 5) - (2000 X 5) = 5000 (-)
C = (6000 X 2) - (2000 X 3) = 6000 (-)

4000 (-)

b. Sales price variance

(SP) – AP) AQ

A = (7-6) 7000 = 7000 (-)
B = (5-5) 3000 = 0
C = (2-3) 2000 = 2000 (+)

5000 (-)

c. Sales volume variance (SQ – AQ) SP

A = (5000 - 7000) 7 = 14000 (+)
B = (4000 - 3000) 5 = 5000 (-)
C = (6000 - 2000) 2 = 8000 (-)

1000 (+)

4000 (A) = 5000 (A) + 1000 (F)

d. Sales mix variance

(RSQ – AQ) SP

R.S.Q. A = 5000 / 15000 X 12000 = 4000
B = 4000 / 15000 X 12000 = 3200
C = 6000 / 15000 X 12000 = 4800
A = (4000 – 7000) 7 = 21000 (+)
B = (3200 – 3000) 5 = 1000 (-)
C = (4800 – 2000) 2 = 5600 (-)

14,400 (+)

e. Sales Revised Volume variance

(SQ – RSQ) SP.

A = (5000 – 4000) 7 = 7000 (-)
B = (4000 – 3200) 5 = 4000 (-)
C = (6000 – 4800) 2 = 2400 (-)

13,400 (-)

1000 (F) = (14400 (F) + 13400 (A))

Note : There is no yield variance in sales variance

Profit variance

It is due to the difference between the standard Profit expected and the actual profit earned. This can be explained in the following chart.

Total profit variance

Profit rate variance Profit volume variance

Total profit variance = (Standard Quantity X Standard profit) – Actual quantity X Actual profit)

If the actuals are higher it is '+'

Profit rate variance

(Standard Profit – Actual profit) Actual Quantity

If the actual profit is high it is (+)

Profit volume variance

(Standard Quantity – Actual Quantity) Standard profit

If actual quiantity sold is high, it means a plus side

Note : Standard profit = Standard selling price – Standard cost price

Actual profit = Actual selling price – Actual cost price

Exercise

1. Product A requires 10 kgs of materials at the rate of Rs. 4 per kg. The actual consumption of materials came to 12 kg at the rate of Rs. 4.50 per kg calculate:
   1. Material cost variance
   2. Material usage variance
   3. Material price variance

2. The standard quantity and standard price of raw material required for one unit of product A are given as follows

Material	quantity	Standard price
X	2 kg	Rs. 3 per kg
Y	4 kg	Rs. 2 per kg
	6 kg	

The actual production and relevant date are as follows

Output 500 units of product A

Material	Total Quantity	Total Quantity	Total cost For 500 units
X		1100 kg	Rs. 3410
Y		800 kg	Rs. 3960

Calculate the variances

3. From the following information of product No,. 142. calculate (1) Material cost variance (2) Material mix variance (3) Material sub-usage variance (4) Material price variance

Material	Standard quantity Kg.	Standard price Rs.	Actual quantity Rs.	Actual price Rs.
X	10	5	12	4.00
Y	8	4	7	4.50
Z	6	3	5	3.25
	24		24	

4. From the following information, compute (a) Mix (b) Price (c) usage variance (d) revised usage (e) cost variance

Material	Standard			Actual		
	Quantity Kgs.	Unit price Rs.	Total Rs.	Quantity (Kilos)	Unit price Rs.	Total Rs.
A	10	2	20	5	3	15
B	20	3	60	10	6	60
C	20	6	120	15	5	75
Total Rs.	50		200	30		150

5. From the following information, calculate material yield variance

Material	Standard			Actual		
	Quantity Kgs.	Price per Rs.	Total Rs.	Quantity Kgs.	Price per kg Rs.	Total Rs.
A	200	5	1000	200	5	1000
B	500	3	1500	500	3	1500
	700		2500	700		2500
Less Normal usage	75			100		
	625		2500	600		2500

Material	Standard			Actual		
	Quantity Kgs	Price Rs.	Total Rs.	Quantity Kgs.	Price Rs.	Total Rs.
A	500	6.00	3000	400	6.00	2400
B	400	3.75	1500	500	3.60	1800
C	300	3.00	900	400	2.80	1120
	1200			1300		
Less N loss	120			A.L. 220		
	1080		5400	1080		5320

Calculate

1. Material cost variance
2. Material price variance
3. Material Mix variance
4. Material Yield variance
5. Total Material usage variance

Note

N.L. Means Normal Loss

A.L. Means Actual Loss

7. The standard cost of a certain chemical misture is :

40% material A at Rs. 200 per ton

60% material B at Rs. 300 per ton

A standard loss of 10% is excepted in production. During a period it is used 90 tone materials. A at the cost of Rs. 180/- ton 110 tons material B at the cost of Rs. 340 per ton. The weight produced is 182 tons of good production.

Calculate and present

Material Price Variance

Material usage variance

Material Mix variance

Material Yield variance

8. Calculate standard labour time for machining part No. z 235 from the following data:

Standard batch size 1000 pieces

Set-up time 85 minutes

Operating time (each piece)

Fixing job on machine = 3 minutes

Cutting time = 12 minutes

Removing job from machine = 5 minutes

Allow 5% of total operation time for inspection during process and allow further 5% on total time for fatigue

9. The standard time and the rate for unit component A are given below.

Standard Hours 15

Standard Rate Rs. 4 per hour

The actual data and related

Information are us under

Actual production	1000 units
Actual hours	15300 hours
Actual rate	Rs. 3.90 per hour

Calculate 1. Labour cost variance 2. Labour efficiency variance 3. labour rate variance

10. Usage the following information calculate each of three labour variance for each department

	Dept. X	Dept. Y
Gross wages direct (Rs.)	28080	19370
Standard hours produced	8640	6015
Standard rate per hour (Rs.)	3	3.40
Actual hours worked	8200	6345

11.

	Standard			Actual	
	Kg	Total Rs	Kg		Total Rs.
Input	500 material @ Rs. 39 per kg labour 4000 @ Rs. 1.5 per hr.	19500	500	Material @ RS. 42/- Labour 4000 hrs @ Rs. 1.50	21000 6000
Normal Loss	20	6000	40	Actual loss	--
Output	480	25500	460		27000

12. A. Chemical Co give the following standard and actual data of its chemical No. 1456 you are required to calculate variances

Kg	Rs	Total Rs.	Kg	Rs	Total
450	Of material A		450	Kg ! 19 per kg 8550	12510
360	@ 20 per kg 9000		360	Kg @ `11 per kg 3960	
810	Of material B				
Loss 90	@ 10 per kg		810		69000
720	@ per hour 2400 skilled hrs 2=4800	12600			
	1200 unskilled hrl 1200	6000	Loss 50	2400 hrs @ 2.25 5400	
		18600	760	1200 hrs @ 1.25 1500	1941

13. Budgeted hours for month of March 180 hrs

Standard rate of article produced per hr	50 units
Budgeted fixed overhead	Rs. 2700/-
Actual production for March	9200 units
Actual hours for production	172 hours

Actual fixed over heads Rs. 2800/-

Calculate overheads cost variance and overheads budget variance and overhead volume variance

14. A factory has estimated its overheads for some year at Rs. 96000/- The factory runs for 300 days in a year. It works for 8 hours a day. The total budgeted production for the year is 24000 articles. Actual data are also given to you as under for the month of April 1980

Actual Overheads	Rs. 8500
Output	2100 Articles
Idle time	4 hours

15

Item	Budget	Actual
No of working days	20	22
Man hours per day	8000	8400
Output per man hour in units	1.0	0.9
Overheads cost (Rs.)	160000	168000

Calculate overheads variance

Calculate 1. Material cost variance 2. Material price variance 3. Material yield variance 4. Labour cost variance 5. Labour price variance 6. Labour yield variance

16. In department X the following data are submitted for the week ended February 20

Standard output for 40 hours per week	2800 units
Standard fixed overheads	RS. 1400
Actual output	2200 units
Actual hours worked	36 hours
Actual fixed overhead	Rs. 1500

Calculate variance from standard

17. Calculate variance from standard

	Standard Data			Actual Data		
Product	Qty	S.P. Rs.	Total Rs.	Qty	S.P. Rs.	Total Rs
A	500	5.00	2500	625	5.40	3375
B	700	8.00	5600	875	8.20	7175
			8100			10550

Calculate 1. Sales Value Variance 2. Sales Price Variance 3. Sales Volume Variance 4. Sales mix Variance 5. Revised Sales Volume Variance

Lesson 6

Marginal costing & Break Even Analysis

Marginal costing, also known as Direct costing or variable costing is a special technique which may be used in conjunction with other techniques like standard costing and budgetary control. Its importance lies in the assistance it may give in solving managerial problems. This lesson discusses some of the important aspects of the technique.

Definition

The Institute of Costs and Management Accountant, England, defines marginal cost 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. "And marginal costing is defined as the ascertainment by differentiating between fixed costs and variable costs and of the effect on of

marginal profit of changes in volume of type of output". As referred to here, a unit may means a single article, a batch of articles, an order, a stage of production, a process or a department i.e it relates to the change in output in the capacity particular circumstances under consideration.

To the economist, marginal cost is an incremental cost which he considers the addition to total cost which results from the production of one more unit of output. The Institute of Chartered Accountants, England defines marginal cost as :every penne (whether of production selling or distribution) incurred by the taking of a particular decision". Marginal cost will be regarded here as the prime costs plus all overheads which vary with volume.

From the above definitions it is clear that under marginal costing, costs are classified as fixed and variable, and only variable costs are charged to products while fixed costs are charged to profit and loss account. Fixed costs otherwise known as period costs, such as rent rates insurance etc are incurred on the basis of period and therefore, carted to profit and loss account without carrying them to next period through closing stocks. On the other hand marginal costs vary with the volume of output and therefore, are charged to production. Marginal costing is not a system of costing such as process or job costing but a technique which presents management with information enabling it to measure the profitability of an undertaking by considering the behaviour of costs. All companies use marginal costing to aid management decisions.

Absorption costing Vs. Marginal Costing:

Absorption costing generally refers to the practice of charging all costs, both variable and fixed, to operations, processes, or products. Under this type of costing system, all costs, whether fixed or variable are treated as product costs and as such the product is made to bear the burden of full costs even though they have no relevance to current operations. But under marginal costing technique only variable casts are regarded as product and the fixed costs are transferred to the profit and Loss Account.

Absorption costing also differs from marginal costing with regard to inventory valuation. While under marginal costing, closing stock are valued at the marginal cost, they are valued at full cost under absorption costing. Such a method of valuation has the effect of carrying over fixed costs from one period to another. Such a procedure would normally affect the trading results and vitate cost comparison also.

In absorption costing, fixed overheads can never be absorbed exactly because of the difficulty in forecasting costs and volume of output. But the exclusion of fixed costs from product costs in the case of managerial costing does not give rise to the problem of over or under absorption of fixed overhead.

In the case of absorption costing, profit is the difference between sales revenue and total cost But under the marginal costing technique, the excess of sales revenue over marginal cost of sales is known as contribution. It is the contribution that is the guiding principle of decision making under the marginal costing technique. In order to ascertain net profits fixed costs are absorbed from total contribution. The following example would illustrate the various points explained above.

Example :

SPN Ltd supplies the following particulars for the preparation of income Statement for the year ended 31-12-1980

Sales -2000 units at Rs. 50 per unit

Manufacturing Costs:

Fixed	- Rs. 19,800
Variable	- 2200 Units at RS 31 per unit
Closing stock	- 200 units
Selling and administrative expenses	- Rs.
Fixed	- 5,600
Variable	- 4,400

Solution

Income Statement of SPN Ltd.
(For the year ended 31.12.1980)

(I) Under Absorption costing method	Rs.	Rs.
Sales (2000 Units at RS. 50/- unit)		1,00,000
Less : Cost of sales : Manufacturing cost fixed	19,800	
Variable	68,200	
	88,000	
Less : Closing Stock	8,000	80,000
(200 units at Rs. 40/- Unit)		
Goss profit		20,000
Less : Selling and administrative expenses		
Fixed	5,600	
Variable	4,400	10,000
Net profit		10,000

Workings	Rs.	
Total cost for 2,200 units	88,000	
Cost of closing stick of 200 units	88000x 200 / 2200	8,000

(ii) Under marginal costing method	Rs.	
Sales (2000 units Rs. 50/- each)		1,00,000
Less : Variable cost of sales		
variable manufacturing cost	68,200	
Less : Closing stock	6,200	
		62,000
Variable Gross Margin		38,000
Less : Variable selling and administrative Expenses		4,400
Contribution margin		33,600
Less : Fixed cost		
manufacturing cost	19,800	
Selling and administration	5,600	
		25,400
Net profit		8,200

Workings

Closing stock is valued on the basis of the variable

Manufacturing cost

$$\frac{68,200 \times 200}{2,200} = \text{Rs. } 6,200$$

The difference in profits is due to the difference in the valuation of closing stock

A proforma Marginal cost statement is given below which may be used by a concern producing and selling multiple products

Marginal Cost Statement Products

		A		A		A	
	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit	Total Rs.	Rs.
Sales – Marginal cost prime cost + variable overheads	X X X	X X X	X X X	X X X	X X X	X X X	
Contribution	X	X	X	X	X	X	XX
Specific fixed cost		X		X		X	XX
Net contribution		X		X		X	XX
General fixed costs		--		–		--	XX
Net profit							XX

The presentation is very helpful in order to decide what each product contributes towards fixed costs and profit. The format shown above should be used for working out problems under marginal cost method. From the marginal cost statement the following equations may be derived :

Sales – Marginal Cost = Contribution

Fixed cost + Profit = Contribution

Combining these two equations, we get the fundamental marginal cost equation :

Sales – Marginal Cost = Fixed Cost + Profit

Symbollically :

S-M=F+P = C (Contribution)

S-C = M

M+C=S

C-F=P

C-P=F

F-C=L (Loss)

F-L=C

C+L=F

The equation may be used for solving problems of different types involving cost volume profit relationship

Role of contribution

Contribution is the difference between sales and marginal costs and it contributes towards fixed costs and profit. When a business manufactures more than one product, the computation of profit realized on individual products may be difficult due to the problem of apportionment of fixed costs to different products. The rationale of contribution lies in the fact that fixed costs are done away with under marginal costing. The concept of contribution helps to determine the break-even point, profitability of products, departments, etc. to select product mix for profit maximisation, and to fix selling prices under different circumstances such as trade depression, export sale price discrimination etc. Contribution is the definite test whether a product or process is worthwhile to continue among different products or processes.

Example

The following information has been obtained from the accounts of a departmental store having three departments.

	Departments		
	A Rs.	B Rs.	C Rs.
Sales	50000	75000	125000
Marginal costs	45000	50000	75000
Fixed cost (apportioned on the basis of sales	10000	15000	25000
Total Cost	55000	65000	10000
Profit (loss)	(5000)	10000	25000

On the basis of the above information management wants to discard Department A immediately as it shows a loss. Also give your opinion on the comparative profitability of different departments if specific. Fixed costs are ascertained to be Rs. 2500 for Department A, Rs. 27500 for Department B and Rs. 15000 for Department C the remaining Rs. 5000 being general fixed cost.

Prepare appropriate statements and also give your comments explaining the position presented in the statement.

Solution :

(a) When all fixed costs are regard as general fixed costs.

Marginal cost statement

	A Rs.	B Rs.	C Rs.	Total Rs.
Sales	50000	75000	125000	250000
Less : Marginal cost	45000	50000	75000	170000
Contribution	5000	25000	50000	80000
Less : Fixed Cost	--	--	---	50000
Profit				30000

Comment :

The loss of Department A,. Rs. 5000 is due to the arbitrary basis of the apportionment of fixed cost to different departments. If the Department A is closed the total contribution as well as profit will be reduced by RS. 5000. Hence it is not admissible to close Department A.

(b) When there are specific as well as generalized cost:

Marginal cost statement

	A Rs.	B Rs.	C Rs.	Total Rs.
Sales	50000	75000	125000	250000
Less :	45000	5000	75000	170000
Marginal cost				
Contribution	5000	70000	50000	80000
Net contribution	2500	(2500)	35000	35000
Less				
General Fixed Cost				
Cost				50000
Profit				30000

Comment

According to the above statement it is the Department B which is to be closed since it shows a loss of Rs. 2500 after apportioning the specific fixed Costs. If the Department B is closed the total contribution as well as profit would increase by Rs. 25000. Hence it is always better to close Department B if either its working cannot be improved or the price of its products cannot be increased. The position of closure of Department B can be shown as below:

Statement of comparative profitability

	Department		
	A	C	Total
Sales	50000	125000	175000
Less :	45000	75000	120000
Marginal cost			
Contribution	5000	50000	550000
Less :	2500	15000	175000
Specific fixed costs			
Net contribution	2500	35000	37500
Less			5000
General Fixed costs			
Profit			32500

It is clear from the above statement that the profit has increased on the closure of Department B by Rs. 2500 which exactly equal to the loss incurred by that Department before closure.

Separation of Semi-variable Expenses into fixed and variable :

Determination of marginal cost is the main task to be carried out in the application of marginal costing. In this task the challenging problem is the segregation of semi-variable overheads into fixed and variable components.

The following methods may be used for this purpose.

Comparison by period or level of activity method:

Under the method or level of output at two levels is compared with corresponding level of expenses are obtained by ratio:

$$\frac{\textit{Change in amount of expenses}}{\textit{Change in activity or quantity}}$$

This and each of other methods would be explained in detail with the help of the following example.

Example :

The information extracted from the books of a manufacturing company relates to semi-variable expense (maintenance cost). Find out the fixed and variable elements and also the semi-variable expenses for the month of July when the volume of output would be 8000 units

Month	Production units	Maintenance cost (Rs. in '000s)
January	4000	220
February	2000	180
March	5000	260
April	10000	380
May	7000	300
June	8000	340

Solution :

Taking the levels of activity of any two months say, March and May the variable element may be calculated as follows

$$\text{Variable element} = \frac{\textit{Change in the amount of expenses}}{\textit{Change in quantity}}$$

$$= \frac{\text{Rs. } 300000 - \text{Rs. } 260000}{(7000 - 5000)\text{ Units}} = \frac{\text{Rs. } 40000}{2000 \text{ units}}$$

= Rs. 20 per unit.

Month	Production units	Semi variable expenses	Variable	Fixed
	Rs.	Rs.	Rs.	Rs.
May	7000	300000	140000	160000
March	5000	260000	100000	160000
	2000	40000		

Total semi-variable expenses for the month of

July = (8000 Units X Rs. 20) + 160000

= 320000

This method is very simple though not scientific and accurate. It is important that in selecting the period or level of activity and costs incurred in such periods, care is taken to see that the figures are not distorted by any abnormal factors.

b. High and Low Points Method

This method is similar to the previous one except that the data relating to high and low business activity out of various levels are considered.

Considering the high and low points from the previous examples.

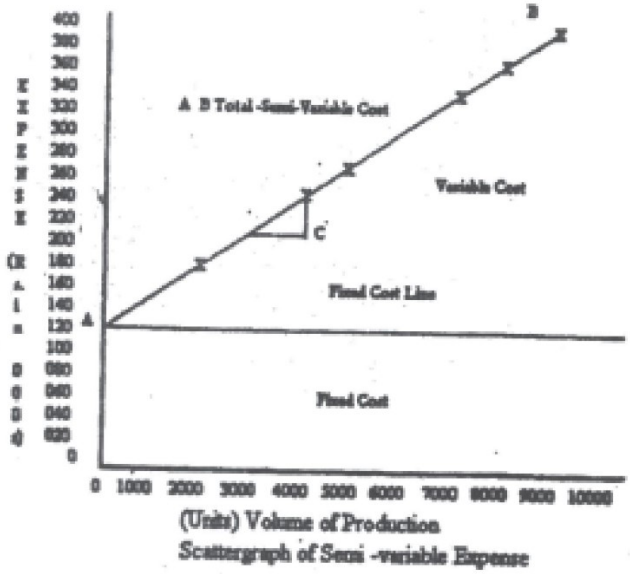
Month	Production units	Expenses	Variable	Fixed
May	10000	380000	250000	130000
March	2000	180000	50000	130000
	8000	200000		

Variable element = 8000 units = RS. 25/-

For July the total semivariable expense = (Rs. 25 X 8000) Rs. 130000 = (Rs. 330000)

C. Scattergraph Method

According to this method costs, are plotted on along Y axis and production units on X axis of a graph. Then the various points are plotted on the graph taking the amount of expenses corresponding to each volume of production. A "line of best fit" is to be drawn by inspection through these points extending it to intersect the vertical axis. This is total cost line and the point of intersection would give the amount of fixed element. A line drawn parallel to the horizontal axis passing through this point of intersection would be fixed element line. The difference between fixed cost and total cost lines would be the variable element. The resulting graph for the data given in the previous example is shown below.



Scattergraph of Semi -variable Expense

From the above graph it is observed that the fixed cost element is Rs. 160000. To obtain variable cost element any two points A and B on total cost line may be taken and the change of amount corresponding to change in volume be observed.

Thus, variable element = Slope of the curve

$$= \frac{BC}{AC} = \frac{\text{Rs. } 26000}{1000 \text{ units}}$$

= Rs. 26/- per unit

Substituting the values to the straight line equation

Y = a + b X, we may obtain

Y = 160000 + 26 X where

For July, putting X = 8000 Units

Y = 160000 + (8000 X 26) = Rs. 368000

b. Method of Least squares

This method is based on the basic regression equation Y = a+b X where 'a' represents fixed element and 'b' the degree of variability, Assuming linear equation Y = a+bX and putting various values we may observe.

$Y_1 = a + bX_1$

$Y_2 = a + bX_2$

$Y_3 = a + b X_3$

$\Sigma Y = Na + \Sigma bx$

In solving the equations (1) and (2) through simultaneous equation method we may obtain the values of 'a' and 'b'. This is explained below considering the same example used for the previous methods.

Solution

Month	Production units (in '000s) (X)	Semi-variable expenses (Rs. In '000s) (Y)	X^2	Xy
January	$x_1 = 4$	$y_1 = 220$	16	880
February	$x_2 = 2$	$y_2 = 180$	4	360
March	$x_3 = 5$	$y_3 = 260$	25	1300
April	$x_4 = 10$	$y_4 = 380$	100	3800
May	$x_5 = 7$	$y_5 = 300$	79	2100
June	$x_6 = 8$	$y_6 = 340$	64	2720
	$\Sigma = 36$ N = 6	$\Sigma xy = 1680$	$\Sigma x^2 = 258$	$\Sigma xy = 11160$

Subsituting the values to the equations (1) and (2)

$\Sigma y = Na + b \Sigma x$ ..... (1)

$\Sigma xy = \Sigma x + b \Sigma x$ ..... (2)

We get

$1680 = 6a + 36b$ ..... (3)

$11160 = 36a = 258b$ ..... (4)

Solving equations (3) and (4) we may obtain

b = Rs. 25 5/7= (Variable element)

a = Rs. 123 333 1/3 = (Fixed element)

Note [In order to reduce the figure work where large figures are given, the scales may be charged by taking deviations from arithmetic mean instead of considering the actual figures]

For July, the semi-=variable cost applying the equation

Y = Rs. 123333 1/3 + 8000 X 25 5/7
= 123333 + 205714
= 329047/-

Managerial uses of Marginal Costing :

Before discussing the managerial uses of marginal costing it would be necessary to mention a few advantages of this technique.

Advantages:

a. Marginal costing is simple to understand and can be combined with standard costing and budgeting control
b. Elimination of fixed overheads from the cost of production avoids the effect of varying charges per unit and also prevents the carry forward of a portion of the current period's fixed overhead to the subsequent period. As such costs and profits are not vitiated cost comparisons become meaningful.
c. There is no problem of over-or-under-absorbed overheads.
d. Practical cost control is greatly facilitated through flexible budgeting and by a clear-cut division of costs into fixed and variable elements.
e. It helps in profit planning by break even charts and profit graph. Comparative profitability can easily be assessed and brought to the notice of management for decision making.
f. It is an effective tool for determining efficient sales of production policies or for taking pricing and tendering decisions particularly when the business is at a low ebb.

From the advantages stated above, the following may be listed as specific managerial uses:

a. Cost Ascertainment

Marginal costing technique facilitates not only the recording of costs but their reporting also. The classification of costs into fixed and variables components makes the job of costs ascertainment more easy. The main problem in this regard is only the segregation of semi variables cost which may be overcome by adopting any of the methods already explained for the purpose.

b. Cost control

Marginal Cost statement can be understood more easily by the management than those presented under the absorption costing. Bifurcation of costs into fixed and variable enables to exercise control over production cost and thereby effect efficiency. In fact, while variable costs are controlled at the lower levels of management, fixed cost are controlled at the top level. Under technique management could study the behaviour of costs at varying conditions of output and sales and thereby exercise better control over costs,.

c. Decision – making

Modern managements are faced with number of decision making problems every day. Profitability is the criterion for selecting the best course of action. Marginal costing through contribution assists management in solving problems. Some of the decision – making problems that can be solved through marginal costing are : (a profit planning (b) pricing of products (c) make or buy decisions (d) Suitable product mix etc.

Limitations of Marginal Costing

Despite its superiority over absorption costing, the marginal costing technique has its own limitations.

a. Segregation of all costs into fixed and variable costs is very difficult. In practice, a considerable technical difficulty arises in drawing a sharp line of demarcation between fixed and variable costs. The distinction between them holds good only in the short run and in the long run, however, all costs are variable.
b. In marginal costing greater importance is attached to sales function thereby delegating the production function comparatively to a secondary position. But the real efficiency of a business is to be assessed only by considering the selling and production functions together.
c. The elimination of fixed costs from the valuation of inventories is illegical since fixed costs are also incurred in the manufacture of goods. Further it results in the understatement of the value of stocks which is neither the cost nor the market price.
d. Pricing decisions cannot be based on contribution alone. Sometimes the contribution will be unrealistic when increased production and sales are effected either through the extensive use of existing machineries or by replacing manual labour by machines. Another possibility is that there is the danger of too many sales being effected at marginal cost.
e. Although the problem of over-or-under-absorption of fixed over-heads could be overcome to a certain extent, the same problem may still persist with regard to variable overheads.
f. The application of this technique is limited in the case of industries in which, according to the nature of business, large stocks have to be carried by way of work-in-progress (e.g. contracts)

Practical Application of Marginal

a. Profit Planning

A business concern exists with the objective of making profits and profits are the yardstick of its success. Profit planning is therefore necessarily a part of operations planning. It is the basis of planning cash-capital expenditure and pricing. If growth and survival of a business are to be ensured. Profit planning becomes absolute necessity. Marginal costing assist profit planning through the calculation of contribution ratio. It enables the planning of future operations in such a way as to either maximize profits or maintain specified level of profit. Best marginal costing equations which are useful in profit planning are as follows.

Profit / volume ratio (P/V ratio). It is the ratio of contribution to sales and symbolically

$$\text{C/S ratio of P/V ratio} = \frac{\textit{Contribution (C)}}{\textit{Sales (s)}} \quad \ldots\ldots\ldots (1)$$

$$\text{Contribution} = \text{Sales X P/V ratio} \ldots\ldots\ldots (2)$$

$$\text{Sales} = \frac{\textit{Contribution}}{\textit{P/V ratio}}$$

Break –Even Point (BEP)

It is the volume of sales or production where there is not profit or no loss. It may be derived from the equation (3) we may get

$$\text{BEP (in Rs.)} = \text{Contribution at } \frac{BEP}{P/V \text{ ratio}}$$

At BEP, the contribution will be equal to fixed cost and therefore, the formula may be restructured as follows :

$$\text{BEP} = \frac{\text{Fixed Cost}}{P/V \text{ ratio}}$$

$$\text{BEP (in units)} = \frac{\text{Fixed Cost (F)}}{\text{Contribution per unit}}$$

Margin of Safety (MS) :

It represents the difference between the sales or production at the selected activity and the break-even sales or production.

MS Sales at the Selected activity – BEP.

$$\text{Sales at the selected activity} = \frac{C}{P/V \text{ ratio}}$$

$$\text{BEP} = \frac{F}{P/V \text{ ratio}}$$

$$\text{MS} = \frac{C}{P/V \text{ ratio}} - \frac{F}{P/V \text{ ratio}} = \frac{\text{Profit (P)}}{P/V \text{ ratio}}$$

When C-F = P

Margin of safety is also presented in percentages as follows :

$$\frac{\text{MS [Sales]} \times 100}{\text{Sales at selected activity}}$$

Illustration 1

From the following information, calculate BEP and determine the net profit if sales are 25% above BEP.

	Rs.
Selling price per unit	50
Direct material cost per unit	20
Direct wages per unit	10
Variable overheads per unit	7.5
Fixed overhead s(total)	50000

Marginal Cost Statement

Solution	**Rs.**
Selling price per unit	50.00
Less : Marginal cost per unit	
Materials	20.00

Wages	10.00	
Variable overheads	7.50	
	-------	37.50

	Contribution	12.50

$$\text{P/V ratio} = \frac{C}{S} \times 100 = \frac{12.50}{50} \times 100 = 25\%$$

$$\text{BEP} = \frac{F}{\text{P/V Ratio}} \text{ Rs.} = \frac{50000}{25} \times 100 = 200000$$

BEP = Rs. 200000

25 % BEP = Rs. 50000

Total Sales = Rs. 250000

Contribution = Sales X P/V ratio

Contribution at Rs. 250000 = Sales Rs. 250000 X 25%

Contribution = Rs. 62500

Less Fixed cost	= Rs. 60000

Net profit	= 12500

Illustration 2

A toy manufacturer earns an average net profit of Rs. 6 per unit in a selling price or Rs. 30 by producing and selling 30000 units at 60% of the potential capacity. Composition of his cost of sales is :

	Rs.
Direct Material	8.00
Direct Wages	2.00
Works overhead	12.00 (50 % fixed)
Sales overhead	2.00 (25% variable)

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

a. his fixed charges will go up by 10%
b. rates of direct labour will increase by 20%
c. rates of material will increase by 5%
d. sell in a price cannot be increased

Under these circumstances by obtains an order for a further 20% of this capacity. What a minimum price will you recommend for accepting the order to give the manufacturer an overall profit of Rs. 180000.

Solution

Marginal cost statement for current year :

			Number of units	30000
			Capacity	60%
			Per unit	Total
			Rs.	Rs.
	Sales		30.00	900000
Less :	Marginal cost	Rs.		
	Material	8.40		
	Wages	2.40		
	Variable works over head	6.00		
	Variable sales over head	0.50	17.30	519000
			---	---
	Contribution		12.70	381000
Less :	Fixed cost			
	Works over head	180000		
Add :	10% increase	18000		
		---	198000	
	Sales overheads	45000		
Add :	10% increase	4000	49500	2475500
		---	---	---
	Net profit			133500

Calculation of minimum price for special order
(10,000 units at 20% capacity)

	Rs.
Planned profit	180000
Actual	133500

Increase in profit to be	46500
Earsed from the order	---

Minimum price

		Rs.
Marginal cost to be recovered 10000 X 17.3	=	173000
Increase in profit to be earned		46500

Minimum selling price for 10000 units	=	219500
Minimum selling price per unit	=	Rs. 21.95

Measurement of profitability

Marginal costing is useful to measure the profitability of a product of process. Profitability is measured with reference to contribution. Another important factor essential for the determination of profitability is the 'Key factor' or 'Limiting factor' or 'Principal budget factor' 'scarce factor'. A key factor may be defined as the factor which over a period, will limit the volume of output or which puts a limit on the efforts of the management to produce as many

units of the selected products as then would like to. Generally sales would be the limiting factor, but some times materials labour, capital, plant capacity may be limiting factors. When contribution and key factor are given one can asses; the relative profitability using the following formula;

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

For example, when rupee sales is the key factor, the profitability is measured by P/V ratio, when labour is in shore supply, the profitability is determined by dividing the contribution by labour hours and so on.

Illustration

The following particulars are taken from records at a company engaged in manufacturing two products X and Y from a certain raw material :

	Product X (per unit) Rs.	Product Y (per unit) Rs.
Sale	25.00	50.00
Material cost (Rs. 2.5 per kg)	5.00	12.50
Direct labour (Rs. 1.5 per hour)	7.50	15.00
Variable overhead	2.50	5.00
Total fixed overhead Rs.	5000	

Comment on the profitability each product when

1. total sales in value is limited
2. raw material is in short supply
3. production capacity is the key factor and
4. when the total availability of raw material is 4000kg and maximum sales potential of each product is 1000 units find the product mix to yield maximum profit. Determine the maximum profit.

Solution

Statement showing comparative profitability

	Product X (per unit) Rs.	Product Y (per unit) Rs.	(per unit) Rs.	(per unit) Rs.
Sale	----	25.00	----	50.00
Less : marginal cost :				
Materials	5.00		12.50	
Direct wages	7.50		15.00	
Variable over head	2.50		5.00	
	------	15.00		32.50
		------		------
Contribution		10.00		17.50
		-------		-------

(i) When total sales in value is limited the profitability is measured by

$$\text{P/V ratio} = \text{Rs.}\ \frac{10 \times 100}{25} = 40\% \quad \frac{17 - 50}{50} \times 100 = 35\%$$

Since the P/V ratio of X is higher, it is more profitabile

(ii) Contribution per kg = $\frac{\text{Rs. } 10}{2\text{kg}}$ = Rs. 5 per kg

$\frac{\text{Rs. } 17.5}{5\text{ kg}}$ = Rs. 3.5 per kg

When raw material is in short supply, contribution per kg. of raw material for product X is more and therefore more profitable.

(iii) contribution per hour = $\frac{\text{Rs. } 10}{5}$ Hrs = Rs. 2 per hour

$\frac{\text{Rs. } 17.50}{10\text{ hrs}}$ = Rs. 1.75 per hour

When the production capacity is limited, contribution per hour of product X is more and therefore, more profitable.

(iv) It is a case of two key factors. When raw material is in short supply, product X is more profitable. So maximum i.e. 1000 units of X could be produced consuming 2000 kg of raw material, and with the balance quantity i.e.

4000 kg. 2000 kg. = 2000 kg. 400 units (2000 kg. % 5 kg. of product X will be produced. Hence for maximum profit, the product mix would be :

Product X 1000 units	= 2000kg
Product Y 400 units	= 2000 kg
Total quantity of materials available	= 4000 kg

Maximum contribution from	Rs.
1000 units of product X	10000
400 units of product Y	7000
Total contribution	17000
Less : Fixed overhead	5000
Maximum profit	12000

(c) Level of activity planning

Business concern may have plans either to expand or contract level of activities depending upon the conditions prevailing in the market. Such planning is to be considered before the events overtake the business. Marginal costing is very useful for taking such decisions by enabling management to compare the contribution at different level of activities.

Output (in units)	60%	70%	80%
	2400	2600	32000
	Rs	Rs.	Rs.
Materials	48000	56000	64000
Wages	14400	16800	19200
Factory overheads	25600	27200	28800
Factory cost	88000	100000	112000

The factory is considering an increase of production to 90% level of activity. It is not expected that there will be any increase in fixed overheads at this level. The management required a statement showing all details of factory costs at 90% level of activity.

Solution :

Marginal Cost Statement

	Level of activities output Total Cost Rs.	90% 3600 units per unit
Materials	72000	20.00
Wages	21600	6.00
Variable overheads	14400	4.00
Marginal cost	108000	30.00
Fixed overhead	16000	
Total Factory cost	124000	

Note :

Factory overheads increase by s. 1600 each level of activity. Therefore variable over heads must be Rs. 1.600/400 units = RS. 4 per unit. At 80% level of activity factory overheads are Rs. 28800 of which variable cost are Rs. 12800 (Rs. 4 X 3.2(0) resulting in fixed overheads of Rs. 16000 (Rs. 28800 – Rs. 12800)

Profitable Mix of Sales

Business which have a variety of product lines, shall employ marginal costing in order to determine the most profitable sales mix form a number of selected alternatives.

Illustration 5 :

The directors of AB Ltd., are considering the sales budget for the next budget period. The following information has been made available from the cost records :

	Product Z (per unit)	Product Y (per unit)
Direct Materials	Rs. 40	Rs. 50
Selling price	Rs. 120	Rs. 200
Direct wages @ Rs. 2 per hour	10 hours	15 hours

Variable over head : 100% of direct wages

Fixed overheads : Rs. 2000 p.a.

You are required to present to the management a statement showing the marginal cost of each product and to recommend which of the following sales mixes should be adopted :

a. 450 units of Z and 300 units of Y
b. 900 units of Z only
c. 600 units of Y only
d. 600 units of z and 200 units of Y

Marginal Cost Statement

	Per unit			
	Product Z		Product Y	
	Rs.	Rs.	Rs.	Rs
Selling prize		120		200
Less Marginal cost				
Direct Materials	40		60	
	Per unit			
	Product Z		Product Y	
	Rs.	Rs.	Rs.	Rs
Direct wages	20		30	
Variable overhead	20		30	
	----	80	---	110
		----		-----
contribution		40		90

Selection of sales Alternatives

	Products			
Z	Y Total			
	Rs.	Rs.		
a. 450 units of Z and 300 units of Y				
Contribution	18000		27000	45000
Less Fixed overheads			20000	

Profit		25000		
b. 900 units of Z only		------		
Contribution	36000		...	36000
Less Fixed cost				20000

				16000
c. 600 units of Y only				
Contribution			54000	54000
Less Fixed cost				20000

Profit				34000
				--------

d. 600 units of Z and
200 units of Y

Contribution	24000	18000	42000
Less fixed cost			20000

Profit			22000

Thus alternative (c) is the one recommended

Marginal Costing and pricing :

Determining the prices of products manufactured by a company is often considered to be a difficult problem. However, the basis problem involved in pricing is the matching of demand and supply. Marginal costing is sometimes used to determine prices, a simple and familiar example being the railway ticket. The normal fare will usually be more than the charge collected for excursion fare (concessional fare) for, the normal fare is calculated to cover all the railway costs including fixed which are a considerable item : Whereas the excurson fare will probably cover only the marginal cost (which is relatively small) and some contribution towards profit. The marginal costing technique can help management in fixing prices in such special circumstances as

a. A trade depression in the industry
b. Spare capacity in the factory,
c. A seasonal fluctuation in demand,
d. When it is desired to obtain a special contract

Illustration 6 :

MI Ltd., manufactures and sells light engineering goods. Due to competition, to the company proposes to reduce its selling price/ If the present level of profit is to be maintained, indicate the number of units to be sold if the proposed reduction in selling prices is 5%, 10% and 15%

The following additional information is available :

	Rs.	Rs.
Present sales (60000 units)	----	150000
Variable cost (60000 units)	90000	
Fixed cost	35000	
	-------	125000

Net profit		25000

Solution

Marginal cost statement

No. of units : 60000

	Present price Rs.	Price 5% Rs	Reduction 10% Rs.	15% Rs.
Sales	150000	142500	135000	127500
Less : Marginal cost	90000	90000	90000	90000
Contribution	60000	52500	45000	37500
Less : Fixed cost	35000	35000	35000	35000
	25000	17500	10000	2500

Contribution

Per unit	Rs. 1.00	Rs.0.875	Rs. 0.750	Rs.0.625

Profit to be maintained Rs. 25000

Contribution to be earned = Profit to be earned + Fixed cost
= Rs. 25000 + Rs. 35000
= Rs. 60000

The number of units required to be sold at different levels of price reductions =

$$\frac{\text{Total contribution be earned}}{\text{Contribution per unit}}$$

Hence

At 5% reduction $= \text{Rs. } \frac{60000}{0.875} = 68572 \text{ units (app)}$

At 5% reduction $= \text{Rs. } \frac{60000}{0.75} = 80000 \text{ units}$

At 5% reduction $= \text{Rs. } \frac{60000}{0.625} = 96000 \text{ units}$

Illustration 7

Calculate from the following information the Break-Even point and the net profit if the sales volume is Rs. 800000

P/V Ratio is 40% and Margin of Safety is 24%

Solution

Contribution – Sales X P/V Ratio

Break – Even point = Actual sales – Margin of Safety

Given P/V Ratio = 40% and MS = 25%

Contribution at a sales volume of Rs. 80000 = Rs. 800000 X 40% = RS. 320000.

Calculation of Fixed cost and BEP

$$\text{MS (as a percentage)} = \frac{\text{MS}}{\text{AS}} \times 100 = 25\%$$

(i.e.) Ms is 25 then AS would be 100 and
BEP is 75 (see the second equation above)
BEP = 75% of AS

$$\text{BEP} = \text{Rs. } 800000 \times \frac{75}{100} = \text{Rs. } 600000$$

Contribution at BEP (which is always equal to fixed costs) = BEP X P/V Ratio

$$\text{Fixed cost} = \text{Rs. } 600000 \times \frac{40}{100} = \text{Rs. } 240000$$

Calculation of profit at a sales volume of Rs. 80000

Contribution	Rs. 320000
Less Fixed Costs	Rs. 240000
	Rs 80000

Illustration

The budged (Sales and Variable costs) results of AB Ltd., are as follows :

Products	Sales	Variables costs as % of sales value
O	50000	60
P	80000	65
Q	40000	50
R	60000	75
S	30000	80

Fixed costs for the period are Rs. 90000 (a) Show the amount of expected loss and (b) suggest a change in sales volume of each product which will eliminate the expected loss assuming that sale of only one product can be increased at a time.

Solution

$$\text{P/V Ratio} = 1 - \text{Marginal cost ratio}$$

$$\text{P/V Ratio for product O} = 1 = \frac{60}{100} = 40\%$$

(a) Statement Showing Amount of Expected Loss

Product	Sales Rs.	X P/V ratio Rs.	= Contribution Rs.
O	50000	40	20000
P	80000	35	28000
Q	40000	50	20000
R	60000	25	15000
S	30000	20	6000
		Total	89000
		Less : Fixed cost	90000
		Loss/ under-recover of fixed cost	1000

b. Additional volume of sales required

Under – recovery of fixed costs

$$\text{Additional sales volume} = \frac{\textit{(Loss)}}{\textit{P/V Ratio}}$$

Product		Additional sales Rs.
O $\frac{\text{Rs. 1000}}{40} \times 100$	=	2500
P $\frac{\text{Rs. 1000} \times 100}{35}$	=	2857 (approx)
Q $\frac{\text{Rs. 1000}}{50} \times 100$	=	2000
R $\frac{\text{Rs. 1000}}{20} \times 100$	=	4000
S $\frac{\text{Rs. 1000}}{20} \times 100$	=	5000
	=	16357 (approx)

Illustration 9 :

Following information has been obtained from the books of Cor. Ltd., for the year 1982:

	Rs.	Rs.
Sales (75% of licensed capacity)		240000
Direct Materials	72000	
Direct Wages	48000	

Variable overheads	18000	
Fixed overheads	72000	
	------	210000
Profit		30000

The key factor is sales demand. In order to match the full capacity level the management **proposes to reduce the** selling price of the product by 5% in 1983.

You are required to prepared a forecast showing the effects of the proposed reduction is selling **price after taking** into account **the** following changes in cost :

Sales forecast (at reduced **prices)** Rs. 304000.

Direct wages and variable **overhead** are **expected** to rise by 5%. Direct Materials prices are **expected to increase** by 5%. Fixed **overheads are estimated** to increase by Rs. 3000.

Solution

Workings

Sales for 1988		Rs.	
Sales (100% capacity) $\frac{\text{Rs. 240000}}{75} \times 100$	=	320000	
Less proposed reduction in selling price	=	16000	
Estimated Sales		304000	
Marginal Cost statement (capacity)		100%	
Total Sales Rs.		304000	

Less : Marginal Cost	Rs.	Rs.	Rs.
Direct Materials	96000		
5% increase in prices on Rs. 96000	4800	100800	
Direct Wages $\frac{\text{Rs. 48000} \times 4}{3}$ =	64000		
+5% increase on Rs. 64000	3200	67200	
Variable overheads 16000 X 4/3	24000		
+5% increase on Rs. 24000	1200	25200	193200
Contribution			110800
Less : Fixed Overhead	72000		
increase	3000		75000
Profit			35800

Illustration 10

The **income statement of C Ltd. is summarised as follows :**

		Rs.
Net Revenue		200000
Less : Expenses including		
Rs. 100000 of Fixed Expenses		220000
Net loss		20000

The sales manager believes than an increase of Rs. 50000 in advertising outlays will increase sales substantially. His plan was approved by the Chairman of the Board.

Show : as at what sales volume will the company break –even?

(b)What sales volume will result in a net profit or Rs. 1000

		Rs.
Sales		20000
Less: Variable expenses		
Total expenses	220000	
Fixed expenses	100000	
		120000
Contribution		800000
Less : Fixed expenses		100000
Net loss		20000

$$\text{P/V Ratio} = \frac{80000 \times 100}{200000} = 40\%$$

When the proposed advertising expenditure is incurred and treated as fixed expenses, the total fixed expenses would be Rs. 150000

(i.e. Rs. 100000 + Rs. 50000)

$$\text{Break-even point} = \frac{F}{\text{P/V Ratio}} = \frac{\text{Rs. } 150000}{40\%}$$

$$= \frac{\text{Rs. } 150000 + \text{Rs. } 10000}{40\%}$$

$$= \frac{\text{Rs. } 160000 + \text{Rs. } 100}{40\%} = 400500$$

The break – even analysis is the most widely known from the CVP analysis. The study or CVP relationship is frequently referred to as bread-even analysis. However, some state that upto the point of activity where total revenues equal total expenses the study can be called as break-even analysis beyond that point, it is the application of CVP relationship.

Thus the narrower interpretation of the break-even analysis refers to a system of determining the level of activities where total revenue equals total cost i.e. the point of zero loss. The broader interpretation denotes a system of analysis that can be used to determine the probable profit at a level of activities.

Assumption of Break-Even Analysis

Break-Even analysis can be carried out in two ways. (a) Algebraic method and (b) Graphical method. Both the methods are based upon certain assumption which are rarely found in practice.

Some of the assumptions are as follows :

a. All costs can be classified into fixed and variable elements.
b. While variable costs vary proportionately with volume that fixed costs remain constant.
c. Selling price remains constant despite volume changes
d. In the case of multiple products, sales mix also remains constant
e. Productivity per worked efficiency of plant etc. remain mostly unchanged

Any change in any one of the above factors will after the break – even point and profits will be affected by factors other than volume. Hence the results one break-even analysis should interpreted subject to the limitations of the above assumptions.

Mathematical Representation of Break – even analysis

Many terms and techniques have been developed which now form part of break-even analysis. The most important terms and the formulas for computations explained

Calculation of Bread – Even Point :

Break-Even point is a no loss, no profit pint where total sales in equal to total costs (fixed as well as marginal costs) or total contribution is equal to total fixed costs.

$$\text{Break Even point (in Rs).} = \frac{\text{Fixed costs}}{\text{P/V Ratio}} \text{ or } \frac{\text{Fixed costs}}{\text{Marginal Cost per unit}}$$

$$\frac{1}{\text{Selling price per unit}}$$

$$\text{Break Even point (in units).} = \frac{\text{Fixed costs}}{\text{Contribution per unit}}$$

$$\text{Where p/V ratio is applied BEP} = \frac{\text{Contribution}}{\text{Sales}} \times 10$$

Contribution = Sales – Marginal Cost.

Example

The fixed costs for the years are Rs. 40000. Variable costs per unit for the single product being made is Rs. 6 Estimated sales for the period are valued at Rs. 160000. The number of units involved coincides with the expected volume of output. Each unit sells at Rs. 10 each. Calculate the Break-Even point.

$$\text{Break Even point} = \frac{\text{Fixed costs}}{1 - \frac{\text{Marginal Cost}}{\text{Selling price}}}$$

$$= \frac{\text{Rs. 40000}}{1 - 6/10}$$

$$= \text{Rs. 40000 X 10} = \text{Rs. 100000}$$

Alternatively

$$\text{Break Even point (BEP)} = \frac{\text{Fixed costs}}{\text{P/V rate}}$$

$$= \frac{\text{Rs. 40000 X 100}}{40} = \text{Rs. 100000}$$

$$\text{BEP (in units)} = \frac{\text{Fixed Costs}}{\text{Contribution per unit}}$$

$$= \frac{\text{Rs. 40000}}{4} = 10000 \text{ units}$$

Calculation of profit volume Ratio :

This ratio shows the relationship between the value of sales and contribution, A more appropriate term might be the contribution / Sales Ratio. This is often expressed as a percentage.

$$\text{Profit / Volume ratio} = \frac{\text{Contribution}}{\text{Sales}} \text{ X } 100$$

When totals sales and total costs (without break up for fixed and variable components) are given to two periods of activity, the following formula may be used to calculate P/V Ratio.

$$\text{P/V Ratio} = \frac{\text{Change in profits}}{\text{Change in sales}} \text{ X } 100$$

Where, Sales – Costs = Profits

A few uses of P/V Ratio are as follows :

a. Determination of marginal costs for any volume of Sales. Marginal cost percentage can be arrived at by deducting P/V ratio from 100%. For example, if P/V ratio is 25% then the marginal cost percentage would be 75% (100 – 25)
b. Calculations of the desired volume of output, profit or other essential facts
c. Comparisons can be made by calculating the P/V Ratio for each factor to be compared; viz.
    1. Line of product
    2. Sales area

3. Method of Sales; eg; through whole sales or retails
4. Individual factories
5. Separate companies

Example

The following products are manufactured and sold by ARS Ltd., Variable costs and prices are also given.

Product	Price Rs.	Variable Cost Rs.
A	100	50
B	200	150
C	400	250

Show the P/V Ratio for each line of product.

Solution

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

Marginal Cost Sheet

	A Rs.	B Rs.	C Rs.
Sales	100	200	400
Less : Marginal Cost	50	150	250
Contribution	50	50	150

$$\text{P/V Ratio A} = \frac{\text{Rs. } 50 \times 100}{100} = 50\% \qquad B = \frac{50 \times 100}{200} = 25\%$$

$$C = \frac{150 \times 100}{400} = 37.5\ \%$$

Example :

Assuming that the cost structure and selling prices remain the same in periods I and II find out P/V Ratio.

Period	Sales Rs.	Total cost Rs.
I	120000	108000
II	140000	124000

Solution

Periods	Sales Rs.	Cost Rs.	Profit Rs.
I	120000	108000	12000
II	140000	124000	16000

$$\text{P/V Ratio} = \frac{\textbf{Change in profits}}{\textbf{Change in sales}} \times 100$$

$$= \frac{\text{Rs. } 16000 - \text{Rs. } 120000}{\text{Rs. } 140000 - \text{RS. } 120000} \times 100$$

$$= \frac{\text{Rs. } 4000}{\text{Rs.} 20000} \times 100 = 20\%$$

Margin of safety (MS) :

The margin of safety is the difference between the total sales and the break- even sales. It may be expressed in monetary terms or as a percentage i.e. the margin of safety is an extremely valuable guide to the strength of a business.

This is calculated as follows :

1. Margin of safety = Actual sales – Break – Even sales
2. $\text{MS (in Rs)} = \frac{\text{Profit}}{\text{P/V}}$ Ratio
3. $\text{MS (in Units)} = \frac{\text{Profit}}{\text{Contribution per unit}}$

Example

Current sales are 20000 units p.a
Selling price is Rs. 6 per unit
Prime costs are Rs. 3 per unit
Variable overheads are Rs. 1 per unit
Fixed costs are Rs. 30000

Calculate (i) P/V Ratio (ii) Break-Even points and (iii) Margin of Safety

Solution :

Marginal Cost sheet

	Output		20000 Units
		Rs.	Rs.
	Sales	6	120000
Less :	Marginal Cost		
	Prime Cost 3		
	Variable over heads 1	4	80000
		---	---
	Contribution	2	40000
Less :	Fixed costs		30000

	Profit		10000

$$\text{P/V Ratio} = \frac{C}{S} \times 100 = \frac{\text{Rs. } 40000}{\text{Rs. } 12000} \times 100 = 33\ 1/3\ \%$$