*Dear All,*

It gives me immense pleasure to present this Costing (Theory) notes. The objective of these notes is to clear the misconceptions from the minds of the students, who feel that it is very difficult to score in theory questions of a Practical subject.

Among the eight papers of CA- Final, Costing is the most easiest and scoring Subject.

I have put in my best efforts to make this notes easy and understandable.

All the Best !!!

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# FINAL C.A.

# COSTING – THEORY NOTES

## INDEX



**All the chapters carry questions from past examinations (theory) at the end along with suggested answers.**

# CHAPTER 1 – BASIC COST CONCEPTS

**Meaning of Cost:**
Cost refers to any amount of expenditure incurred / attributable to any particular thing.

**Costing:** The method of ascertaining the cost and thereby controlling it is referred to as costing.

**Cost Accounting:** The process of accounting for cost which begins with recording of income and expenditure or the bases on which they are calculated and ends with the preparation of periodical statements and reports for ascertaining and controlling costs.

***Question I:***
***State the objectives of Cost Accounting.***

**Objectives of Cost Accounting:**

The primary objective of study of cost is to contribute to profitability through Cost Reduction and Cost Control. The following objective of Cost Accounting can be identified.

1. **Ascertainment of Cost:** This involves collection of cost information, by recording them under suitable heads of account and reporting such information on a periodical basis.

2. **Determination of selling price:** Selling price is influenced by a number of factors. However prices cannot be fixed below cost save in exceptional circumstances. Hence cost accounting is required for determination of proper selling price.

3. **Cost Control and Cost Reduction:** In the long run, higher profits can be achieved only through Cost Reduction and Cost Control.

4. **Ascertaining the profit of each activity:** Profit of each department / activity / product can be determined by comparing its revenue with appropriate cost. Hence Cost Accounting ensures profit measurement on an objective basis.

5. **Assisting management in decision-making:** Business decisions are taken after conducting Cost-Benefit Analysis. Hence Cost and benefits of various options are analysed and the Manager chooses the least cost option. Thus Cost Accounting and reporting system assists managers in their decision making process.

***Question II:***

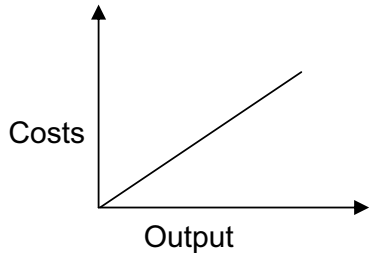
**Classification of costs:**

**a. On the basis of Time period:**

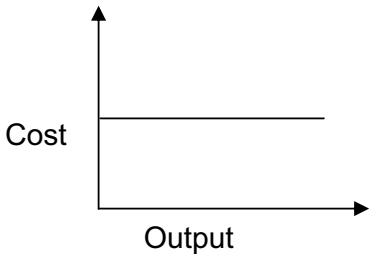
1. Historical Costs: Costs relating to the past period, which has already been incurred.
2. Current Costs: Costs relating to the present period.
3. Pre-determined Costs: Costs relating to the future period; Cost, which is computed in advance, on the basis of specification of all factors affecting it.

**b. On the basis of Behaviour / Nature / Variability:**

1. **Variable Costs:** These are costs which tend to vary or change in relation to volume of production or level of activity. These costs increase as production increases and vice-versa e.g. cost of raw material, direct wages etc. However, variable costs per unit are generally constant for every unit of the additional output.



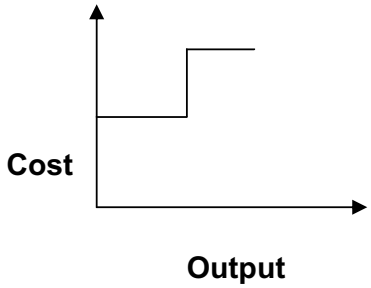

2. **Fixed Costs:** The cost which remain fixed irrespective of the change in the level of activity / output. These costs are not affected by volume of production e.g. Factory Rent, Insurance etc. Fixed Costs per unit vary inversely with volume of production i.e. if production increases, fixed costs per unit decreases and vice-versa. Sometimes, these are also known as Capacity Costs or Period Cost.




For decision-making purpose Fixed Costs are further sub-classified into (a) Committed Fixed Costs and (b) Discretionary Fixed Costs.

| Committed Fixed Costs | Discretionary Fixed Costs |
|---|---|
| These are costs that arise from the possession of<br>• Plant, building and equipment (e.g. depreciation rent, taxes insurance premium etc.) or<br>• A basic organization (e.g. salaries of staff) | These are costs incurred as a result of management's discretion.<br>It arises from periodic (usually yearly) decisions regarding the maximum outlay to be incurred, and<br>It is not tied to a clear cause and effect relationship between inputs and outputs |
| These costs remain unaffected by any short-term changes in the volume of production. | These cannot be changed in the very short-run. |
| Any reduction in committed fixed costs under normal activities of the concern would have adverse repercussions on the concern's long term objectives. | Discretionary fixed Cost can change from year to year, without disturbing the long-term objectives. |
| Such costs cannot be controlled. | These costs are controllable. |

3. **Semi-variable Costs:** These are those costs which are party fixed and partly variable. These are fixed upto a particular volume of production and become variable thereafter for the next level of production. Hence, they are also called Step Costs. Some examples are Repairs and Maintenance, Electricity, Telephone etc.




**c. On the basis of Elements:**

1. Materials – Cost of tangible, physical input used in relation to output/production, for example, cost of materials, consumable stores, maintenance items etc.

2. Labour – Cost incurred in relation to human resources of the enterprise, for example, wages to workers, Salary to Office Staff, Training Expenses etc.

3. Expenses – Cost of operating and running the enterprise, other than materials and labour, it is the residual category of cost. For example, Factory Rent, Office Maintenance, Salesmen Salary etc.

**d. On the basis of Relationship:**

1. **Direct Costs:** Costs which are directly related to / identified with / attributable to a Cost Centre or a Cost unit.
   ***Example:*** Cost of basic raw material used in the finished product, wages paid to site labour in a contract etc.

2. **Indirect Costs:** Costs that are not directly identified with a cost centre or a cost unit. Such costs are apportioned over different cost centers using appropriate basis.
   ***Examples***: Factory Rent incurred over various departments; Salary of supervisor engaged in overseeing various construction contracts etc. Note: All indirect costs are collectively called as Overheads, since they are generally incurred over various products (cost units), various departments (cost centers) and over various heads of expenditure accounts.

**e. On the basis of Controllability**

1. **Controllable Costs** – Costs, which can be influenced and controlled by managerial action. However, Controllability is a relative term and is subject to the following restrictions.

   (a) Time – Certain costs are controllable in the long run and not in the short run.

   (b) Location – Certain costs are not influenced and decided at a particular location / cost centre. If lease agreements of factory premises are executed centrally at the Head Office, factory managers cannot control the incurrence of cost.

   (c) Product / Output – Certain cost are controllable by reference to one product or market segment and not by reference to the other, for example, cost of common raw material input for exports is lower than that of domestically sold goods since excise duty concessions / duty drawback is available for export sales.

2. **Uncontrollable Costs** – These are the costs that cannot be influenced and controlled by a specific member of the organization. The line of difference between controllable and non-controllable costs is thin.
   **Note:** No cost is uncontrollable. Controllability is subject to the restrictions laid down above.

**f. On the basis of Normality:**

1. **Normal Cost**: Cost, which can be reasonably expected to be incurred under normal, routine and regular operating conditions.

2. **Abnormal Cost:** Costs over and above normal costs; Costs which is not incurred under normal operating conditions e.g. fines and penalties.

**g. On the basis of Functions or operations:**

1. **Production Cost:** The cost of the set of operations commencing with supply of materials, labour and services and ends with the primary packing of product. "Thus it is equal to the total of Direct Materials, Direct Labour, Direct Expenses and Production /factory Overheads.

2. **Administration Cost:** The cost of formulating the policy, directing the organisation and controlling the operations of the undertaking, which is not directly related to production, selling, distribution, research or development activity or function. E.g Office Rent, Accounts Department Expenses, Audit and Legal Expenses, Directors Remuneration etc.

3. **Selling Cost:** The cost of seeking to create and stimulate demand and of securing orders. These are sometimes called 'marketing costs' e.g. Advertisement, remuneration to Salesmen, Show-room Expenses, Cost of samples.

4. **Distribution Cost:** The cost of the sequence of operations which begins with making the packed product available for dispatch and ends with making the reconditioned returned empty package, if any, available for re-use. E.g Distribution packing (secondary packing), carriage outwards maintenance of delivery vans, expenditure incurred in transporting articles to central or local storage, expenditure incurred in moving articles to and from prospective customers (as in Sale or Return) etc.

5. **Research Cost:** The cost of researching for new or improved products, new applications of materials or improved methods.

6. **Development Cost:** The cost of the process which begins with the implementation of the decision to produce a new or improved product, or to employ a new or improved method and ends with commencement of formal production of that product or by that method.

7. **Pre-production Cost:** The part of development cost incurred in making a trial production run prior to formal production.

8. **Conversion Cost:** The sum of direct wages, direct expenses and overhead cost of converting raw materials to the finished stage or converting a material from one stage of production to the other.

**h. On the basis of Attributability to the product:**

1. **Period Cost:** These are the costs, which are not assigned to the products but are charged as expenses against the revenue of the period in which they are incurred. Non-manufacturing costs e.g. Selling and Distribution Costs are generally recognised as period costs. These costs are not included in inventory valuation.

2. **Product Cost:** These are the costs, which are assigned to the product and are included in inventory valuation. These are also called as Inventoriable costs. Under absorption costing, total manufacturing costs are regarded as product costs while under marginal costing, only variable manufacturing costs are considered. The purposes of computing product costs are as under:

   (a) Preparation of Financial Statements – with focus on inventory valuation.

   (b) Product pricing – focus on costs assigned and incurred on the product till it is made available to the customer / user.

   (c) Cost-plus-Contracts with Government Agencies – where the focus is on reimbursement of costs specifically assigned to the particular job/contract.

**i. On the basis of Decision Making**

A. **Relevant Costs:** The costs, which are relevant and useful for decision-making purposes.

1. **Marginal Cost** – Marginal cost is the total variable cost i.e. prime cost plus variable overheads. It is assumed that variable cost varies directly with production whereas fixed cost remains fixed irrespective of volume of production. Marginal cost is a relevant cost for decision taking, as this cost will be incurred in future for additional units of production.

2. **Differential Cost** – It is the change in costs due to change in the level of activity or pattern or method of production. Where the change results in increase in cost it is called **incremental cost**, whereas if costs are reduced due to increase of output, the difference is called decremental costs. The differential costs are relevant costs.

3. **Opportunity Cost** – This cost refers to the value of sacrifice made or benefit of opportunity foregone in accepting an alternative course of action.

   For example:
   (1) a firm financing its expansion plans by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.
   (2) The opportunity cost of using a machine to produce a particular product is the earning forgone that would have been possible if the machine was used to produce other products.
   (3) The opportunity cost of one's time is the earning which he would have earned from his profession.

   Opportunity cost is a relevant cost where alternatives are available. However, opportunity cost does not find any place in formal accounts and is computed only for comparison purposes.

4. **Discretionary costs** – These are "escapable" or "avoidable" costs. In other words these are costs, which are not essential for the accomplishment of a managerial objective.

5. **Replacement Cost** – It is the cost at which there could be purchase of an asset or material identical to that which is being replaced or devalued. It is the cost of replacement at current market price and is relevant for decision-making.

6. **Imputed Costs** – These are notional costs **appearing in the cost accounts** only e.g. notional rent charges, interest on capital for which no interest has been paid. These are relevant costs for decision-making. Where alternative capital investment projects are being evaluated, it is necessary to consider the Imputed interest on capital before a decision is arrived at as to which is the most profitable project.

7. **Out-of pocket cost** – These are the costs, which entail current or near future cash outlays for the decision at hand as opposed to cost, which do not require any cash outlay (e.g. depreciation). Such costs are relevant for decision-making, as these will occur in near future. This cost concept is a short-run concept and is used in decisions relating to fixation of selling price in recession, make or buy, etc. Out-of-pocket costs can be avoided or saved if a particular proposal under consideration is not accepted.

B. **Irrelevant Costs:** The costs, which are not relevant or useful for decision-making.

1. **Sunk Cost** – It is the cost, which has already been incurred or sunk in the past. It is not relevant for decision-making and is caused by complete abandonment as against temporary shutdown. Thus if a firm has obsolete stock of materials amounting to Rs.50,000 which can be sold as scrap for Rs.5,000 or can be utilised in a special job, the value of opening stock of Rs.50,000 is a sunk cost and is not relevant for decision-making.

2. **Committed Cost** – A cost, which has been committed by the management, is not relevant for decision making. This should be contrasted with discretionary costs, which are avoidable costs.

3. **Absorbed Fixed Cost** – Fixed costs which do not change due to increase or decrease in activity is irrelevant for decision-making. Although such fixed costs are absorbed in cost of production on a normal rate, such costs are irrelevant for managerial decision-making. However if fixed costs are specific, they become relevant for decision-making.

**Explicit and Implicit Costs:**

**Explicit Costs** – These are also known as **out of pocket costs**. They refer to costs involving **immediate payment of cash.** Salaries, wages, postage & telegram, printing & stationery, interest on loan etc. are some examples of explicit costs involving immediate cash payment.

**Implicit Costs** – These costs do not involve any immediate cash payment. They are not recorded in the books of account. They are also known as economic costs.

**Estimated cost:**
"the expected cost of manufacture or acquisition, often in terms of a unit of product computed on the basis of information available in advance of actual production or purchase". Estimated costs are prospective costs since they refer to prediction of costs.

**Shut down costs:**
Those costs, which continue to be, incurred even when a plant is temporarily shutdown, e.g. rent, rates, depreciation, etc. These costs cannot be eliminated with the closure of the plant. In other words, all fixed costs which cannot be avoided during the temporary closure of a plant will be know as shut down costs.

**Absolute Cost:**
These costs refer to the cost of any product, process or unit in its totality. When costs are presented in a statement form, various cost components are shown in absolute amount or as a percentage of total-costs or as per unit cost or all together. Here the cost depicted in absolute amount may be called absolute costs and are base costs on which further analysis and decisions are based.

**Difference between cost reduction and cost control:**

| | Cost Control | Cost Reduction |
|---|---|---|
| 1 | It aims at achieving the **established cost standards**. | It aims at achieving a **reduction in cost** by using any suitable technique like value engineering, Work Study, Standardisation and Simplification, Variety reduction, Quality measurement and research<br>Operations research,<br>Market research,<br>Job Evaluation and Merit Rating<br>Improvement in design,<br>Mechanisation and automation. |
| 2 | It is a **preventive function**. Costs are optimised before they are incurred. | It is a **corrective function**. It operates even when efficient cost control system exists. There is a room for reduction in achieved costs. |
| 3 | The main stress is on the **present and past** behaviour of costs. | The emphasis here is partly on present cost and **largely on future** costs. |
| 4 | It starts from establishing cost standards and attempts to keep the costs of operation of a process **in line with the standards**. | It **challenges the standards** forthwith and attempts to reduce cost on continuous basis. |
| 5 | It attempts to achieve the best possible results at the least cost under given conditions. | Under cost reduction, no condition is considered to be permanent, where a change will secure a lowest cost figure. |
| 6 | This process undertakes the **competitive analysis** of actual results with established norms. | This process finds out the **substitutes** by finding out new ways and means. |
| 7. | It has **limited applicability** to those items of cost for which standards can be set. | It is **universally applicable** to all areas of business. It does not depend on standard though target amounts may be set. |
| 8. | Cost control sometimes **lacks dynamic approach**. | It is a **continuous process** involving dynamic approach. |

**Data Base**

A data base is a computer file system that uses a particular file organization to facilitate rapid updating of individual records, simultaneous updating of related records, easy access to all records by all applications programs, and rapid access to all stored data which must be brought together for a particular routine report or inquiry or for special purpose report or inquiry.

**Features:**

A file structure that facilitates the association of one internal record with other internal records.

Cross-functional integration of files of that records which previously would have been in entirely independent files can now be associated and processed together automatically.

Program/data file independence, which eases the updating and maintenance of the database and enhances special-report capabilities.

Common standards throughout in respect of data definitions, record formats, and other types of data descriptions.

A data base management system (DBMS) to manage the data files.

A **data dictionary** that contains information about the data and the database.

**Large-scale direct access memory** to contain the data and the data base management system.

Sophisticated communications equipment and programs that **permit multiple users** to access the database simultaneously.

Sophisticated backup, recovery, and restart techniques to **permit reconstruction** of the data base files if data is lost or destroyed.

A query language that **permits** each on-line query as well as records **update** on a transaction-by transaction basis.

**Key attributes of Operational Databases:**

**Operational Databases:** Operational activities require full details about the transactions involved. Operational databases satisfy the requirements of day-to-day operations (as opposed to decision making). The attributes of operational databases of operational activities are :

1. **Consistency of related information elements:** Operating personnel (as well as managers) are alert for information that is inconsistent with information they already possess. If information from different sources about the same transactions is consistent (one source tends to confirm and support the other), this information, as well as the information system, has greater validity. In case of inconsistencies, operations personnel may develop time-consuming supplemental information systems of their own.

2. **Timeliness of transactions, information and managerial reports:** Information is more useful when they are provided on a real time basis to operations as well as for managers. Operational databases are always timely due to:

   (a) Simultaneous updating of all records affected by a transaction;
   (b) Frequent use of on-line transactions entry; and
   (c) Multiple files need not be processed sequentially for report generation.

3. **Backup detail provided by inquiry capability:** Operations personnel must refer to back details, such as transactions with a vendor in a preceding period, that are needed to answer customer questions about account status. If the detailed backup data is retained

with an on-line database that has a query language, the details needed can usually be accessed rapidly through the "window" provided by the data base query language.

4. **Data sharing:** The sharing of a large pool of operations data among multiple user departments is possible with database. For example, production engineering and inventory personnel may need information related to one another's current activities that can be made available as needed. Such data is made available through all operational database.

**Attributes of Managerial Databases**

Managerial databases are used for managerial decision-making (as opposed to operations). Apart from the routine features found in Operational Database, the following additional features are found in Managerial Databases:

1. **Intelligence systems:** Intelligence information needed from outside the organization for strategic planning purposes is both substantial in quality and critical to top management activities. The combination of intelligence systems and database constitutes one of the most important ingredients in a MIS.

2. **Special management problems:** Database improve managers' ability to respond rapidly to special management problems, thus providing an enhanced adhoc reporting capability. However data for special problem usage cannot be anticipated, it may be possible to provide the information needed for these problems more rapidly with a database because of progam/file independence, common standards, and other data base characteristics.

3. **Management models:** Database can serve managers by enhancing the ability to develop computer models for management use. Data can be extracted from an operations database for inclusion in the Decision Support Systems database. This data need not be reformatted and placed in a separate file for accessing by the model, which is the common practice for modeling with non-data base systems. The ability of relational data base systems to quickly generate entire new files (which could become the DSS data base) appears to recommend them for companies that expect to develop decision support systems.

4. **Key task information systems:** Databases can serve managers by helping them to organize the information system around key management tasks. Databases should be structured around key tasks at each level, usually with one database for each key task. Successful accomplishment of key tasks often requires co-ordinating information from multiple functional areas, which argues in favour of cross-functional data base systems for key tasks.

**Principles relevant for creating Databases for Management purposes**

1. **Wholistic Principle** – Consider a global perspective: whenever a new application is contemplated, it should be viewed in the light of the entire scheme of the information system. An effective data base system cannot be established on application at a time when an entirely new orientation and a coherent data base master plan are required. The cost of unplanned development is high.

2. **Decision making Principle** – Use a "top-down" design: A database project begun by first focusing on information needs at the bottom of the organization-a "bottom-up

approach" will never receive adequate attention. The top-down approach to designing databases explicitly recognizes management needs. This approach focuses first on senior and middle-management information needs and then on operations needs.

3. **Exception Principle** – Provide for selective information reporting: The database should generate primary reports for each major management activity, with backup detail available on request. This primary report should contain all the relevant information required for the managerial tasks and should not contain extraneous information. Managers should not be forced to go through several data base reports simultaneously to sort the relevant information from the available information.

4. **Differentiation Principles** – Provide for different and multiple data bases for different levels of management: Databases should be designed by the type of managerial activity (such as key tasks) for a particular level of management, due to difference in information requirements and distinction between planning and control activities. In many situations at least two types of databases at each level will be most useful; one or more databases may be needed for management control, and one or more may also be needed for planning activities.

5. **Non-conversion Principle** – Do no convert existing files: Conversion of existing conventional files has many disadvantages. It means that the database design personnel, (1) are not aware of information resource management concepts (or at least do not practice them), (2) are not practicing the first two principles of global perspective and top-down design, (3) are intending to develop data bases that are not cross functional, and (4) will end up with a more expenses and probably no effective file system, in terms of managerial utility; than that existed before conversion.

## Questions from past examinations:

**Q. 1**
Distinguish between cost control and cost reduction. (Asked 5 times) (5 marks)

**Answer:**
Refer page 7

**Q. 2**
Briefly explain the concept of opportunity cost. (November 1996 / 1997) (4 marks)

**Answer:**
Refer to page 7

**Q. 3**
What is meant by incremental revenue? (November 1997) (4 marks)

**Answer:**
Incremental revenue is the additional revenue that arise from the production or sale of a group of additional units. It is one of the two basic concepts the other being incremental cost which go together with differential cost analysis. Incremental cost in fact is the added cost due to change either in level of activity or in the nature of activity.

**Q. 4**

"Costs may be classified in a variety of ways according to their nature and information needs of the management" Discuss. (November 1997) (4 marks)

**Answer:**
Costs can be classified according to their nature and information needs of the management in the following manner.

1. By element: Under this classification costs are classified into (a) Direct costs and (b) Indirect costs according to elements viz. materials, labour and expenses.

2. By function: Here costs are classifieds as: Production cost, administration cost, selling cost, distribution cost, research cost, distribution cost etc.

3. By behaviour: According to this classification costs are classified as fixed, variable and semi-variable costs. Fixed costs can be further classified as committed and discretionary costs.

4. By Controllability: Costs are classified as controllable and non-controllable costs.

5. By normality: Costs are segregated as normal and abnormal costs.

Management of a business house requires cost information for decision making under different circumstances. For e.g. they require such information for fixing selling price, controlling and reducing costs. To perform all these functions a classification of cost according to their nature and information needs is an essential pre-requisite of the management.

**Q. 5**
What are incremental costs and sunk costs? (November 1998) (4 marks)

**Answer:**
Refer page 5 and 6

**Q. 6**
Briefly explain the term Products cost and period cost. (May 1999) (4 marks)

**Answer:**
Refer page 5

**Q. 7**
Give any three examples of opportunity cost. (May 1999) (3 marks)

**Answer:**
Refer page 5

**Q. 8**
Outline the key attributes of an operational database? (May 2003) (4 marks)

**Answer:**
Refer page 8

**Q. 9**
Explain the concept of relevancy of cost in the context of decision making. (May 2004) (4 Marks)

**Answer:**
Relevant costs are those costs which are affected by a decision. Relevance means pertinent to the decision in hand. The expected future costs which are essential and which differ by taking an alternative course of action are relevant costs. Examples of relevant costs re:

- Past costs are not relevant costs
- Historical or sunk costs are not relevant
- Variable costs are relevant costs
- Fixed costs are not relevant
- Book value of equipment is not relevant
- Disposal value of equipment is relevant
- Fixed costs which differ by decision becomes relevant
- Variable costs which do not differ by a decision are not relevant

# CHAPTER 2 – MARGINAL COSTING

## Theory of Marginal Costing

At any given level of output, additional output can normally be obtained at less than proportionate cost per unit. This is because the aggregate of certain items of cost will tend to remain fixed and only the aggregate of the remainder (variable Cost) will tend to rise proportionately with increase in output. Conversely, a decrease in the volume of output will normally be accompanied by a less than proportionate fall in the aggregate cost.

Therefore, costs should be analysed into variable and fixed components, for meaningful decision-taking. This theory, which recognises the difference between variable and fixed costs is called Marginal Costing.

## Meaning

It is technique of decision making, which involves:

(a) Ascertainment of total costs
(b) Classification of costs into (1) Fixed and (2) Variable
(c) Use of such information for analysis and decision making.

Thus, Marginal costing is defined as the ascertainment of marginal cost and of the 'effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs.

Marginal costing is mainly concerned with providing information to management to assist in decision making and to exercise control.

Marginal costing is also known as 'variable costing' or 'out of pocket costing'

## Direct Costing

Direct costing is the practice of charging all direct costs to operation, processes or products, leaving an all indirect costs to be written off against profits in the period in which they arise.

Under direct costing stocks are valued at direct costs, i.e. costs whether fixed or variable, which can be directly attributable to the cost units.

Direct costing differs from marginal costing in that some fixed costs considered direct are charged to operations, processes or products whereas in marginal costing only variable costs are considered.

**Three applications of direct costing:**

1. Stock valuation
2. Minimum quantity to be purchased to recover pattern or mould cost.
3. Close down decisions – like closing down of a department or a shop.

## Differential Cost

Differential cost is "the increase or decrease in total cost or the change in specific elements of cost that result from any variation in operation". It represents an increase or decrease in total cost resulting out of:

(a) Producing or distributing a few more or few less number of the products;
(b) A change in the method of production or of distribution;
(c) An addition or deletion of a product or a territory and
(d) Selection of an additional sales channel.

Differential cost, thus includes fixed and semi-fixed expenses. It is the difference between the total costs of two alternatives, it is all adhoc cost determined for the purpose of choosing between competing alternatives, each with its own combination of income and costs. Differential cost may be incremental or decremental.

**Marginal Cost:**
Marginal Cost represents the increase or decrease in total cost, which occurs with a small change in output say, a unit of output. In cost accounting, variable costs represent marginal cost.

Distinguish between **Differential Cost and Marginal Cost**:
The main point which distinguishes marginal cost and differential cost is that of change in fixed cost when volume of production increases or decreases by a unit of production. In the case of differential cost, variable as well as fixed cost i.e. both costs change due to change in the level of activity, whereas under marginal costing only variable cost changes due to change in the level of activity.

**Variable Cost**

- Variable cost is that portion of cost, which changes or varies in relation to output or volume of production.
- Generally, Variable Cost = Direct Materials + Direct Labour + Direct Expenses + Variable Overheads
- Variable cost per unit remains constant.

**Fixed Cost**

Fixed Costs are costs, which remain constant, for a given period of time, irrespective of level of output.

Generally, Fixed Cost consist of Fixed Production Overheads Plus Administrative Overheads Plus Fixed Selling and Distribution Overheads.

Fixed cost per unit of output will however fluctuate with changes in the level of production. As output increases, fixed cost per unit decreases, and vice-versa.

Fixed costs are treated as **period costs** and are therefore charged to profit and loss account.

**Semi-variable Cost**

Some expenses exhibit characteristics of Fixed and Variable Costs, Such costs are semi variable costs.

Increase or decrease in expenses is not in proportion to output. Example: Delivery van expenses, Telephone, Electricity etc.

These expenses can be segregated into fixed and variable. Example: Depreciation of plant and machinery depends partly on efflux of time and partly on wear and tear. The former is fixed and the latter is variable.

**Methods of segregating Semi-variable costs into fixed and variable costs**

The following methods can be applied for segregation of semi variable costs into fixed and variable portions;

(a) Graphical method (Scatter Graph)
(b) High and low points method
(c) Analytical method
(d) Comparison by period or level of activity method
(e) Least squares method

**Need of classification into fixed and variable**

(a) **Control over Expenses:** Fixed costs are based on policy and relate to the period in which they are incurred. Hence it may be difficult to control them. On the other hand, Variable Costs relate to the level of activity and can be controlled properly.

(b) **Budgeting and Estimates:** Overhead classification into fixed and variable helps as a budgeting tool to forecast future movement in expenses. Estimates and Quotations can be prepared on the basis of such useful analysis.

(c) **Decision-making:** Since all costs are not fully fixed or fully variable, proper segregation is a must to know the behaviour of total cost at different levels of output. Such classification helps in understanding the pattern of total costs and take appropriate decisions.

**Marginal and Absorption Costing – Differences**

**I. Absorption costing *v/s* Marginal Costing:**

**1. COST CLASSIFICATION:**

Under adsorption costing, costs are classified on functional basis i.e. Production, Administration, Selling & Distribution, Research, Development etc.

Under marginal costing, costs are classified as either Fixed or Variable.

**2. PRODUCT v/s PERIOD COSTS:**

Under adsorption costing, fixed costs are treated as product costs.

Under marginal costing, fixed costs are treated as period costs. They are written off in the period in which they are incurred.

**3. STOCK VALUATION:**

Under adsorption costing, the fix overheads (fixed production overheads under financial accounting system and fixed production and administration overheads under cost accounting system) are charged to the output. To the extent, the output remains unsold i.e. closing stock; its valuation would include not only the variable production cost but also the fixed overheads. This implies that part of the current period's fixed cost is effectively converted into an asset

and carried forward and charged to the next period. Likewise the opening stock valuation also includes the fixed overheads of previous period.

Unlike that, under marginal costing, the fixed overheads are all treated as period cost items and are charged to the period rather than the output. Accordingly, the stock valuation includes only the variable factory or production cost and not the fixed charge.

**4. PROFIT MANIPULATION:**

Profit figure can be manipulated by showing higher stocks under absorption costing.

No such manipulation is possible under marginal costing.

**5. VARIANCE CALCULATION:**

In variance reporting, Fixed Overheads expenditure variance only can be computed under marginal costing. There is no volume variance since fixed overheads are non "absorbed".

In variance reporting Fixed Overheads Expenditure and Volume variance, variance can be computed under absorption costing. Volume variance can also be sub-classified into Capacity, Efficiency and Calendar variances.

**6. OVER /UNDER ABSORPTION:**

If the spent amount is different from absorbed amount then, there will be over/under absorption under absorption costing.

Since all fixed costs are written off in the period in which they are incurred there is no possibility of over/under absorption.

**7. APPLICATION:**

Absorption costing technique is used for external reporting purposes. It distorts decision-making.

Marginal costing technique is used for internal reporting purposes. It aids in decision-making.

**Contribution:**

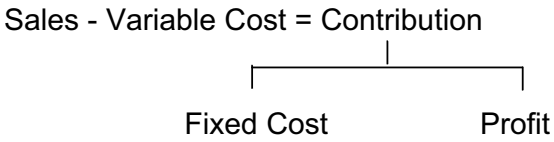
- Contribution is the excess of sales revenue over the variable cost, i.e. Contribution = Sales Less Variable cost.

It is called so, since it initially contributes towards recovery of fixed costs and thereafter towards profit of the business. The contribution forms a fund for fixed expenses and profit.

The contribution concept is based on the theory that the profit and fixed expenses of a business is a 'joint cost' which cannot be equitably apportioned to different segments of the business. Hence contribution serves as a measure of efficiency of operations of various segments of the business.

**Marginal Cost Equation:**

The Marginal Cost Statement, when written in an equation form, constitutes the Marginal Cost Equation.




**Cost-Volume-Profit Analysis:**

Cost-Volume-Profit analysis is analysis of three variables i.e, cost, volume and profit which explores the relationship existing amongst costs, revenue, activity levels and the resulting profit.

It aims at measuring variations of profits and costs with volume, which is significant for business profit planning.

CVP analysis makes use of principles of marginal costing. It is an important tool of planning for making short term decisions.

**The following are the basic decision making indicators in Marginal Costing:**

(a) Profit Volume Ratio (PV Ratio) / Contribution Margin ratio
(b) Break Even Point (BEP)
(c) Margin of Safety (MOS)
(d) Indifference Point or Cost Break Even Point
(e) Shut-down Point

**Profit Volume Ratio (PV Ratio)**

The Profit Volume Ratio (PV Ratio) is the relationship between Contribution and Sales Value. It is also termed as Contribution to Sales Ratio.

**Significance of PV Ratio:**

- PV Ratio is considered to be the basic indicator of the profitability of the business.
- The higher the PV Ratio, the better it is for a business. In the case of a firm enjoying steady business conditions over a period of years, the PV Ratio will also remain stable and steady.
- If PV Ratio is improved, it will result in better profits.

**Improvement of PV Ratio**

PV Ratio can be improved by the following means:

By reducing the variable cost,
By increasing the selling price, or
By increasing the share of products with higher PV Ratio in the overall sales mix.
(where a firm produces a number of products)

**Uses of P/V Ratio:**

1. To compute the variable costs for any volume of sales.
2. To measure the efficiency or to choose a most profitable line. The overall profitability of the firm can be improved by increasing the sales/output of a product giving a higher PV ratio.
3. To determine break-even point and the level of output required to earn a desired profit.
4. To decide more profitable sales-mix.

**Break Even Point (BEP):**

**Meaning**

The Break – Even Point is the point or a business situation at which there is neither a profit nor a loss to the firm. In other words, at this point, the total contribution equals fixed costs.

**Assumptions underlying break even analysis**

1. Total costs can be easily classified into Fixed and Variable categories.
2. Selling Price per unit remain constant, irrespective of quantity sold.
3. Variable Costs per unit remain constant. However total variable costs increase as output increases.
4. Fixed Costs for the period remains same irrespective of output.
5. Productivity of the factors of production will remain the same.
6. The state of technology process of production and quality of output will remain unchanged.
7. There will be no significant change in the level of opening and closing inventory.
8. The company manufactures a single product. In the case of a multi-product company, the sales-mix remains unchanged.
9. Both revenue and cost functions are linear over the range of activity under considerations.

**Break-even chart:**

The break-even chart is a graphical representation of cost-volume profit relationship. It depicts the following:

(1) Profitability of the firm at different levels of output.
(2) Break-even point – No profit no loss situation.
(3) **Angle of Incidence:** This is the angle at which the total sales line cuts the total cost line. It is shows as angle Θ (theta). If the angle is large, the firm is said to make profits at a high rate and vice versa.
(4) Relationship between variable cost, fixed expenses and the contribution.
(5) Margin of safety representing the difference between the total sales and the sales at breakeven point.

**Different types of Break-even charts**

1. **Contribution Breakeven Chart:** This chart shows contribution earned by, the firm at different levels of activity.

2. **Cash Breakeven Chart:** In this chart variable costs are assumed to be payable in cash. Besides this the fixed expenses are divided into two groups, viz. (a) those expenses which involve cash outflow e.g. rent, insurance, salaries, etc. and (b) those which do not involve cash outflow. e.g. depreciation.

3. **Control Breakeven Chart:** Both budgeted and actual cost data are depicted in this chart. This chart is useful in comparing the actual performance of the firm with the budgeted performance for exercising control.

4. **Analytical break even chart:** This chart shows the break-up of variable expenses into important elements of cost. Viz. direct materials, direct labour, variable overheads, etc. Also the appropriations of profit such as ordinary dividends, preference dividend , reserves, etc. are depicted in this chart.

5. **Product wise break even chart:** Separate break-even charts for different products can also be prepared to compare the profitability of the products or their contribution.

6. **Profit graph:** Profit graph is a special type of break-even chart, which shows the profits or loss at different levels of output.

**Impact of non-linear sales and cost functions, on the Break-even point**

In break-even analysis, it is presumed that the total sales line and variable cost lines will have a linear relationship. i.e. these lines will be straight lines. However, in actual practice it is unlikely to have a linear relationship for two reasons, namely:

(a) After the saturation point of existing demand, the sales value may show a downward trend.
(b) The law of increasing cost may operate and the variable cost per unit may increase after reaching particular level of output.

In such cases the contribution will not increase in a linear proportion. When such a situation arises, the company should find the level of output where the profitability is optimum and any manufacture beyond this level will not be profitable. The optimum profit is earned at the point where the distance between sales and total cost is the greatest.

**Limitations of break-even chart**

1. The variable cost line need not necessarily be a straight line because of the possibility of operation of law of increasing returns or decreasing returns.

2. Similarly the selling price will not be a constant factor. Any increase or decrease in output is likely to have all influence on the selling price.

3. When a number of products are produced separate break-even charts will have to be calculated. This poses a problem of apportionment of fixed expenses to each product.

4. Break-even charts ignore the capital employed in business, which is one of the important guiding factors the determination of profitability.

**Margin of Safety**

Margin of Safety (MOS) represents the difference between ‘the actual total sales and sales at break-even point.’ It can be expressed as a percentage of total sales, or in value, or in terms of quantity.

**Significance**

- Upto Break even point the contribution earned is sufficient only to recover fixed costs. However beyond the Break even point. The contribution is called profit (since fixed costs are fully recovered by then)
- Profit is nothing but contribution carried out of Margin of Safety Sales.
- The size of the margin of safety shows the strength of the business.
- If the margin of safety is small, it may indicate that the firm has large fixed expenses and is more vulnerable to changes in sales.
- If the margin of safety is large, a slight fall in sales may not affect the business very much but if it is small even a slight fall in sales may adversely affect the business.

**Improvement in Margin of Safety:**

1. Increase in the selling price, provided the demand is inelastic so as to absorb the increased prices.
2. Reduction in fixed expenses.
3. Reduction in variable expenses.
4. Increasing the sales volume provided capacity is available.
5. Substitution or introduction of a product mix such that more profitable lines are introduced.

**Indifference Point**

**Meaning:**
It is the level of sales at which total costs (and hence total profits) of two options are equal. The decision maker is indifferent as to option chosen, since both options will result in the same amount of profit.

**Significance:**
Indifference point represents a cut-off indicator for deciding on the most profitable option. At that level of sales (i.e indifference point).Costs and profits of two options are equal. The profitability of different options are:

| Level of Sales | Most Profitable Option to be chosen | Reason |
|---|---|---|
| Below Indifference Point | Options with Lower Fixed Cost | Lower the Fixed Costs, lower will be the BEP. Hence more profits beyond the BEP |
| At Indifference Point | Both options are equally profitable | Indifference Point |
| Above Indifference Point | Option with Higher PV ratio (lower variable cost). | The higher the PV ratio, the better it is. |

**Shut Down Point**

**Meaning:**
Shut Down Point indicates the level of operations (sales), below which it is not justifiable to pursue production. For this purpose fixed costs of a business are classified into (a) Avoidable or Discretionary Fixed Costs and (b) Unavoidable or Committed Fixed Costs. A firm has to close down if its contribution is insufficient to recover the avoidable fixed costs.

The focus of shutdown point is to recover the avoidable fixed costs in the first place. By suspending the operations, the firm may save as also incur some additional expenditure. The decision is based on whether contribution is more than the difference between the fixed

expenses incurred in normal operation and the fixed expenses incurred when plant is shut down.

**Key Factor:**

- Key factor or Limiting factor represents a resource whose availability is less than its requirement.
- It is a factor, which at a particular time or over a period limits the activities of a firm.
- It is also called Critical Factor (Since it is vital or critical to the firms success) and Budget Factor (since budgets are formulated by reference to such limitations or restraints).
- Some examples of key Factor are (a) Shortage of raw material; (b) Labour shortage; (c) Plant capacity; (d) Sales Expectancy; (e) Cash availability etc.
- In case of key factor situation the procedure for decision-making is as under:

| Step | Description |
|---|---|
| 1 | Identify the key factor |
| 2 | Compute total contribution or contribution per unit of the product. |
| 3 | Compute contribution per unit of the key factor, i.e. Contribution per hour, contribution per kg of raw material etc. |
| 4 | Rank the products based on contribution per unit of the key factor |
| 5 | Allocate the key resources based on ranks given above |

**Important factors to be considered in marginal costing decisions**
In all recommendations of marginal Costing decisions, the following factors are to be considered:

**Contribution:** Whether the product or production line in question makes a contribution.

**Specific fixed cost, if any:** Where a choice is to be made between two course of action, the additional fixed overhead, if any, should be taken into account.

**CVP relationship:** The effect of increase in volume on profits, and the rate of earning, additional profits, should be analysed.

**Incremental contribution:** Where additional quantities can be sold only at reduced prices, incremental contribution will be more effective in decision making, as it takes into account the additional sale quantity and additional contribution per unit.

**Capacity:** Whether acceptance of the incremental order, or additional product line is within the firm's capacity or whether key factor comes into play, should be analysed.

**Non cost factors:** Non cost factors should also be considered, wherever applicable.

**Advantages of Marginal Costing:**

1. **Pricing decisions**: Since marginal cost per unit is constant from period to period within a short span of time, firm decisions on pricing policy can be taken. If fixed cost is included, the unit cost will change from day to day depending upon the volume of output. This will make decision task difficult.

2. **Overhead variances**: Overheads are recovered in costing on the basis of pre-determined rates. This creates the problem of treatment of under or over-recovery of overheads, if fixed overheads were included. Marginal costing avoids such under or over recovery of overheads.

3. **True Profit**: It is argued that under the marginal costing technique, the stock of finished goods and work in progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.

4. **Break-even analysis:** Marginal costing helps in the preparation of break-even analysis, which shows the effect of increasing or decreasing production activity on the profitability of the company.

5. **Control over expenditure:** Segregation of expenses as fixed and variable helps the management to exercise control over expenditure. The management can compare the actual variable expenses with the budgeted variable expenses and take corrective action through variance analysis.

6. **Business decision-making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.

**Limitations of Marginal Costing**

**Difficult to classify:** It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed.

**Contribution is not final:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

**Wrong pricing decisions:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence sales staff should be cautioned while giving marginal cost.

**Stock valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position, fixed overheads have to be included in work in progress.

**Native assumptions:** Some of the assumptions regarding the behavior of various costs are not necessarily true in realistic situation. For example, additional output can be sold only by reducing sale prices.

**Ignores time value:** Marginal costing ignores time factor and investment. For example, the marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of job, which takes longer time and uses costlier machine, would be higher. This fact is not disclosed by marginal costing.

## Questions from past examinations:

**Q. 1**
Write short note on Break Even Chart. (May 1995) (4 marks)

**Answer:**
Refer to page 18 above

**Q. 2**
Distinguish between absorption costing and marginal costing. (May 1998 / November 2001/ 2003) (4 marks)

**Answer:**
Refer to page 15 above

**Q. 3**
Distinguish between marginal cost and differential cost. (May 1999) (5 marks)

**Answer:**
Refer to page 13 above. (Write definition and then distinguish)

**Q. 4**
Distinguish between cost indifference point and break even point. (May 2002) (4 marks)

**Answer:**
**Cost indifference point:**
It is the point at which total cost lines under the two alternatives intersect each other. It is calculated as under: **(Ref. Q.11 part 3 - in practical questions text book)**
Difference in fixed costs / Difference in variable costs **OR**
Difference in fixed costs / Difference in P/V ratio
It is the level at which costs under different alternatives (say manufacture or buy) will be same.

**Break Even Point (BEP):**
It is the point where the total cost line and total revenue line for a particular alternative intersect each other.

The following are the main points of distinction between the two:

1. The cost indifference point is the activity level at which total cost under two alternatives are equal. Whereas BEP is the activity level at which the total revenues from a product or product mix is equal to its total cost.
2. The cost indifference point is used to choose between two alternative processes for achieving the same objective. The choice depends on the estimated activity level. Break even point is used for profit planning.

**Q. 5**
Describe the assumptions underlying break even analysis. (May 1995 / November 1998 / May 2003) (4 marks)

**Answer:**
Refer to page 18 above.

**Q. 6**
What are the limitations of marginal costing? (November 1998 / May 2001) (5 marks)

**Answer:**
Refer to page 22 above.

**Q. 7**
What is margin of safety? How can margin of safety be improved? (May 1999) (4 marks)

**Answer:**
Refer to page 19 and 20 above.

**Q. 8**
What are the limitations of break even chart? (May 1999) (4 marks)

**Answer:**
Refer to page 18 above.

**Q. 9**
Discuss the relationship between Angle of incidence, Break even level and margin of safety. (November 1999) (8 marks)

**Answer:**

**Angle of incidence:**
It is the angle between total sales line and total cost line drawn in the case of break even chart. It provides useful information about the rate at which profits are being made. The larger the angle of incidence, the higher the rate of profit and vice versa. (Refer module page 2.23 for graphical representation)

**Break Even Level:**
The Break – Even level is the level or a business situation at which there is neither a profit nor a loss to the firm. In other words, at this level, the total contribution equals fixed costs.

**Margin of Safety**
Margin of Safety (MOS) represents the difference between 'the actual total scales and sales at break-even point. It can be expressed as a percentage of total sales, or in value, or in terms of quantity.

Relationship between Angle of incidence, Break even level and margin of safety:

1. If the break even point is low and angle of incidence is large, the margin of safety will be large and business enjoys financial stability. A low break even point indicates that the business could be run profitable even if there is a fall in sales, unless the sales are very low.

2. If the break even point is low and angle of incidence is small, the conclusions are the same as in 1 above except that the rate of profit earning capacity is not as high as in 1.
3. If the break even point is high and angle of incidence is small, the margin of safety will be low. This implies that the business is very vulnerable, even a small reduction in activity may result in a loss.

4. If the break even point is high and angle of incidence is large, the margin of safety will be low. The business is likely to incur losses through a small reduction in activity. However, after a break even point, the business makes the profit at a high rate.

**Q. 10**
Briefly explain the methods of separating semi-variable costs into fixed and variable elements. (May 2000) (6 marks)

**Answer:**
Refer to page 15 above.

**Q. 11**
Briefly explain the methods of separating semi-variable costs into fixed and variable elements. (May 2000) (6 marks)

**Answer:**
Refer to page 15 above.

**Q. 12**
State three applications of direct costing. (May 2001) (3 marks)

**Answer:**
Refer to page 13 above.

**Q. 13**
State three applications of direct costing. (May 2001) (3 marks)

**Answer:**
Refer to page 13 above.

# CHAPTER 3 – AREAS OF DECISION MAKING

**Areas of decision-making:**

(i) Stock management and inventory control decisions
(ii) Plant location decisions
(iii) Machinery replacement / capital budgeting decisions
(iv) Further processing decisions
(v) Product decisions – Dropping or adding a product line
(vi) Marketing decisions
(vii) Submitting tenders and quotations for new jobs based on relevant cost analysis
(viii) Acceptance of incremental orders in different situations like spare capacity, full capacity etc.
(ix) Make or buy decisions
(x) Product pricing decisions
(xi) Intra-Company transfer pricing decisions
(xii) Purchasing vs. lease financing decisions

The above areas involve the use of marginal costs, relevant cost and different cost approaches.

**I. Inventory Decisions**
**Need**

- If the stock level is less, it disrupts production and affects sales
- If the stock level is more, it involves locking up money, increases expenditure by way of carrying costs and risk of obsolescence. Hence the optimum inventory levels, which lies somewhere between the maximum and minimum levels, should be determined.
- Different departments within an organization can have varying interest concerning stock:
  (a) Sales department would like to have maximum stock of all varieties of finished goods so as to meet all its customer demand immediately.
  (b) Production department may wish to produce large batches of a new products so that production runs are long and costs are low.
  (c) Financial control department would prefer low stock in order to reduce the capital tied up in stock.

So decisions regarding stock levels are usually concerned with seeking the best economic compromise between conflicting objectives.

**II. Plant Location Decisions:**
The following are the basic aspects of plant location decisions:

(a) Selection of territory – the state or territory in which the factory is to be located and
(b) Selection of site – the exact site where the factory is to be put up.

Selection of territory. This aspect is influenced by:
(a) Entrepreneur's choice;
(b) Tax benefit available; and
(c) Laws of the State, which may be suitable for setting up of the industrial units.

**Selection of site:** The advantages associated with each probable site may be analysed into the following categories:

| Natural Advantages | Derived Advantages |
|---|---|
| • Availability of water and power<br>• Availability of raw material<br>• Proximity to markets<br>• Climatic conditions<br>• Availability of labour-in certain areas cheap and unskilled labour is available in plenty, in certain areas skilled labour will be available. | • Specialized facilities like railways, warehouses, harbour, etc.<br>• Links with other industries, like proximity to an industry from which raw materials are purchased.<br>• Availability of ancillary services, like repairs.<br>• Factors of distribution such as transport facilities, freight rate concessions, etc. |

**Analysis of alternatives**: If a number of alternative sites are available, decisions can be taken by reference to the following aspects:

1. Relative advantages of one site over others
2. Capital expenditure of alternative site locations
3. Break-even analysis of the project at various site locations
4. Incremental rate of return
5. Intangible factors

**III. Cost factors and non-cost-factors in an asset replacement decision**

**Cost Factors:**

Comparison of operating costs of the existing plant with that of alternative plant.

Figures of comparative profitability, return on capital employed and interest on capital.

Assessment of opportunity costs to determine whether the funds proposed to be invested in purchase of the new asset in replacement could be more gainfully deployed elsewhere.

Effect of disposal of the existing plant.

Additional capital expenditure of an obligatory nature to be incurred, if any, on related or allied projects such as those for welfare.

Effect on tax liability due to profit or loss on the sale of plant/machinery to be replaced.

**Non Cost Factors:**

1. Market standing of the product: If the product is likely to become obsolete or go out of fashion in the near future, it will not be worthwhile to go in for plant replacement.
2. Nature of the market – capability of absorbing the product manufactured by the new plant in its entirety at the anticipated price.
3. Constraints on the resources required for the new plant.
4. Possibility of any bottleneck or imbalances in subsequent operations or process, in the new plant and if so, whether these can be removed.
5. Possibility of any substitute product coming up which make the replaced plant redundant.
6. Likely effects of any change in the policy of the Government with regard to import of raw materials, export of products, levy of duties etc.

**Areas of Decision Making**

**IV. Further Processing Decisions**

The following steps are involved in decision making on further processing of joint products:

(a) Compute Additional Revenue = Sale Value after Further Processing – Sales Value at split off

(b) Compute Additional Costs = Further Processing costs + S & D OH if any

(c) Compute Additional Profit = Additional Revenue – Additional Costs

(d) If Additional Profit is positive, process further, else sell at split off point.

Joint costs i.e. costs upto split-off stage is irrelevant

**V. Product Development Decisions**

1. Product development embraces new development, major modifications of existing products, manufacture of products which are similar to those of competitors, product line acquisition, etc.

2. The six stages of innovation process, in the product development decisions are:

(a) **Idea generation:** Ideas are continually being generated through technology, competitors, firm's scientists and salesmen & customer feedback. They also emanate from conferences and discussions, at meetings.

(b) **Screening:** Screening seeks to eliminate from further consideration those product ideas, which are not in conformity with the Company's (a) objectives; or (b) resources. The objective may be maximum profit, sales stability and sales growth or company image. If the product idea is compatible with these objectives, it will be examined in the light of availability of resources, viz. capital, know-how, production facilities to be used for the manufacture, etc. Product ideas that pass these tests will move on to the next stage.

(c) **Business analysis:** This involves estimation of future sales, profits and rate of return for the proposed new product and also to determine whether these are in conformity with the objectives of the company. The various methods for carrying out business analysis are (a) Break-even analysis; (b) Discounted Cash Flow or NPV method (c) Marketing mix method (d) Bayesian Decision method; (e) Standard Deviation method; and (f) Critical Path method.

(d) **Developing the product in a concrete form:** This involves the following four stages:

Engineering - preparation of prototype that is designed free of trouble for economical manufacture and appealing to customer.

Consumer preference testing – to seek the distribution or strength of consumer preferences;

Brand name – to enable easy identification for the product; and

Packing – to ensure product protection, economy and also to serve as a sales promotional by using attractive packaging designs.

(e) **Test Marketing:** Here, the entire product and marketing programme is tried out for the first time in a small number of well-chosen and authentic sales environments. This primary motive of test marketing is to improve knowledge of potential sales. It can also choose an alternative marketing plan after ascertaining market position.

**(f) Commercialisation:** After passing all the aforesaid stages of development, the project becomes ripe for commercial production. By this time, the company gains confidence in the product's future.

**VI. Product Policy Decisions**

A product policy decision involves the following:

a. Product modification decision
b. Product elimination decision; and
c. Product mix decision

**(a) Product modification strategies**

- **Quality Improvement:** This is undertaken where the sales are declining due to poor quality of product or to compete successfully with the other manufacturers who supply product of good quality.

- **Feature Improvement:** It involves redesigning of the product so that it offers more convenience, safety, efficiency or versatility. It serves as an effective means of building a firms progressiveness and leadership.

- **Style Improvement:** This strategy aims at improving the aesthetic appeal of the product in contrast to its functional appeal. Changes in style of motor vehicles are examples of this strategy.

**(b) Product elimination decision:**

The cost of sustaining a weak product is as under: Un-recovered overheads; Loss of profit; Short production runs and expensive set up times, and More attention of advertising and sales force time.

- The elimination of a weak product is done by: Piece-meal basis: Where the loss becomes conspicuous and hence necessary to eliminate the product.
- Crisis basis: The need to eliminate the product arises because of persistent decline in total sales, piling inventories, or rising costs.

**(C) Product Mix Decision:**

Product mix means a composite of product offered for sale by a firm. The firm's final choice of a product strategy is based on its long run objective, viz. profits, sales, stability and sales growth. To achieve these objectives the firm chooses an optimal product mix, considering the following factors:

The **objective function**, which is normally maximization of profits or minimization of cost;
The **constraints** within which the objective function is to be achieved. These may be machine capacity, raw materials availability, labour time, sales potential, etc.

**VII. Product distribution decision:**

The objective of distribution is getting the right goods to the places at the right time for the optimal cost.
The basic output of a distribution system is the level of customer service, which can be defined as the number of day of delivery. In other words it is the percentage of customers who should get their orders in so many number of days. This level of service depends upon an analysis of probable-customers, competitors and response to alternative levels of service available.
The provision of a certain level of customer service involves warehousing, transportation costs etc. These are considered to be the inputs of a distribution system.

The system can be considered efficient if it maintains a particular level of service at minimum cost. This means freight charges, warehousing cost, inventory carrying cost etc. should be minimum.

Decision-making tools used for this purpose are (a) Linear programming (Transportation Model); and (b) Inventory models.

**VIII. Dropping or adding a product line:**

Since the objective of any business organization is to maximize its profits, the firm can consider the economies of dropping the unprofitable products, and adding a more remunerative product(s).

In such cases, the firm may have two alternatives as under:

(a) To drop the unprofitable product and to leave the capacity unutilised.

(b) To drop the unprofitable product and to utilize the capacity for the manufacture of a more remunerative product.

For this purpose, the contribution approach is adopted, taking the following factors into account:

1. Contribution from unprofitable product (i.e. Sale Revenue Less Variable Costs)
2. Specific fixed costs of the unprofitable product, which can now be avoided or reduced.
3. Contribution from the other profitable product, which is proposed to be produced with the balance capacity.

**IX. Make or Buy Decisions:**

Make or buy decisions may be required to be taken in respect of component / raw material parts. In such cases, the marginal costing and opportunity costing approaches shall be adopted in decision making. The decisions will be based on the following computation:

(a) Compute Cost of Manufacturing = Variable Costs
+ Specific Fixed Cost (if any)
+ Opportunity Cost (in case of full capacity operations)

(b) Compute Cost of Buying = Direct Purchase Costs
+ Indirect Costs like buying commission
+ Opportunity Cost if any (e.g. Purchase of different quality raw material, leading to reduction in selling price of finished product).

(c) Decisions will be as under:
If cost of manufacturing < Cost of Buying, the firm should go for manufacturing
If cost of manufacturing < Cost of Buying, then the firm is indifferent
If cost of manufacturing < Cost of Buying, the firm should go for buying

## Questions from past examinations:

**Q. 1**

Mention any four important factors to be considered in marginal costing decisions. (November 1999) (4 marks)

**Answer:**
Important factors to be considered in marginal costing decisions are as follows:

Whether a product or production makes a contribution.

In the selection of alternatives, additional fixed costs if any should be considered.

The continuity of demand after expansion and its impact on selling price are to be considered.

Non-cost factors such as the need to keep labour force intact and governmental attitude are also to be taken into account.

**Q. 2**
In what circumstances it may be justifiable to sell at a price below marginal cost? (May 2000) (4 marks)

**Answer:**
It may be justifiable to sell at a price below marginal cost for a limited period under the following circumstances:

1. Where materials are of perishable nature
2. Where stocks have been accumulated in large quantities and the market prices have fallen.
3. To popularise the new product
4. Where such reduction enables the firm to boost the sale of other products having larger profit margins.
5. To capture foreign markets
6. To obviate shut down costs
7. To retain future market

**Q. 3**
Cost is not the only criteria for deciding in favour of shut down – briefly explain. (May 2000) (3 marks)

**Answer:**
Cost is not the only criteria for deciding in favour of shut down. Non-cost factors worthy of consideration in this regard are as follows:

1. Interest of workers, if the workers are discharged. It may become difficult to get skilled workers later, on reopening of the factory. Also shut-down may create problems.
2. In the face of competition it may be difficult to re-establish the market for the product.
3. Plant may become obsolete or depreciate at a faster rate or get rusted. Thus heavy capital expenditure may have to be incurred on re-opening.

**Q. 4**
State the non-cost factors to be considered in make/buy decisions. (May 2001) (4 marks)

**Answer:**
**Non-cost factors in make/buy decisions:**

Possible use of released production capacity and facility as a result of buying instead of making.

Source of supply should be reliable and they are capable of meeting un-interruptedly the requirement of the concern.

Assurance about the quality of goods supplied by outside supplier.

Reasonable certainty, from the side of suppliers about, meeting the delivery dates.

The decision of buying the product / component from outside suppliers should be discouraged, if the technical know how used is highly secretive.

The decision of buying the component from outside suppliers should not result in the laying off of workers and create industrial relations problems. In fact, on buyinf from outside, the resources freed, should be better utilised elsewhere in the concern.

The decision of manufacturing the product / component should not adversely affect the concern's relationship with outside suppliers.

Ensure that more than one supplier of product / component is available to reduce the risk of outside buying.

In case the necessary technical expertise is not available internally then it is better to buy the requirements from outside.

**Q. 5**

Enumerate the factors involved in decisions relating to expansion of capacity. (May 2001) (3 marks)

**Answer:**

The factors involved in decisions relating to expansion of capacity are enumerated as below:

1. Additional fixed overheads involved should be considered.
2. Possible decrease in selling price due to increased production capacity.
3. Whether the demand is sufficient to absorb the increased production.

# CHAPTER 4 – RELEVANT COSTING

***What is Marginal Costing?***

Marginal costing is not a separate method of costing like job costing / process costing / operating costing etc. It is a special technique which helps in decision-making. Management has to make various decisions of strategic importance. These decisions are very important from profitability and hence survival point of view. The typical feature of these decisions is that they are non-recurring / non-repetitive in nature. (*Example: Reliance's decision to enhance capacity of its petrochemical refinery*). These decisions involve high costs and cost – benefit analysis has to be conducted before taking final decision.

***Important feature of Marginal Costing:***

Under Marginal Costing the overheads are classified as either fixed or variable unlike classification on the basis of functions (*i.e. Factory, Administrative, Selling & distribution )* under absorption costing. This ensures that all the fixed overheads are written off in the period in which they are incurred.

**Trading and Profit and Loss Account (Under Marginal Costing)**

**(Under Financial / Management Accounting)**

**Trading Account**

| | |
|---|---|
| To Opening Stock | By Sales |
| To Purchases (Direct Material – DM) | |
| To Wages (Direct Labour – DL) | By Closing Stock |
| To Other ***Variable*** Manufacturing expenses (Direct Expenses – DE) | (At Prime Cost = DM + DL + DE) |
| To Gross Profit c/d | |

**Profit and Loss Account**

| | |
|---|---|
| To ***Manufacturing Overheads*** | By Gross Profit b/d |
| To Administrative Overheads | |
| To Selling & Distribution Overheads | |
| To Other Expenses | |
| To Net Profit | |

Since all the fixed overheads are written under profit and loss account, they are entirely written off in the period in which they are incurred. (*As nothing is charged to the closing stock*)

**Trading and Profit and Loss Account (Under Absorption Costing)**

**(Under Financial Accounting)**

**Trading Account**

| | |
|---|---|
| To Opening Stock | By Sales |
| To Purchases (Direct Material – DM) | |
| To Wages (Direct Labour – DL) | By Closing Stock |
| To Other ***Variable*** Manufacturing expenses (Direct Expenses – DE) | (At Factory Cost = DM + DL + DE + F. Ohds.) |
| To Gross Profit c/d | |

**Profit and Loss Account**

| | |
|---|---|
| To Administrative Overheads | By Gross Profit b/d |
| To Selling & Distribution Overheads | |
| To Other Expenses | |
| To Net Profit | |

**Trading and Profit and Loss Account (Under Absorption Costing)**

**(Under Management Accounting)**

**Trading Account**

| | |
|---|---|
| To Opening Stock | By Sales |
| To Purchases (Direct Material – DM) | |
| To Wages (Direct Labour – DL) | By Closing Stock |
| To ***Fixed Manufacturing expenses*** (Direct Expenses – DE) | (At Cost of Prod. = DM + DL + DE + F. Ohds. + Adm. Ohds.) |
| To Administrative Overheads | |
| To Gross Profit c/d | |

**Profit and Loss Account**

| | |
|---|---|
| To Selling & Distribution Overheads | By Gross Profit b/d |
| To Other Expenses | |
| To Net Profit | |

As can be seen that under Absorption Costing, fixed production / manufacturing overheads are charged to trading account. In such a case to the extent any production remains unsold, the fixed overheads will be carried forward to the next year. (*This is because closing stock valuation will include part of the fixed overheads*).

**Following are the differences between Absorption costing & Marginal Costing:**

**1. COST CLASSIFICATION:**

Under adsorption costing, costs are classified on functional basis i.e. Production, Administration, Selling & Distribution, Research, Development etc.

Under marginal costing, costs are classified as either Fixed or Variable.

**2. PRODUCT v/s PERIOD COSTS:**

Under adsorption costing, fixed costs are treated as product costs. (*As they are included in closing stock valuation*)

Under marginal costing, fixed costs are treated as period costs. They are written off in the period in which they are incurred.

**3. STOCK VALUATION:**

Under absorption costing, the fixed overheads (fixed production overheads under financial accounting system and fixed production and administration overheads under cost accounting system) are charged to the output. To the extent, the output remains unsold i.e. closing stock; its valuation would include not only the variable production cost but also the fixed overheads. This implies that part of the current period's fixed cost is effectively converted into an asset and carried forward and charged to the next period. Likewise the opening stock valuation also includes the fixed overheads of previous period.

Unlike that, under marginal costing, the fixed overheads are all treated as period cost items and are charged to the period rather than the output. Accordingly, the stock valuation includes only the variable factory or production cost and not the fixed charge.

For the normal accounting purposes, absorption costing is very widely accepted but for management accounting purpose, it is only the marginal costing technique that is to be used.

The profit and loss statement based on two different methods would give us two different profit figures and the difference would be only because of stock valuation, (difference in respect of opening and closing stock), and under cost accounting, under/over absorption, if it is carried forward.

**When production is more than sales**, profit under absorption costing system will be higher as compared to marginal costing. This is because closing stock valuation will be higher under absorption costing system.

**When production is less than sales**, profit under marginal costing system will be higher as compared to absorption costing. This is because opening stock valuation will be lower under absorption costing system.

Both the systems will give same profits when there are no stocks or when the opening and closing stocks are same.

Incidentally it may also be noted that usual analysis of fixed overheads variance, based on recovery, into expenditure variance, volume variance etc. presupposes that the company follows absorption costing. If at all it is specifically given that the company follows marginal costing then, the usual analysis is irrelevant and we need to calculate only one variance i.e. fixed overheads expenditure variance.

**4. OVER /UNDER ABSORPTION:**

If the spent amount is different from absorbed amount then, there will be over/under absorption under absorption costing.

Since all fixed costs are written off in the period in which they are incurred there is no possibility of over/under absorption.

**5. APPLICATION:**

Absorption costing technique is used for external reporting purposes. It distorts decision-making.

Marginal costing technique is used for internal reporting purposes. It aids in decision-making.

**II. Absorption Costing: Limitations:**

i. Fixed cost treated as product cost.
ii. Fixed cost is included in closing stock.
iii. Entire fixed cost is not written off.
iv. Net profit / Depreciation / Divided / Tax - All wrong.
v. The more the production, the more the profits

**III. Marginal Costing: Advantages:**

i. Fixed cost treated as period cost.
ii. Fixed cost is not included in closing stock.
iii. Entire fixed cost is written off.
iv. Net profit / Depreciation / Dividend / Tax - All right

v. The more the sales, the more the profits

**IV. Break even analysis:**

Important presumptions:

This analysis, known as break-even analysis or contribution-margin analysis or cost volume profit analysis is based on following three presumptions, it being used at planning stage.

i. Sales price per unit always remains constant.
ii. The variable cost per unit always remains constant.
iii. The fixed cost for the period always remains constant.

This means that the contribution would always be some fixed percentage of sates. Also the contribution-minus fixed cost is net profit just as contribution minus net profit is fixed cost or fixed cost plus net profit is equal to contribution.

**V. Break even point:**

This is financial break-even point. It is the level of sales required to get no loss and no profit situation. In other words, it is the level of sales that gives us the contribution which is exactly equal to the amount of fixed cost.

To get the break even point, we need to know the amount of fixed cost and the relationship between sales and contribution (known as profit/volume ratio). Amount of fixed cost is the amount of contribution required and the P/v ratio is the rate at which contribution will be earned. By using these two, we can easily calculate break-even point. The break-even point can be expressed in terms of value or volume.

**VI. Profit-Volume ratio:**

This is the relationship between the sales and contribution. Ever-time sales increases by Rs.100 the contribution and therefore the net profit would increase by the amount which is at the rate of P/v ratio. Likewise every time sales of Rs.100 are lost, the contribution and therefore the net profit would be lost by the amount at the rate of P/V ratio.

**VII. Margin of Safety:**

This is the positive difference between the actual sales and the break even sales. The more the amount of margin of safety the more should be the safety that the company enjoys because, even if the sales fall by the amount of margin of safety, the company still would not make the losses. Thus, it is Actual sales minus Break even sales. This can be expressed in units or amount.

**VIII. Margin of safety ratio:**

This is margin of safety expressed as a percentage of the actual sales. Thus, it is margin of safety divided by actual sales. It implies that even if sales fall by the margin of safety percentage, the company still would be very safe in the sense that it will not be making losses. Net profit divided by contribution also gives this ratio.

**IX. General observations:**

1. If sales and contribution at any given point of time are known then, by using the presumption that there is constant relationship between the two, we can get P/V ratio by dividing contribution by sales.
2. If we have net profit of any two periods as also the sales of the same periods, the difference between two profit figures would be nothing but the amount of contribution, fixed cost remaining fixed, earned on sales, which is the difference between two sales figures. When we divide contribution difference by sales difference, we get P/V ratio.
3. Fixed cost is contribution on break even sales and therefore if any two of break-even sales, P/v ratio and fixed cost are given to us, the third one we can calculate (e.g. If we divide the fixed cost by the break even sales, we get the P/V ratio.).
4. Margin of safety is sales above the break even point and the contribution earned above the break even point is net profit. In other words, net profit is contribution on margin of safety and therefore, if we divide net profit by margin of safety, we get the P/V ratio.
5. Given the sales, P/v ratio and fixed cost, we can easily calculate the expected net profit and likewise given the target net profit, fixed cost and P/v ratio, we can easily calculate the sales required to meet the profit target. Similarly given the sales, P/v ratio and the net profit, we can find out the expected fixed cost.
6. All observations written above are subject to the vital presumptions written in note 5. Therefore, if the presumptions fails, then the calculations would have to be changed accordingly.

**X. Types of *Break-Even* Points:**

i) The usual break-even point where normal fixed cost is considered.
ii) Cash Break-even point where only the cash fixed cost is considered.
iii) Shut down point where only the additional fixed charge is considered.
iv) Cost Break-even point.
v) Profit Break-even-point.

**XI. Determination of Profitable Mix:**

**a) When there is NO limiting factor:**

The total fixed cost to be incurred remaining constant, the product, which offers more contribution per unit, is more profitable product because it would maximise the total contribution and therefore the net profit. Accordingly, calculate contribution per unit or the total contribution that each product makes and the product which offers highest contribution will be taken as most profitable one and so on. As long as the contribution per unit is positive, the product is profitable. The product priorities and withdrawal of a product should be decided on the basis of contribution that each product offers and not the net profit. If the demand for various products is of complementary nature, then the total contribution based on various product combinations should be considered. Also, if the fixed cost changes, as the product mix changes, then, that should also be considered which means that the decision is based on net profit. However, absorption costing should be completely ignored for such decisions.

**b) When there is limiting factor:**

Whenever some resources are required for products and are not adequately available, these resources become limiting factor. Likewise, if demand is not adequate, demand becomes limiting factor. If there are some limiting factors, then the product which gives more contribution per unit may not give more amount of total contribution because it may not make more profitable use of the limited resources.

In such cases, we can calculate contribution per unit of limiting factor and the product, which offers more contribution per unit of limiting factor, is to be treated as more profitable product and the product priority order is to be accordingly calculated. We divide the contribution per unit by the number of units of limiting factor required per unit of the product. If one limiting factor is on production side and the other on the sales side, then, we first calculate contribution per unit of limiting factor on production side and we decide on the product priority order. Keeping in mind that and the demand limitation of each product, we make the allocation of limited resources to get the most profitable product mix.

If there are two or more constraints on production side, then the most profitable mix can be developed either by graphical method (if there are only two products) or by simplex method (if we have three or more products).

# DECISION MAKING PROCESS

Whenever the decision is to be taken, no matter what is the type of proposal, we always calculate relevant revenue & relevant cost in respect of the decision & if the net result is the gain, then, we take the decision favourably. The statement that we need to prepare is given below:

A. Relevant revenue

- Money to be received
- Outflow to be avoided

B. Relevant cost

- Money to be spent
- Inflow to be lost

C. Net gain / (loss) [A – B]

**(A) The following points should be carefully remembered.**

1) The money is yet to be received & it is such money that would be received if & only if the decision is taken favourably. Thus, it is not the money already received & also it is not the money, which is yet to be received, but in any case, regardless of whether the proposal is accepted or rejected.

2) The outflow to be avoided is that outflow which would take place if the proposal is rejected & would be avoided if the proposal is accepted. Thus it is not the outflow, which has already been avoided, & also not the outflow, which anyway is not going to take place.

**(B)**

1) The money is vet to be spent, which means relevant cost is future cost & not sunk cost. Further it would be spent if & only if the proposal is accepted, not otherwise.
2) Likewise the inflow to be lost is the inflow that would take place but for the decision & would not take place because of the decision.

To conclude the events that is to be written in parts (A) & (B) are such that they have direct link with the way we take the decision. Unless there is one to one relationship

between the way we take the decision & relevant revenue or relevant cost taking place, the transaction given in the problem would not be relevant.

(C) Usually we take the decision only based on the net gain or net loss. However sometimes
we are specifically asked to take the decision after taking into account the **qualitative factors**. In such cases, we will make the recommendation only after carefully considering the qualitative or subjective / intangible considerations. [Ref. Q.9 (b)]

**(d) Some important points**

1) **Material cost – Refer Printed Sheet**
2) **Labour cost – Refer Printed Sheet**
3) **Variable overheads:**

The variable charge depends on the utilisation of capacity & unless otherwise given, the variable charge pertaining to additional utilisation should be taken as relevant cost.

However if it is clearly given that additional utilisation would not increase the variable cost then the same should be ignored.

Likewise if the company if operating at full capacity then acceptance of offer would result into diversion of some capacity to the given offer & in such cases, like the treatment given to labour in such cases, either variable charge may be taken as money to be spent or it may be completely ignored & contribution to be lost should be calculated after treating variable charge as irrelevant charge.

In most of the problems, the variable charge is given as % of labour cost. In such cases it should be remembered that for special offer the workers may be paid nothing or may be paid the wages but irrelevant or may be paid at a rate other than normal. The variable charge as such depends on utilisation of capacity & not on whether workers are paid anything and, if yes, whether relevant or not. Accordingly, we calculate variable overheads as if the labour cost is normal.

The points written above pertain to variable production overheads & not to administration and S&D overheads. The administration & S & D charges may or may not be relevant. The instruction would always be given in the problem in this regard but it not given then variable

charges like sales commission should be ignored because the comm. is unlikely to be paid on the sales value of special proposal.

**4). Fixed Overheads:**

The fixed overheads based on absorption costing principles are never relevant. However, if because of the proposal, there is increase in the normal fixed cost, then, the amount of this increase becomes relevant.

# CHAPTER 5 – STANDARD COSTING

For Notes on standard costing, refer module.

# CHAPTER 6 – PRICING DECISIONS

## PRICING OF FINISHED PRODUCT:

### I. Cost Plus pricing:

It is the most widely used method of pricing a product as it ensures that the selling price is greater than the total cost of a product. This method helps business firms to generate profits and survive in the future.

Under cost plus pricing the selling prices of a product are determined based on its estimated cost plus a fixed profit margin. Here 'cost' means full cost at current output and wage levels since these are regarded as most relevant in price determination.

The unit cost of the product can be determined by using different methods viz. total cost, manufacturing cost or variable / incremental cost. The percentage of mark up to be added to estimated cost also vary and depends upon the cost figures used.

**Cost Determination**: For cost determination purposes, the following principles are adopted:

**1. Cost Classification:** Costs may be classified into:
Manufacturing, Administration and Selling & Distribution Costs; (Under Absorption costing) or Variable and Fixed Costs (Under Marginal costing)

**2. Size of the unit and scale of operations:**

**Small manufacturers:** An individual manufacturer may take his cost of production into account and arrive at a price at which the products are to be sold in the concerned region.

**Medium and large manufacturers:** A manufacturer having several factories all over the country may determine the weighted average cost of the factories so as to arrive at a uniform ex-factory price for the country as a whole. If commodities are in short supply, high cost of individual units may have to be allowed in the price. However, in the case of high cost producers, the profit element may have to be reduced to encourage them to reduce their costs.

**3. Uniform costing for whole industry:**

The price may be fixed after taking into account the cost or representative unit from the industry, which may fall within the range of lowest cost unit and highest cost unit.

The factories in the industry may be classified into (i) Small size (ii) Medium Size; and (iii) Large size.

Representative samples are drawn and costs are determined by reference to the distribution of the factories. For example, the costs of medium size factories can be taken into account if this group forms the greater part of the industry.

**4. Determination of Fixed costs:**

Variable costs can be easily determined on a per unit basis. However, fixed costs per unit will have to be ascertained with informed judgment.

Fixed cost per unit should normally be based on the level of production and capacity utilisation likely to be achieved, i.e. Normal Capacity or Capacity based on Sales expectancy.

Any assumption of low utilisation may result in over estimating the cost. Conversely, a high utilization assumption may result in under estimating the cost.

It is therefore, desirable that the level of production and capacity utilization, which are likely to apply in the near future, should be arrived at with utmost care on realistic basis keeping in view both the past performance and the future demand.

**5. Depreciation:**

If a firm wants to survive and stay in business, it has to maintain its fixed capital intact so that its fixed assets may be replaced at the end of their useful working life out of the funds generated from profits retained in the business.

In a period of relatively stable price levels, depreciation based on historical cost of fixed assets would be adequate for achieving this object.

In periods when the price level is continuously changing, the firm may not be left with adequate funds generated out of accumulated depreciation at the end of the life of the plant to replace it at a higher price.

Hence depreciation should be properly included as part of cost so as to leave sufficient profits for asset replacement.

**Advantages of Cost Plus pricing**

**Guaranteed Contribution:** When full costs plus basis is used for pricing, the firm earns a guaranteed contribution equivalent to fixed costs plus profit margin. Even, profit margin is taken as nil, fixed costs included in prices will guarantee minimum contribution.

**Assured Profit:** Cost plus is a fair method of price fixation. The business executives are convinced that the price fixed will cover the cost.

**Reduced risks and uncertainties:** If price is greater than cost, the risk is covered. This is true when normal expected capacity basis of cost estimation is used. The decision-maker may accept a pricing formula that seems reasonable for reducing uncertainty.

**Most suitable in long run:** Cost plus pricing is ideal in the long run since there are no permanent opportunity cost. The effect of seasonal fluctuations is ironed out and prices are established based on normal long run costs.

**Considers market factors:** Cost plus pricing does not mean that market forces are ignored. The mark up added to the cost to make a price reflect the well-established customs of trade, which guide the price fixer towards a competitive price.

**Full Recovery of all costs of the product:** For long-run pricing decisions, full costs of the product informs managers of the minimum costs to be recovered so as to continue in business rather than shut down.

**Price Stability:** Price fixation based on full costs of the product promotes price stability, because it limits the ability of sales person to cut prices. Price stability facilitates planning.

**Simplicity:** A full cost formula for pricing does not require a detailed analysis of cost-behaviour patterns to separate costs into fixed and variable components for each product. It is simple to operate.

**Disadvantages of Cost plus pricing**

**Ignores demand:** Cost plus pricing ignores demand and fails to take into account the buyers' needs and willingness to pay, which govern the sales volume obtainable at each series of prices.

**Ignores competition:** It fails to reflect competition adequately.

**Arbitrary Cost allocation:** It assumes that the costs have been estimated with exact accuracy. This assumption is not true particularly in multi-product firms where the common costs are allocated arbitrarily.

**Ignores opportunity costs:** For many decisions incremental cost play a vital role in pricing, rather than full costs. This aspect is ignored. Also opportunity costs, most relevant for decision-making are summarily ignored.

**Price-Volume relationships:** Since the fixed overheads are apportioned on the basis of volume of production, the cost will be more if sales volume is less and vice-versa. The increase or decrease in sales volume is dependent on price. Thus it is a vicious circle- cost plus mark up is based on sales volume & sales volume is based on price.

**II. Rate of Return Pricing**

Rate of return pricing is used when each division is treated as an Investment Centre.

Determination of return on capital employed is one of the most crucial aspects in price fixation and performance evaluation of Investment Centres.

The firm should determine an average mark-up on cost, which is necessary to produce a desired rate of return on its investment.

The issues to be considered are:

- Basis on which the capital employed is computed
- Components to be covered in the return on capital
- Fairness of the rate or return.

The fairness of the rate of return varies from industry to industry and from time to time and is primarily dependent on the risks involved. In following fair rate of return, the desirability of earning adequate profits to plough back into business should be kept in mind.

It would be correct to assume that allowing the industry to earn adequate return on the capital employed would attract additional capital and increase the number of factories and production of all commodity which must ultimately lead to competition and reduction in costs and prices.

**III. Variable Costs Pricing**:

Selling prices are fixed above variable costs in order to generate contribution. However, in the short run, selling prices may be equal to variable cost or sometimes even below variable cost. Some illustrative situations are:

Products / Materials are perishable in nature.

Launch of new product at competitive prices.

Sales of old and defective stocks, seconds sales, etc.

Disposal of accumulated stocks, where market prices have fallen (to save carrying costs)

Sale of one product with reduced margin, to boost sales of other products having higher profit margin.

**IV. Pricing above marginal cost, but below total cost.**

In periods of recession, a firm may sell its articles at a price less than the total cost but above the marginal cost for a limited period. The advantages of this policy arise due to avoidance of shut-down. Thus the benefits are:

The firm can continue to produce and use the services of skilled employees who are well trained and will be difficult to re-employ later if discharged.
Plant and machinery can be prevented from deterioration through idleness.
The firm would be ready to take advantage of improved business conditions later.
The firm can continue in the market and reduce loss of market share to Competitors.

Such pricing policy is **necessarily restricted to the short run**. When business conditions improve in the long run, such pricing below total cost but above marginal costs is not advisable.

**V. Differential selling prices:**

Use of differential selling price, which is above marginal cost but below total cost is primarily intended to absorb surplus capacity. It can be achieved in any of the following ways:

**Different Markets – Export Pricing:** The firm producing a branded article may use the surplus capacity to produce the same article to be sold above variable cost in a different market, e.g. export sales. The articles sold in the home market will recover all fixed expenses. Since price reduction in the home market is injurious to the normal sales, it is not resorted to. Any reduction in the selling prices in the export market will not affect the price prevailing in the home market.

**Different products:** The firm may produce and sell one product, which covers the entire fixed overheads and use the surplus capacity to produce another product, which may be sold at a price above its marginal cost. The overall profitability will thus increase. The manufacture of the second product should be confined to surplus capacity and it should not have the possibility of becoming a major product at the low price at which it is sold. If it becomes so, there will be a reduction in profit.

**VI. Competitive Pricing:**

When a company fixes its price mainly on the consideration of what its competitors are charging, its pricing policy is called Competitive Pricing or competition-oriented pricing.
The company need not charge the same price as charged by its competitors. But under such a pricing method the Company keeps its prices lower or higher than its competitors by a certain percentage.
Competitive price so determined does not maintain a rigid relation between its price, cost or demand.
The Company's own costs or demand may change, but it will maintain its price because its competitors maintain their prices. Conversely, the Company will change its price when its competitors change their price, even if its own costs or demand have not altered.
The different types of competitive pricing are
Going rate pricing
Sealed bid pricing

**VII. Incremental pricing:**

Incremental pricing involves comparison of the impact of decisions on revenues and cost. If a pricing decision results in a greater increase in revenue than costs, it is favourable. It also means that consideration is being given to other objectives of the business. Thus profitability

can be set as the matter of primary consideration and then the decision can be adjusted to bring it in consonance with the other decision of the business.

Incremental pricing analyses all aspects of decision-making as listed below:

**Relevant Cost Analysis**: This technique considers changes in costs rather than in average cost. Overhead allocations are irrelevant. Incremental revenue inflows and cost outflows are included for decision-making.

**Product-Line Relationship Analysis:** This technique necessitates consideration being given to possible complementary relations in demand. Sale of one product may lead to the sale of a complementary product. This overall effect on profitability has to be evaluated.

**Opportunity Cost Analysis:** the incremental revenue should cover the opportunity cost and also generate surplus. A price which results in an incremental revenue which in turn merely covers the incremental costs is not sufficient. If the opportunity foregone is greater than incremental revenue, the decision is not sound.

**Time Factor Analysis:** The decision should take into account the short run and long run effects. A high price may increase its immediate profits but may lead to loss of revenue in the long run owing to competitors snatching the business

**CVP Analysis:** In fixing prices, consideration should be given to price volume relationship. The responsiveness of the market to the price should be such that the volume is increased to achieve full utilization of plant capacity.

**Risk Analysis:** Consideration should also be given to the evaluation of uncertainty and risk factor. The decision taken should be able to maximize the expected value based on probability theory.

**VIII. New Product Pricing:**

New Product Pricing is generally a difficult decision because of the uncertainty involved in the estimation of their demand. For determining optimal prices, the following procedure may be adopted by a firm.

**Market Survey:** Experimental sales are conducted in different markets using different prices to see which price is suitable. For example, choose three different markets and by using the same amount of sales promotional activities, ascertain what is the right price.

**Price Volume Relationship:** The relationship between price and volume should be ascertained, using the concept of elasticity of demand. The extent of volume increase due to price reduction and vice-versa, can be reasonably quantified through such analysis.

**Incremental Contribution Approach:** For decision making, the firm should adopt the incremental contribution approach i.e. additional total contribution from additional sales quantity. The firm can increase its prices as long as there is further incremental contribution. Such analysis may prove that the highest prices yielding the largest unit contributory margin need not necessarily maximize the profits. A lower price may well go to maximize the profits.

## PRICING STRATEGIES

Pricing strategy is defined as a broad plan of action by which an organization intends to reach its goal. Some illustrative strategies are:

Expanding product lines that enjoy substantial brand equity.
Offer Quantity discounts to achieve increase in sales volume.

Some types of pricing strategies, which a firm can adopt are:

Market entry Strategies – New Product Pricing – **Skimming or penetration Pricing**
Discount Strategies – Differentials and discounts to Dealers, Distributors and Customers etc.
Price Discrimination Strategies – based on customers, time, product version etc.
Geographic Pricing Strategies

**a) Skimming Pricing Strategy:**

It is a policy of **high prices** during the early period of a product's existence and in the later years the prices are gradually reduced. It is an attempt to exploit those segments of the market that are relatively insensitive to price changes. For example, high initial price may be charged to take advantage of the novelty appeal of a new product when the demand is initially inelastic. It offers a safeguard against unexpected future increase in costs, or a large fall in demand after the novelty appeal has declined. This policy **should not be adopted when the substitutes are already available in the market**.

The reasons for following such a policy are:

1. **Inelastic Demand:** The demand is likely to be inelastic in the earlier stages till the product is established in the market. The firm can take advantage of high prices.

2. **Sales Boost:** The change of high price in the initial periods serves to skim the cream of the market that is relatively insensitive to price. The gradual reduction in price in the later years will tend to increase the sales.

3. **Assured Profit:** This method is preferred in the beginning because in the initial periods when the demand for the product is not known the price covers the initial cost of production. Contribution is guaranteed.

4. **Cost Revenue Matching:** High initial capital outlays, needed for manufactures, results in high cost of production. Also, the manufacturer has to incur huge promotional activities resulting in increased costs. High initial prices will be able to finance the cost of production. Gradually, the economies of scale and savings in costs are passed on to customers.

**b) Penetration Pricing Strategy**

It is a policy of using a **low price** as the principal instrument for penetrating mass markets early.

This method is **used for pricing a new product** and to popularize it initially.

Profits may not be earned in the initial stages. However, prices may be increased as and when the product is established and its demand picks up.

The low price policy is introduced for the sake of long-term survival and profitability and hence it has to receive careful consideration before implementation. It needs an analysis of the scope for market expansion and hence considerable amount of research and forecasting is necessary before determining the price.

The circumstances in which penetrating Pricing can be adopted are:

**Elastic demand:** The demand of the product is high, when price is low. Hence lower prices mean large volumes and hence more profits.

**Mass Production:** When there are substantial savings in large-scale production, increase in demand is sustained by the adoption of low pricing policy.

**Frighten off competition:** The prices fixed at a low level act as an entry barrier to the prospective competitors. The use of this policy by existing concerns will discourage the new concerns to enter the market. This pricing policy is also know as "stay-out-pricing"

## PARETO ANALYSIS

**Meaning:**

PARETO ANALYSIS is a rule that recommends focus on the most important aspects of the decision making, in order to simplify the process of decision –making.

It is based on the 80:20 phenomenon, first observed by Vilfredo Pareto, an Italian economist. He noticed that 80% of the wealth of Milan was owned by 20% of its citizen. This pattern of 80:20 or approximations like 70:30 can be observed in many different business situations.

The management can use it in a number of different circumstances to direct management attention to the key control mechanism or planning aspect. It helps to clearly establish top priorities and to identify both profitable and unprofitable targets.

**Usefulness of Pareto Analysis:** Pareto analysis is useful to

Prioritize problems, goals and objectives.
Identify root causes
Select and define key quality improvement programs.
Select key customer relations and service programs.
Select key employee relations improvement programs.
Select and define key performance improvement programs.
Maximize research and product development time.
Verify operating procedures and manufacturing processes
Sales/distribution of Products or services.
Allocate physical, financial and human resources.

**Situations where Pareto Analysis can be applied:**

Pareto analysis is applicable in the presentation of Performance Indicators data through selection of representative process characteristics that truly determine or directly or indirectly influence or conform the desired quality or performance result or outcome. It is generally applicable to the following business situations:

**1. Product Pricing**

- Where a company sells a number of products, it may not be possible to analyse cost-volume-price- profit relationships for all products.

- Pareto Analysis is used for analyzing the firm's estimated sales revenues from various products and it might indicate that approximately 80% of its total sales revenue is earned from about 20% of its products.
- This helps top management to delegate the pricing decision for approximately 80% of its products to the lower managerial levels. Top management can concentrate on pricing decisions for the important 20% products, which are essential for the company's survival.
- Sophisticated pricing methods can be adopted for the important products while for other products cost based pricing methods may be used.

**2. Customer profitability Analysis:**

- The modern business thinking is to recognize the customer and satisfy his requirements. Hence instead of analyzing products, customers can be analysed for their relative profitability to the organization.
- It is often found that approximately 20% of customers generate 80% of the profits.
- Such analysis is useful for evaluation of the portfolio of customer profile, and decision making such as whether to continue serving a customer group, what is the extent of promotion expenses to be incurred etc.

**3. ABC Analysis – Stock Control:**

Raw material stock control, it is found that only a few of the goods in stock make up most of the value.

About 70% of the materials value is due to high priced materials which constitute only 20% of the quantity.

These materials are classified into A, B and C categories based on their importance. Control is directed primarily over 'A' category items by setting EOQ, Stock levels, Surprise Stock Verification procedures etc.

The outcome of such analysis is that by concentrating on small proportion of stock items that jointly accounts for 80% of the total value, a firm will be able to control most of the monetary investment in stocks.

**4. Activity Based Costing**

Activity Based Costing involves the identification of cost drivers for various items of Overhead expenses.

Generally, 20% of the firm's cost drivers are responsible for 80% of the total cost.

By analyzing, monitoring and controlling those cost drivers that attribute to high costs, a better control and understanding of overhead will be obtained.

**5. Quality Control**

- Pareto analysis can be extended to discover from an analysis of defect report or customer complaints which 'vital few' causes are responsible for most of the reported problems.
- Generally 80% of reported problems are traceable to 20% of the underlying causes. By concentrating one's efforts on rectifying the vital 20%, one can have the greatest immediate impact on product quality.
- Pareto Analysis indicates how frequently each type of failure (defect) occurs. The purpose of the analysis is to direct management attention to the areas where the best return can be achieved by solving most of quality problems, perhaps just with a single action.

## Questions from past examinations:

**Q. 1**
Write Short Notes on Penetration Pricing. (May 1995) (5 marks)

**Answer:**
Refer page 41

**Q. 2**
What is meant by cost plus pricing? (November 1997) (4 marks)

**Answer:**
Refer page 36 (First paragraph only)

**Q. 3**
Write Short Notes on Skimming pricing policy and at which situation it should be exercised? (May 1998 / May 2002 / November 2004) (6 marks / 4 marks)

**Answer:**
Refer page 41

**Q. 4**
What is penetration pricing? Enumerate the circumstances, which are favourable for the adoption of penetration pricing policy. (May 1999 / May 2001 / May 2003) (4 marks)

**Answer:**
Refer page 42

**Q. 5**
Explain the concept of cost plus pricing? What are its advantages and disadvantages? (May 2000) (8 marks)

**Answer:**
Refer page 36

**Q. 6**
Explain the usefulness of Pareto analysis and its applicability to business situations. (November 2003) (4 marks)

**Answer:**
Refer page 42

# CHAPTER 7 - COSTING OF SERVICE SECTOR

Services sector companies provide their customers with services or intangible products. The activities of service sector may be used for both: (i) Provision of services to outside customers (ii) Provision of services internally. The types of service that may be provided, by service sector are of diverse nature and they have their own peculiarities, requirements, different cost accounting treatment but the general principles of costing discussed in earlier chapters relating to manufacturing sector will also apply to service sector.

***Question I:***

**Mention the main characteristics of service sector.**

**MAIN CHARACTERISTIC OF SERVICE SECTOR:**

1. **Activities are labour intensive:** The activities of service sector generally are labour intensive. The direct material cost is either small or non-existent. For example, cost of stationery used by a professional consultant for expressing an opinion in back and white, for a client will be small or even non-existent in case he gives verbal opinion. In the preceding example direct labour cost content of a service is significant.

2. **Cost-unit is usually difficult to define:** The selection of cost unit usually, for service sector is difficult to ascertain as compared to the selection of cost unit for manufacturing sector. The following table provides some examples of the cost units for service sector.

| (A) | **To External Customer** | **Cost Unit** |
|---|---|---|
| | (i) Hotel | Bed nights available, Bed night occupied |
| | (ii) School | Student hours, Full time students |
| | (iii) Hospital | Patient per day, Room per day |
| | (iv) Accounting firm | Charged out client hours |
| | (v) Transport | Passenger km., quintal km. |

| (B) | **Internal Services** | **Cost Unit** |
|---|---|---|
| | (i) Staff canteen | Meals provided, No. of staff |
| | (ii) Machine maintenance | Maintenance hours provided to user department |
| | (iii) Computer department | Computer time provided to user department |

3. **Product costs in service sector:** Cost are classified as product or period costs in manufacturing sector for various reasons. These are:

To determine the unit manufacturing costs so that inventories can be valued and selling prices created and verified.
To report production costs on income statement
To analyse costs for control purposes.

***Question II:***
***What are the differences between manufacturing and service sector.***

1. The difference between manufacturing and service sector is that in service sector there is **no physical product** that can be stored, assembled and valued. Services are rendered and cannot be stored up or placed in a vault.

2. In service sector the **cost of material is insignificant**.

3. For computing unit cost of services the **most important cost** would be professional's **labour cost**.

4. The direct labour cost is traceable to service rendered.

5. In addition to labour cost the service sector like manufacturing sector incurs various overhead cost. In service sector those overhead costs, which are incurred for offering a service, are classified as **service overheads** (like factory overhead in manufacturing sector).

6. Examples: Rendering a loan service, representing someone in court of law or selling an insurance policy are typical services performed by professionals.

***Question III:***
**How is cost data collected in service sector?**

**COLLECTION OF COSTING DATA IN SERVICE SECTOR**

1. **Classification:** Costs are accumulated under various heads for control purpose and for decision making.

2. **Grouping:** Costs are then grouped under fixed costs and variable costs.

3. **Put in a particular format:** They are then put in a format, which depends upon the nature of industry and the need of the management.

4. **Period:** For preparing a cost sheet under operating costing, costs are usually accumulated for a specified period viz. a month, a quarter or year etc.

5. **Composite cost units:** Often composite cost units such as passenger km, bed, nights etc. are used by these organizations for ascertaining the cost of these services respectively. Since there is no

***Question IV:***
***Discuss the different costing methods that are used in service sector.***

**Different costing methods used in service sector:**

**Job Costing method:** In job costing method the cost of a particular service is obtained by assigning costs to a distinct identifiable service. In service sector like Accounting firm, Advertising campaigns etc. job costing method is used.

**Process Costing method:** In process costing system the cost of a service is obtained by assigning costs to masses of similar unit and then computing unit cost on an average basis. Retail banking, Postal delivery, Credit card etc. uses process costing method.

**Hybrid costing method:** Many companies uses a method of costing which is neither job costing nor process costing method. They in fact uses a hybrid costing method which combines elements of both job costing and process costing methods.

***Question V:***
***Write a note on Job costing method in service sector.***

**Job costing method in service sector:** The two costs, which are incurred in service sectors, are:

Direct labour
Service overheads

For ascertaining the price of a service provided by service sector if job-costing method is followed, the costs for each job are to be monitored continuously. There are two main uses of this job costs information:

1. To guide decisions on job pricing
2. To assist in cost planning and cost control

The five steps, which are generally adopted for assigning costs to individual jobs, are as follows:

1. **Identify the job that is chosen as cost object** : For instance, litigation work for Motorola India Ltd. By Dua & Associates by assuming that work requires 100 budgeted hours of professional labour.

2. **Identify the direct cost categories for the job** : In the above example the professional hours required for doing litigation work is a direct cost.

3. **Identify indirect costs (overheads) associated with the job**: This step requires identifications of indirect costs incurred for providing services. These costs may include the costs of support labour, computer time, travel, telephone/fax machine, photocopying etc.

4. **Select the cost allocation base to be used in assigning each indirect cost to the job :** This step requires the selection of cost allocation base that has a cause and effect relationship between changes in it and changes in the level of indirect costs. The allocation base suitable for allocating indirect cost of law firm is professional labour hours.

5. **Identify the rate per unit of the cost allocation base used to allocate cost to the job**: The budgeted indirect cost allocation rate is computed by using following formula.

***Question VI:***
***Write a note on Customer Costing in service sector.***

**Customer Costing in service sector:** The customer costing is a new approach to management. The theme of this approach is customer satisfaction. In some service industries such as public relations, the specific output of industry may be difficult to identify and even more difficult to quantify. Further where there are multiple customers, identifying support activities i.e. common costs with particular customer may be more problematic. In such cases, it is important to cost customers. An ABC analysis of customers profitability provides valuable information to help management in pricing customer. Consider a banking sector A bank's activities for customer will include the following types of activities. These are :

(i) Stopping a cheque
(ii) Withdrawal of cash
(iii) Updation of pass book
(iv) Issue of duplicate pass book
(v) Returning a cheque because of insufficient funds
(vi) Clearing of a customer cheque.

Different customers or categories of customers use different amount of these activities and so customer profiles can be build up and customer can be charged according to the cost to serve them.

**For example:**

1. In Computer Institute the cost of providing a course for enrolled students may be determined by a variety of factors, such as type of course (Oracle or Java) and the level of course (introduction or advanced).

2. A hotel may have activities that are provided for specific types of customers such as well laid gardens, swimming pool and a bar. Older guest may appreciate and use the garden, families the swimming pool and business guests the bar. If the activities are allocated to relevant guest a correct cost per bed occupied can be calculated for each type of category.

For customer costing purpose, the costs are divided into following categories. These are

1. **Customer Specific costs:** These are direct and indirect cost of providing service to customer plus customer related cost assigned to each customer. For example cost of express courier service to a client/customer who requests overnight delivery of some agreement.

2. **Customer-line categories:** These are the cost which are broken into the broad categories of customers and not individual customer.

3. **Company costs:** These are those costs which are not allocated to either customer line or individual customers but charge to company. The example is the cost of advertisement to promote sale of service.

***Question VII:***
***Write a note on pricing by service sector.***

**PRICING BY SERVICE SECTOR**

1. The service sector follows a different approach for pricing their service. Although a service has no physical existence it must be priced and billed to customers.

2. Most service organizations use a form consisting of time and material pricing to arrive at the price of a service.

3. Service companies such as appliance repair shops, automobile repair business calculate their prices by using two computations, one for labour and other for materials and parts.

4. A mark up percentage is used to add the cost of overhead to the direct cost of labour, materials and parts. If materials and parts are not part of service being performed, then only direct labour costs are used as basis for determining price.

5. For professionals such as accountants and consultants direct labour costs and apportioned overhead and indirect costs are considered for pricing.

## Questions from past examinations:

**Q. 1**
Explain pricing by service sector. (November 2003) (3 marks)

**Answer:**
Refer Question VII

# CHAPTER 8 – TRANSFER PRICING

Transfer price is the price which one unit (segment, department, division etc.) of an organization charges for a product supplied or service rendered to another sub-unit of the same organization. Transfer price creates revenues for the selling sub-unit (Transferring Division) and purchase costs for the buying sub-unit (Recipient Division), affecting each sub-unit's operating income.

The product transferred between sub-units of an organization is called intermediate product. It can either be processed further for final sale by the Recipient Division or, if transferred from production to marketing, resold as such, to an external customer.

**Objectives of Transfer Pricing:**
The main objectives of intra-company transfer pricing are:

1. **Overall Company Profitability:** The focus of transfer pricing is to foster a commercial attitude in the managers who are in charge of profit centres. This objective compels the units to improve their profit position. Improvement in each sub-unit's profit results in overall company profitability.

2. **Full Capacity Utilisation:** There may be certain divisions that have spare capacity. Such divisions should be motivated to utilize their balance capacity in the optimal manner. The focus is to optimize the profit of the concern over a short period of time, by stressing on maximum utilization of plant capacity.

3. **Optimum Resource Utilisation:** The resources of the Company, whether they are abundant or scarce, have to be used in the most optimal manner. This is a long term objective. The allocation of resources is based on relative performance of various profit centres, which in turn are influenced by transfer pricing policies.

**Methods of Transfer Pricing:**

The various methods of transfer pricing can be classified into:
Cost Based Transfer Pricing, i.e, Cost or any variant of cost, with or without mark-up, for example:
   a. Variable Manufacturing Cost
   b. Full Manufacturing Cost
   c. Total Cost (Actual)
   d. Standard Cost

Market Price based Transfer Pricing
Bargained or Negotiated Transfer Pricing.

**1. Cost Based Transfer Pricing:**

**a) Variable Manufacturing Costs:**

| Merits | Demerits |
|---|---|
| • Simple to understand.<br>• Easy to operate<br>• No negative contribution to Transferring division | • Costs and prices fluctuate from time to time. Hence, transfer prices also vary.<br>• No contribution for transferring |

| | |
|---|---|
| • Suitable if transferring division has sufficient spare capacity and intermediate product is not marketable. | division, since only variable manufacturing cost is recouped.<br>• Not suitable for performance evaluation.<br>• Does not consider opportunity costs and losses.<br>• Not suitable for transferring divisions which operate at full capacity. |

**b) Full Manufacturing Cost:**

| Merits | Demerits |
|---|---|
| • Simple to understand.<br>• Easy to operate<br>• Guaranteed contribution to transferring division, to the extent of Fixed Manufacturing Costs.<br>• Ideal if transferring division has sufficient spare capacity, and intermediate product is not marketable. | • Costs and prices fluctuate from time to time. Hence, transfer prices also vary.<br>• Not suitable for performance evaluation of transferring division.<br>• Does not consider opportunity costs and losses.<br>• Not suitable for transferring divisions which operate at full capacity. |

**c) Total Actual Costs:**

| Merits | Demerits |
|---|---|
| • Simple to understand.<br>• Easy to operate<br>• Guaranteed contribution to transferring division, to the extent of Fixed Costs. Usable if transferring division has sufficient spare capacity, and intermediate product is not marketable. | • Actual Costs fluctuate from time to time.<br>• No suitable for performance evaluation of transferring division.<br>• Does not consider opportunity costs and losses.<br>• Not suitable for transferring divisions which operate at full capacity.<br>• Cost efficiency of transferring division may mean lower prices, hence no incentive for cost reduction. |

**d) Standard Costs:**

| Merits | Demerits |
|---|---|
| • Simple and easy to operate when compared to actual cost based methods.<br>• Inventories are carried at standard costs in transferring and receiving divisions. | • The transferring division usually absorbs variances and hence segment-wise performance evaluation is not possible.<br>• Does not consider opportunity costs and losses. |

**Cost Plus mark-up:** Under this method, the transfers are made at Cost + Mark-up basis. Cost may be any variant i.e. Variable Manufacturing Costs or Full Manufacturing Costs or Total Cost (Actual) or Standard Costs.

Mark-up added to cost may be expressed either (1) as a percentage of full cost or (2) as a percentage of capital employed.

**2. Market Price based methods**

Under this method, the transfer prices are based on market prices. The major **merits** of this method are:

a. **Maximum Prices**: In a competitive market, goods/services cannot be transferred to its users at a higher price. Hence market prices constitute the basis for efficient production.

b. **Demand and Supply Forces**: Market prices take into account, the forces of demand and supply. If intermediate products are freely saleable, in the long run, market prices will provide a good indicator of the overall efficiency of the various divisions.

c. **Opportunity Cost Recovery**: Opportunity costs of transferring divisions are fully recovered. Hence there is sufficient incentive for internal transfer, for transferring divisions operating at full capacity.

d. **Objective:** Market prices provide reliable measures of divisional income because these prices are established independently rather than by individuals who have an interest in the results.

The major **demerits** of this method are:

a. **Availability of Market Prices:** There may be difficulty in obtaining just / fair market prices. Sometimes, the intermediate product may not be saleable; in other cases direct market substitutes may not be available for products, which are manufactured only for internal consumption.

b. **Impact of S&D Costs:** There may be difficulties in determining the elements of Selling and Distribution costs such as commission, discounts, advertisement and sales promotion etc. so that necessary adjustment may be made in the market price to provide benefit of these expenses, to the recipient Division.

c. **Unjust Enrichment:** Market Prices lead to unjust enrichment of the transferring division, particularly if the former has sufficient spare capacity and the intermediate is not freely salebale externally.

**3. Negotiated Transfer Prices**

Negotiated Transfer Pricing refers to the determination of transfer prices based on active participation, involvement, co-ordination and agreement of the managers of the transferring and recipient divisions. In this method each decentralized unit is considered as an independent unit. Such units decide the transfer price by, negotiations or bargaining.
Divisional Mangers have full freedom to purchase their requirement from outside if the prices quoted by the transferring division are not acceptable to them.

**Advantages:**

1. **Proper Decision Making:** Negotiated prices lead to business like attitude amongst divisions of the company. The buying division may purchase from outside sources if the outside prices are lower than the internal division's price.

2. **Autonomy and Motivation Value:** Each sub-unit is considered as an independent unit. Buyers and Sellers are completely free to deal outside the Company. This promotes sub-unit autonomy and motivates managers.

3. **Overall Company Profitability:** Through properly direct negotiations, managers will be able to determine the appropriate transfer prices that satisfy the requirements of the divisions and is in the best interest of the Company as a whole.

**Limitations:**

1. **Sub-optimal**: The agreed transfer price may depend on the negotiating skills and bargaining powers of the managers involved. The final result may not always be optimal.

2. **Conflicts**: Rather than agreement on transfer prices, negotiations can lead to conflict between divisions and may require top-management mediation.

3. **Defeat of Performance evaluation criteria**: Transfer prices dependent on manager's negotiation skills will defeat the very purpose of performance evaluation.

4. **Time and Cost:** Negotiations are time consuming for the manager involved, particularly when the number of transactions and interdependencies are large.

In order to have an effective system of transfer pricing; the following points should be kept in view;

Price of all transfer in and out of a profit centre should be determined by negotiation between the buyer and the seller.
Negotiations should have access to full data on alternative source and markets and to public and private information about market prices.
Buyers and sellers should be completely free to deal outside the company.

**Criteria for setting Transfer Prices**

**Goal Congruence:** Transfer prices should help in achieving the organisation's goals and objectives as a whole, thereby promoting goal congruence. This will happen when actions that divisional managers take to improve the reported profit of their divisions also improves the profit of the company as whole.

**Management Effort:** Transfer prices should aid in accomplishing the Company's strategies and in the promotion of a bolstered management effort to accomplish the same. Top mangement's initiative and active co-ordination is essential.

**Segment performance Evaluation:** The selection of transfer pricing system should necessarily facilitate the top management of an enterprise to evaluate the performance of the individual sub-units and their respective leads.

**Sub-unit autonomy:** Transfer prices promote the autonomy of the sub-units in decision making. Thereby the sub-unit heads should be left on their own to transact with outside agencies or with other sub-units of the organization to maximize their profit. Divisional autonomy should not be undermined.

**Motivation Value:** The transfer pricing system should provide information that motivates divisional manages to make good economic decisions.

**Analysis of the impact of various transfer pricing methods:**

| Criteria | Cost Based | Market Price Based | Negotiated |
|---|---|---|---|
| Achieves Goal Congruence | Often, but not always. | yes, if markets are competitive | Yes |
| Useful for evaluating sub-unit performance | Difficult, unless transfer price exceeds full costs | Yes, if markets are competitive | Yes, but transfer prices are affected by bargaining strengths. |
| Motivates management effort | Yes, if based on budgeted costs; less incentive to control costs if transfers are based on actual costs. | Yes | Yes |
| Preserves sub-unit autonomy | No, since it is rule-based | Yes, if markets are competitive | Yes, because it is based on negotiations between sub-units. |
| Other factors | Useful for determining full cost of products and services | No market may exist or markets may be imperfect or in distress. | Bargaining and negotiations take item and may, need to be reviewed repeatedly as conditions change. |

**General guidelines for setting Transfer Prices:**
An effective Transfer Pricing system should be based on negotiations and agreement between divisional managers. For this purpose, a range of transfer prices, i.e. minimum transfer price to maximum transfer price may be used for preliminary negotiations.

**Minimum Transfer Price**: The relevant cost analysis used in decision-making while dealing with outside parties, can also be extended to intra-company transfer pricing. For this purpose, the following guideline (formula) can serve as the Minimum Transfer Price:

**Minimum Transfer Price** = Incremental Costs upto the point of Transfer + Opportunity costs.
Incremental Costs = Additional costs of producing and transferring the products or services
= Variable Costs + Fixed Costs, if specific to such transfer
[Selling and Distribution Costs, not incurred for internal transfers are not included]

Opportunity Costs = Contribution foregone by the transferring division, if the products or services are transferred internally.

It should be noted that opportunity costs arises only if.
Transferring Division produces and sells marketable products; and
Transferring Division Operates at full capacity

**Maximum Transfer Price:** The maximum limit for transfer prices may be determined by any of the following:

Market Price, since this represents the fair value in exchange, based on market forces.
Purchase Cost. i.e. Market Price + Buying Costs, since the recipient division would have to incur this cost if the products are procured externally.

Recipient Division's ability to pay, for example, if the recipient division sells the final product at Rs.100 after incurring incremental costs of Rs.15 in its own division it will be prepared to pay maximum of Rs.85 for the intermediate product.

The transfer price may be determined by negotiations between divisional managers, subject to the range of minimum to maximum prices. The range of transfer prices as given above must be adhered to since:

- Transferring Division has no incentive to transfer at any price below the minimum, as its incremental costs and opportunity costs may not be fully recovered.
- Recipient Division has no incentive for internal purchase, at any price above the maximum, as outsourcing may be beneficial to such division.

**Transfer Pricing conflicts between division and company as a whole**

**Objective and conflicts:**
The criteria for fixing transfer prices are (a) Goal Congruence in decision-making, (b) Management Effort (c) Segment Performance Evaluation and (d) Sub-unit autonomy and motivation value. However, no single transfer price can serve all of those criteria. They often conflict and managers are forced to make trade-offs.

**Some situations of conflicts between objectives are:**

**Goal Congruence vs. Performance Evaluation:** The transfer price that leads to the short-run optimal economic decision is relevant cost. If the transferring division has excess capacity, this cost will be equal to variable cost only (since opportunity costs are Nil) The transferring divisions will not recover any of its fixed costs when transfers are made at variable costs and will therefore report a loss.

**Goal Congruence vs. Divisional autonomy:** In case of failure of a division to achieve the objective of 'goal congruence' the management of the company may dictate their 'transfer price' If a transfer price is imposed on the manager of the supplying division, the concept of divisional autonomy and decentralization is undermined.

**Performance Evaluation vs. Profitability:** A transfer price that may be satisfactory for evaluating divisional performance may lead to make sub-optimal decisions when viewed from the overall company perspective.

**Conflicts between Divisions and Company as a whole:**
If divisional managers are given "absolute free hand" in decision making on transfer prices, there is a possibility that divisional goals may be pursued, ignoring overall company interest. This may force the top management to interfere in decision making. However, interference of top management and "dictating a transfer price" on the divisions is usually the main basis of conflict between a division and the company as a whole.

**Proposals for resolving transfer pricing conflicts:**
To resolve the transfer pricing conflicts the following transfer pricing methods can be suggested:

Dual-rate transfer pricing system
Two part transfer pricing system

**Dual-rate transfer pricing system:**
Dual-rate transfer pricing uses two separate transfer prices to price each inter-divisional transactions.

**Full Cost plus Mark-up:** The transferring Division may receive the full cost plus a mark-up on each transaction. This price is intended to approximate the market price of the goods or services transferred. The mark-up provides the transferring division with sufficient contribution to recover its fixed costs and report profits. The price will be used, even if the intermediate product is not marketable.

**Marginal Cost:** The Recipient Division may be charged at the marginal cost of the transfers. Alternatively, the relevant costs (variable plus opportunity costs) may be substituted for the marginal costs. The use of relevant costs will automatically lead into optimal decision making from the company's view point.

Under this method, Company Profits = Sum of divisional profits less inter-divisional mark up.

**Advantages:**

**Incentive to Transferring Division**: The transfer price will meet the performance evaluation requirements of the transferring division since each unit transferred generates a profit (due to mark-up). Thus the supplying division manger is motivated to transfer the intermediate product internally.

**No unjust Enrichment:** If the transfer price is set at the transferring division's marginal cost of the intermediate product, it will not have any contribution from the internal transfers. All the total contribution from inter-divisional trading will be assigned to the Recipient division. Such unjust enrichment is avoided thought he use of mark-up.

**Optimal Decisions:** Since relevant cost analysis is used as the second transfer price, the transfer pricing system automatically promotes goal congruence by leading to optimal decisions.

**Disadvantages:**

1. **Confusing:** The use of different transfer prices causes confusion, particularly when more than two divisions are involved.

2. **Artificial:** Dual Transfer Prices are considered to be artificial.

3. **No incentive:** Fixed price with mark-up protects transferring divisions from competition. It reduces divisional incentives to compete effectively and give them little incentive to improve their productivity.

4. **Misleading:** Dual Transfer prices can result in misleading information and create a false impression of divisional profits. There is a possibility of double-counting of profits. At the extreme, all divisions may report profits when the company as a whole is losing money.

**Two part transfer pricing system**

- This is another method of resolving transfer pricing disputes between divisions and the Company as a whole.
- Under this method, Transfer price = Marginal Cost + Lump-sum Fixed Fee
- This method is most suited when there is no market for the intermediate product, and the transferring division has no capacity constraints.

- The Transferring Division is provided with sufficient incentive for internal transfer, since marginal costs are fully recovered and the lump-sum fee received will reduce it's losses by recovering fixed costs.
- The Recipient Division is also interested in the internal procurement since the transfer price will be less than market price or cost of alternative option like outsourcing etc. Moreover, the lump-sum fixed fee constitutes a commitment if the divisions to utilize a portion of the capacity of the transferring divisions, for an agreed compensation.

## Questions from past examinations:

**Q. 1**
In transfer pricing what is common conflict between a division and the company as whole.
**OR** "Transfer pricing is a widely debated and contested topic." – Discuss.
(May 1997 / November 1999) (6 marks)

**Answer:**
Refer page 51

**Q. 2**
Enumerate and briefly explain any three methods of determining transfer pricing. (May 1998) (6 marks)

**Answer:**
Refer page 46

**Q. 3**
What should be the basis of transfer price, if unit variable cost and unit selling price are constant. (November 1999) (4 marks)

**Answer:**
If unit variable cost and unit selling price are constant then the main problem that would arise while fixing the transfer price of a product would be as follows:

There is an optimum level of output for a firm as a whole. This is so because there is a certain level of output beyond which its net revenue will not rise. The ideal transfer price under these circumstances will be that which will motivate these managers to produce at this level of output.

Essentially, it means that some divisions in a business house might have to produce its output at a level less than its full capacity and in all such cases a transfer price may be imposed centrally.

**Q. 4**
Enumerate the main objectives of transfer pricing. (November 2002) (3 marks)

**Answer:**
Refer page 46

**Q. 5**
Outline the limitations of negotiated method of transfer price. (May 2003) (4 marks)

**Answer:**
Refer page 49

# CHAPTER 9 -TARGET COSTING

***Question I:***
***Define Target Costing. Briefly explain the steps involved in target costing approach to pricing.***

**Meaning**

Target Costing is defined as "a structured approach to determine the cost at which a proposed product with specified functionality and quality must be produced, to generate a desired level of profitability at its anticipated-selling-price"

**Steps in Target Costing approach to pricing:**

1. **Setting of target selling price:**
   The setting of target selling price of a product which customers are prepared to pay, depend on many factors like design specifications of the product, competitive conditions, customer's demand for increased functionality and higher quality projected production volume, sales forecasts etc. A concern can set its target selling price after taking into account all of the aforesaid factors.

2. **Determination of target costs:**
   Target profit margin may be established after taking into account long-term profit objectives and projected volume of sales. On deducing target profit margin from target selling price, target cost is determined.

3. **Estimate the actual cost of the product:**
   Actual cost of the product may be determined after taking into account the design specifications, material cost and other costs required to produce the product.

4. **Comparison of estimated cost with actual cost:**
   In case the estimated cost of the product is higher than that of the target cost of the product then the concern should resort to cost reduction methods involveing the use of **Value Engineering / Value Analysis** tools.

***Question II:***
***Define Value Engineering and its scope. What are the issues that needs to be dealt with during a value engineering review.***

**VALUE ENGINEERING (VE)**

**Meaning**

**Value Engineering** or **Value Analysis** involves searching for opportunities to **modify the design** of each component or part of a product **to reduce cost**, but without reducing the functionality or quality of the product. It entails studying the activities that are involved in producing the product to detect non-value adding activities that may be eliminated or minimized to save costs, but without reducing the functionality or quality of the product.

**Scope**
Value Engineering and Value Analysis help identify costs into (a) Value-Added Cost and (b) Non Value-Added Cost. The objective is to retain (if possible, reduce) value-added cost, while totally avoiding or eliminating non-value added costs.

**Value-added cost**: A value-added cost is a cost that, if eliminated, would reduce the value or utility (usefulness) customers obtain from using the product or service.

**Non value-added cost**: A non value-added cost is a cost that, if eliminated would not reduce the value or utility customers obtain from using the product or service. It is a cost that the customer is unwilling to pay to the company.

**Some issues analysed during VE review are:**

**1. Elimination of unnecessary functions from the production process:**

- This involves a detailed review of the entire manufacturing process to see if there are any steps that add no value to the product, e.g. interim quality review before further processing and final quality check.
- By eliminating unnecessary or duplicate functions, the firm can reduce their associated direct or overhead costs from the total product cost.
- The possible repercussions of elimination of any intermediate production function should be carefully analysed. The engineering team must be careful to develop work-around steps that eliminate the need for the original functions.

**2. Elimination of unnecessary product qualities:**

- The product quality should be studied with reference to the nature of its use, longevity of product's useful life.
- If some unnecessary quality e.g. excessive degree of sturdiness in consumable item (as opposed to a durable item) can be eliminated, it should be done in order to save significant material and other product costs.
- However, visible reduction in durability or reliability cannot be stretched too far. Hence any designs that have had their structural integrity reduced must be thoroughly tested to ensure that they meet all design standards.

**3. Design Minimisation:**

- This involves the creation of a design that uses fewer parts or has fewer features.
- This approach is based on the assumption that a minimal design is easier to manufacture and assemble Also, with fewer parts to purchase, less procurement expenses is associated with the product.
- However, sometimes it would be less expensive to settle for a few extra standard parts that are more easily and cheaply obtained, rather than customised pre-fabricated parts, which complicate the assembly process.

**4. Better product Design to suit manufacturing process:**

- This is also known as Design For Manufacture and Assembly (DFMA) and involves the creation of a product design that can be created in only a specific manner. For example, a toner cartridge for a laser printer is designed so that it can be successfully inserted into the printer only when the sides of the cartridge are correctly aligned with the printer opening; all other attempts to insert the cartridge will fail.
- When used for the assembly of an entire product, this approach ensures that a product is not incorrectly manufactured or assembled, which would call for a costly disassembly or product recalls from customers who have received defective goods.

**5. Substitution of Parts:**

- This is also called as Component Parts Analysis. This approach encourages the search for less expensive components or materials that can replace more expensive parts currently used in a product design.
- Substitution of new parts is encouraged since new materials are being developed every year.
- However parts substitution must be accompanied by a review of related changes elsewhere in the design and the consequent impact on total costs.
- This also involves allied analysis on tracking the intentions of suppliers to continue production of parts in the future. If parts are not available, they must be eliminated from the product design.

**6. Combination of Steps:**

- Sometimes, a careful review of all processes associated with a product reveals that some steps can be eliminated, other steps can be consolidated, or that several can be accomplished by one person, rather than having people in widely disparate parts of the production process to perform them. This is also known as Process Centering.
- By combining steps, transfer and queue time can be eliminated from the production process, which in turn reduces the chances of damage during transfers.

**7. Search for better way of doing things:**

- This seeks to answer a basic question – is there a better way?
- It strikes at the core of the cost reduction issue. It is a more general attempt to start from scratch and build a new product or process that is not based in any way on pre-existing ideas.
- Improvements resulting from this technique tend to have the largest favorable impact on cost reductions but can also be the most difficult for the organization to adopt, especially if it has used other designs or systems for production.

***Question III:***
***Briefly describe the role of a firm's Suppliers in its Value Engineering or Cost Reduction drive.***

**Role of a firm's Suppliers in its Value Engineering or Cost Reduction drive**

Value Engineering also involves calling on the services of a company's suppliers to assist in the cost reduction effort. Suppliers of materials can have significant role in value engineering due to the following reason:

Suppliers can contribute information on enhanced types of technology of materials.
Suppliers specialize in areas that a company has no information about and can share product expertise.

- They may have also conducted extensive value engineering for the components they manufacture, resulting in advanced designs that a Company may be able to incorporate into its new products.
- Suppliers may have also redesigned their production processes, or can be assisted by a company's engineers in doing so, producing cost reductions or decreased production waste that can be translated into lower components costs for the company.

***Question IV:***
***Briefly explain Kaizen costing.***

## KAIZEN COSTING

Kaizen Costing refers to the ongoing continuous improvement program that **focuses on the reduction of waste** in the production process, thereby further lowering costs below the initial targets specified during the design phase. It is a Japanese term for a number of cost reduction steps that can be used subsequent to issuing a new product design to the factory floor.

The initial VE review may not be complete and perfect in all costs aspects. There may be further chances of waste reduction, cost and time reduction and product improvement. Such continuous cost reduction technique is call as kaizen Costing.

The review of product costs under the target costing methodology is not reserved just for the period up to the completion of design work on a new product. On the contrary, there are always opportunities to control costs after the design phase is completed, though these opportunities are fewer than during the design phase.

**Kaizen Costing Process**: Activities in kaizen costing include elimination of waste in production, assembly and distribution processes, as well as the elimination of work steps in any of these areas. Thus kaizen costing is really designed to repeat many of the value engineering steps for as long as a product is produced, constantly refining the process and thereby stripping out extra costs at each stage.

**Savings from Kaizen Costing**: The cost reductions resulting from kaizen costing are much smaller than those achieved with value engineering. But these are still significant since competitive pressures are likely to force down the price of a product over time, and any possible cost savings allow a company to still attain its targeted profit margins Mille continuing to reduce cost.

**Multiple Versions of Products - Continuous Kaizen Costing**: Multiple improved versions of products can be introduced to meet the challenge of gradually reducing costs and prices. The market price of products continues to drop over time, which forces a company to use both target and kaizen costing to reduce costs and retain its profit margin.

However, prices eventually drop to the point where margins are reduced, which forces the company to develop a new product with lower initial cost and for which kaizen costing can again be used to further reduce costs. This pattern may be repeated many times as a company forces its costs down through successive generations of products.

The exact timing to switch to a new product is easy to determine well in advance since the returns from kaizen costing follow a trend line of gradually shrinking savings. Since prices also follow a predictable downward track, plotting these two trend lines into the future reveals when a new product version must be ready for production.

***Question V:***
***What are the advantages of target costing?***

**Advantages of Target Costing:**

- **Innovation**: It reinforces top-to-bottom commitment to process and product innovation and is aimed at identifying issues to be resolved.

**Competitive Advantage**: It enables a firm to achieve competitive advantage over other firms in the industry. The firm, which achieves cost reduction targets realistically, stands to gain in the long run.

**Market Driven Management**: It helps to create a company's competitive future with market-driven management for designing and manufacturing products that meet the price required for market success.

**Real Cost Reduction**: It uses management control systems to support and reinforce manufacturing strategies and to identify market opportunities that can be converted into real savings to achieve the best value rather than simply the lowest cost.

***Question VI:***
***What are the limitations of target costing?***

**Limitations of Target Costing:**

a. **Time Factor**: The development process can be lengthened to a considerable extent since the design team may require a number of design iterations before it can devise a sufficiently low-cost product that meets the target cost and margin criteria.

b. **Responsibility for Cost Reduction**: A large amount of mandatory cost cutting can result in finger-pointing in various parts of the company, especially if the cost reduction targets are not equitably shared. For example the industrial engineering staff will not be happy it is required to completely alter the production layout in order to generate cost savings, while the purchase staff is not required to make any cost reductions through supplier negotiations. Strong inter-personal and negotiation skills are required on the part of the project manager, to avoid this problem.

c. **Co-ordination**: Having representatives from a number of departments on the design team can sometimes make decision-making difficult, as there are too many opinions regarding design issues. Resolving this difficulty requires a strong team manager, as well as a long-term commitment on the part of a company to weed out those who are not willing to act in the best interests of the team.

**Remedy:** The above problems can be set right by a good team, leader, who must have an exceptional knowledge of the design process, good interpersonal skills, and commitment to staying within both time and cost budgets for a design project.

***Question VII:***
***Briefly explain the Cost Accountant's role in a Target Costing Environment.***

**Cost Accountant's role in a Target Costing Environment:**

a. **Cost Estimation**: To provide other members of the design team a running series of cost estimates based on initial design sketch, activities based costing reviews of production processes, and "best guess" costing information from suppliers based on estimated production volumes.

b. **Permissible Cost Ranges**: To provide estimates within a high-low range costs, since preliminary data will necessarily be vague. However, this estimated cost range should be tightened as more information becomes available.

c. **Capital Budgeting Analysis**: To cater to capital budgeting requests generated by the design team based on types of equipment needed for the anticipated product design, product revenues and costs, rates of return etc. The Cost Accountant should also be able to answer questions regarding uncertainties and risk analysis.

d. **Cost Principles Explanation**: To work with the design team to help it understand the nature of various costs (such as cost allocations based on an activity-based costing system), as well as the cost-benefit trade-offs of using different design or cost operations in the new product.

e. **Review of Cost Reduction Targets**: To track the gap between the current cost and the target cost that is the design team's goal providing an itemization of where cost savings have already been achieved and where there has not been a sufficient degree of progress.

f. **Final Review and Feedback**: To compare a product's actual cost to the target cost after the design is completed, and for as long as the company sells the products is a necessary step because management must know immediately if costs are increasing beyond budgeted levels and why these increases are occurring.

***Question VIII:***
***Explain in brief the Impact of target costing on profitability.***

**Impact of target costing on profitability**

**Assured Profit by constant review**: Target Costing places detailed continuing emphasis on product costs throughout the life cycle of every product that it is unlikely that a company will experience runaway costs. Also the management is completely aware of costing issues since it receives regular reports from the cost accounting members of all design teams.

**Price Determination and Consequent Cost Control**: Target Costing improves profitability through precise targeting of the correct prices at which the company feels it can field a profitable product in the marketplace that will sell in a robust manner. The traditional cost-plus approach revolves around designing a product, determining its cost, adding a profit margin and failing to understand why its resoundingly high price does now attract buyers. Thus, target costing results not only in better cost control but also in better price control.

Target costing can have positive impact on profitability, depending on the commitment of management to its use, the constant involvement of cost accountants in all phases of a product's life cycle, and the type of strategy a company follows. Target costing is really part of a larger concept called concurrent engineering, which requires participants from many departments to work together on project teams. It is indeed one of the most proactive systems found in the entire range of accounting knowledge.

***Question IX:***
***What are the features and sources to extract data for Target Costing?***

**Features of Target Costing Data:**

- **Non-Traditional**: The traditional sources of cost data is a central accounting data base consisting of accounts payable, billings, bills of material, and inventory records. These do not provide information required for Target Costing.

- **Futuristic**: Target Costing Data is essentially futuristic, as it is associated with new and improved products, new designs and manufacturing processes.

- **Poorly defined**: The data for Target Costing project is more poorly defined information. The Cost Accountant has to start from scratch in order to estimate costs. In earlier stages of product designs, "best possible guesses" may have to be used.

**Sources of Target Costing Data**:

1. **Unorganised preliminary Information**:
   Information about preliminary cost estimates can be garnered through careful review of possible component parts, as well as a comparison to the costs of existing products with designs similar to those under review. This results in relatively rough cost estimates, especially during the earliest stages of product development. The Cost Accountant must have a wide-ranging view of costing systems and a willingness to start with rough estimates and gradually refine them into more concrete information as designs gradually solidify.

2. **Risk Analysis – Highest Possible Costs**: Cost estimates are rough in the earliest stages of a new product design. However, it is possible to include with the best estimate, an additionally estimate of the highest possible cost that will be incurred. This helps the management to know whether there is a significant degree of risk that the project may not achieve its desired cost target. This may result in either outright termination of the project or redefining targets in order to launch the product.

3. **Market and Competitor Information**: Competitor information collected by the marketing staff or an outside research agency, gives ideas on (a) prices at which competitors sell their products (b) prices of ancillary products (c) discounts given at various points (d) market share data for individual products or by firm (e) opinion of customers regarding the offerings of various companies, and (f) financial conditions of competitors. This information is used to determine the range of prices at which a company should sell its existing or anticipated products, as well as the features that should be included at each price point.

4. **Competitor Cost Information**: Cost structure of competitors is compiled by a combined effort of the marketing and engineering staffs through a process called reverse engineering or tear-down analysis. Under this process, a company buys a competitor's product and disassembles it in order to determine the process and materials used to create it, and their costs. This information helps in determining the greatest allowable cost of a new product design since a company can copy the methods and materials used by a competitor, and see if the reduction in costs can be achieved. The information is also of use from a pricing perspective.

5. **Data from Past analysis**: The engineering staff may have compiled, over the course of numerous design projects, a set of tables itemizing the cost of components or clusters of components used to create a specific product feature. Also the cost of specific production functions generally requires an in depth analysis that can be obtained only through a prolonged activity based accounting review. Sometimes, the enterprising cost accountant himself may conduct this research.

6. **Engineering Data**: This information extends to (a) upcoming technological changes that can be used to enhance the features of existing products (b) interaction of various components of a product, so that one can predict what cost changes are likely to arise in the subsystem of a product if a part is reconfigured in a different subsystem (c) changes in costs that will arise from the use of a smaller or larger number of fasteners, different materials , different product sizes or weights or a host of other factors.

7. **Supplier Data**: Information on supplier's coves (a) previous quality, cost and on time delivery performance of all key suppliers. (b) production capacities of each supplier (c) assumed profitability levels for each supplier etc. The cost accountant can use this information to determine which standard parts are no longer acceptable for future product designs, based on a history of high cost, poor quality or inadequate on-time delivery. Also, if suppliers show inadequate profits, it may signal their inability to obtain further cost reductions through capital asset purchases, which may necessitate switching to a different supplier.

***Question X:***
***What are the steps involved in implementing target costing system?***

**Steps involved in implementing a Target Costing System:**

1. **Create a Project Charter**: Project Charter is a document, approved by top management that describes its goals and what it is authorized to do. This Charter is based on the corporate mission statement and related goals. Written approval of Project Charter by the top management provides the target costing effort with a strong basis of support and direction in all subsequent efforts.

2. **Obtain a Management Sponsor**: Management Sponsor is an individual belonging to top management. His role will be to support the initiative in all respects, to obtain funding, to co-ordinate with other members of top management, to eliminate problems in a timely manner.

3. **Obtain a Budget**: The funding should be based on a formal allocation of money through the corporate budget. The fund should be given unreservedly to the target costing effort.

4. **Assign a Strong Team Manager**: The Target Costing Team involves the active participation of many members with diverse backgrounds. A strong Team Manager is required to bring the group together as a smooth functioning team focused on key objectives. He should be skilled in dealing with management, the use of project tools and working with a diverse group of people. This manager should be a full-time employee, so that his or her complete attention can be directed towards the welfare of the project.

5. **Enroll Full-time Participants**: It is essential that the members of the team be devoted to it full-time rather than trying to fulfill other commitment elsewhere in the company at the same time. They should have a single focus on ensuring the success of the target-costing program.

6. **Use Project Management Tools**: Target costing can be a highly complex effort especially for high-cost products with many features and components. The team should use all available project management tools, such as Microsoft Project (for tracking the

completion of specific tasks), a company database containing various types of costing information and a variety of product design tools.

## Questions from past examinations:

**Q. 1**
Briefly explain the steps involved in target costing approach to pricing. (May 2003) (4 Marks)
Trace the stages involved in target costing. (May 2004) (4 Marks)

**Answer:**
Refer to Q.I (ignore definition part)

# CHAPTER 10 - LIFE CYCLE COSTING

**Product Life Cycle**

Product life cycle is a pattern of expenditure, sale level, revenue and profit over the period from new idea generation to the deletion of product from product range.

Product life cycle spans the time from initial R&D on a product to when customer servicing and support is no longer offered for the product. For products like motor vehicles this time span may range from 5 to 7 years. For some basic pharmaceuticals, the time span may be 7 to 10 years. In case of cameras, photocopying machines etc. the life is more than 100 years.

***Question I:***
***Explain briefly the phases in product life cycle.***

**Phases in product life cycle**
The four identifiable phases in the Product Life Cycle are (a) introduction (b) Growth (c) Maturity and (d) Decline. A comparative analysis of these phases is given below:

| Particulars | Introduction | Growth | Maturity | Decline |
|---|---|---|---|---|
| **Phase** | **I** | **II** | **III** | **IV** |
| Sales Volume | Initial stages, hence low | Rise in sales levels at increasing rates. | Rise in sales levels at decreasing rates. | Sales level off and then start decreasing. |
| Prices of Products | High levels to cover initial costs and promotional expenses. | Retention of high level prices except in certain cases* | Prices fall closer to cost, due to effect of competition | Gap between price and cost is further reduced. |
| Ratio of promotion expenses to Sales | Highest, due to effort needed to inform potential customers, launch products, distribute to customers etc. | Total expenses remain the same, while ratio is reduced due to increase in sales. | Ratio reaches a normal % of sales. Such normal % becomes the industry standard. | Reduced sales promotional efforts as the product is no longer in demand. |
| Completion | Negligible and insignificant | Entry of a large number of competitors | Fierce Competition | Starts disappearing due to withdrawal of products |
| Profits | NIL due to heavy initial costs. | Increase at a rapid pace. | Normal rate of profits since costs and prices are normalized. | Declining profits due to price competition, entry of new products etc. |

* In the growth stage, the firm will maintain the prices at the high levels, in order to realise maximum profits. Price reduction will not be undertaken unless (a) the low prices will lead

***Question II:***
***Briefly explain the Characteristics of product life cycle.***

The major characteristics of product life-cycle concept are as follows:

1. The products have finite live and pass through the cycle of development, introduction, growth, maturity decline and deletion at varying speeds.

2. Product cost, revenue and profit patterns tend to follow predictable courses through the product life cycle, Profits first appear during the growth phase and after stabilizing during the maturity phase declines at the point of deletion.

3. Profit per unit varies as products move through their life cycles.

4. Each phase of the product life cycle poses different threats and opportunities that give rise to different strategic actions.

5. Products require different functional emphasis in each phase-such as all R&D emphasis in the development phase and a cost control emphasis in the decline phase.

6. Finding new uses or getting the present users to increase their consumption, may extend the life of the product.

***Question III:***
***Explain various stages of product life cycle.***

**Stages in products life cycle**

The life cycle of manufactured product will consist of the following stages:

**Market Research**: Market research will establish what product the customer wants, how much he is prepared to pay for it and how many lies will buy.

**Specification**: The design specification will give details such as required life, maximum permissible maintenance cost, maximum permissible manufacturing cost, the number required, the delivery date, the required performance of the product. Customer requirements are translated into product specifications.

**Design**: The designers produce the drawings and process schedules, which define the geometry of the product and the manufacturing processes.

**Prototype manufactures**: From the drawings it will be possible to manufacture a small number of the product. These prototypes will be used to develop the product and eventuality to demonstrate that it meets the requirements of the specification.

**Development**: When a product is made for the first time, it is necessary to prove that it meets the requirements of the specification. In fact, when a product is first made it rarely meets the requirements of the specification and changes have to be made until it satisfies the requirement. This period of testing and changing is ‘development.

**Tooling**: Tooling up for production means building a production line consisting of machinery and equipments, building expensive jigs, buying special purpose machine tools etc. It requires large investment.

**Manufacture**: Manufacture of a product involves the purchase of the raw materials the purchase of bought out components, the use of labour to make and assemble the product is considered under this stage.

**Selling**: When the product is fit and available for sale, it may be necessary to spend money on a campaign to sell the product. Stimulating and creating demand for the product is considered under this stage.

**Distribution**: In the process of selling the product, it must be distributed to the sales outlets and to the customers. Demand at various locations and markets, must be met through appropriate distribution channels.

**Product support**: The manufacturer or supplier will have to make sure that spares and expert servicing are available for the life of the product. The manufacturer or the supplier may even have to offer free servicing and parts replacement during the early life of the product.

**Decommissioning or Replacement**: When a manufacturing product comes to an end, the plant used to build the product must be reused, sold, scrapped, or decommissioned in a way that is acceptable to society.

## LIFE CYCLE COSTING

***Question IV:***
***What is life cycle costing?***

Life cycle costing, aims at cost ascertainment of a product, project etc. over its projected life. It is a system that tracks and accumulates the actual costs and revenues attributable to cost object from its inception to its abandonment.

Sometimes the terms, “cradle-to-grave costing” and “womb-to-womb costing” convey the meaning of fully capturing all costs associated with the product from its initial to final stages.

***Question V:***
***Describe characteristics and benefits of product life cycle costing.***

### PRODUCT LIFE CYCLE COSTING

It is an approach used to provide a long term picture of product line profitability, feedback on the effectiveness of life cycle planning cost data to clarify the economic impact of alternatives chose in the design, engineering phase etc. It is also considered as a way to enhance the control of manufacturing costs. The thrust of product life cycle costing is on the distribution of costs among categories changes over the life of the product, as does the potential profitability of a product. Hence it is important to track and measure costs during each stage of a product’s life cycle.

**Features / Characteristics Of Product Life Cycle Costing:**
Product life cycle costing is important due to the following features:

Product life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their entire life cycle. Costs and revenues can be analysed by

time periods, but the emphasis is on costs and revenue accumulation over the entire life cycle for each product.

Product life cycle costing traces research and design and development costs, incurred to individual products over their entire life cycles, so that the total magnitude of these costs for each individual product can be reported and compared with product revenues generated in later periods.

Life cycle costing therefore ensures that costs for each individual product can be reported and compared with product revenues generated in later periods. Hence the costs are made more visible.

**BENEFITS OF PRODUCT LIFE CYCLE COSTING**

The benefits of product life cycle costing are summarized as follows:

1. The product life cycle costing results in earlier actions to generate revenue or to lower costs than otherwise might be considered. There are a number of factors that need to the managed in order to maximize return on a product.

2. Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.

3. Product life cycle thinking can promote long-term rewarding in contract to short-term profitability rewarding.

***Question V:***
**What is the Importance of Product Life Cycle Costing?**

**Importance of Product Life Cycle Costing:**

Product Life Cycle Costing is considered important due to the following reasons:

1. **Time based analysis**: Life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their life cycle. Costs and revenues can be analysed by time periods. The total magnitude of costs for each individual product can be reported and compared with product revenues generated in later periods.

2. **Overall Cost Analysis**: Production costs are accounted and recognized by the routine accounting system. However non-production costs like R&D, design, marketing, distribution, customer service etc. are less visible on a product-by-product basis. Product Life Cycle Costing focuses on recognizing both production and non-production cost.

3. **Pre-production Costs analysis**: The development period for R&D and design is long and costly. A high percentage of total product costs may be incurred before commercial production begins. Hence, the company needs accurate information on such costs for deciding whether to continue with the R&D or not.

4. **Effective Pricing Decisions**: Pricing Decisions, in order to be effective, should include market consideration on the one hand and cost considerations on the other. Product Life Cycle Costing and Target Costing help analyse both these considerations and arrive at optimal price decisions.

5. **Better Decision Making**: Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.

6. **Long Run Wholistic view**: Product life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding. It provides an overall framework for considering total incremental costs over the entire life span of a product, which in turn facilitates analysis of parts of the whole where cost effectiveness might be improved.

7. **Life Cycle Budgeting**: Life Cycle Budgeting. i.e. Life Cycle Costing with Target Costing principles, facilitates scope for cost reduction at the design stage itself. The Company stands to benefit since costs are avoided before they are committed or locked in.

8. **Review**: Life cycle Costing provides scope for analysis of long term picture of product line profitability, feedback on the effectiveness of life cycle planning and cost data to clarify the economic impact of alternatives chosen in the design, engineering phase etc.

## Questions from past examinations:

**Q. 1**
State the benefits of product life cycle costing. (Nov. 2002) (4 Marks)

**Answer:**
Refer to Q. V above (only benefits part)

**Q. 2**
What is life cycle costing? Explain the stages in product life cycle. (Nov. 2003) (7 Marks)

**Answer:**
Refer to Q.IV and III above.

**Q. 3**
What is product life cycle costing? Describe its characteristics and benefits. (Nov. 2004) (5 Marks)

**Answer:**
Refer to Q. IV and V above.

# CHAPTER 11 - JUST IN TIME

***Question I:***
***What is JIT? What are the steps involved in JIT?***

**Operation of JIT (Just –in-time) concept:**
A JIT approach is a collection of ideas and philosophy that streamline a company's production process activities to such an extent that waste of all kinds viz. material and labour is systematically driven out of the process.
Just in Time Technique enables a company to ensure that it receives products / spare parts / materials from its suppliers on the exact date and at the exact time when they are needed. The **steps** involved are:

**Supplier Evaluation:** The Purchasing Department must evaluate and investigate every supplier and eliminate those who could not keep up with the delivery dates.

**Supplier Assistance:** The engineering staff must visit supplier sites and examine their processes, not only to see if they can reliably ship high-quality parts but also to provide them with engineering assistance to bring them up to a higher standard of product.

**Supplier Information System:** The firm must install a system, which is as simple as a fax machine or as advanced as an electronic data interchange system or linked computer systems, that communicates with suppliers as to exactly how much of specified parts are to be sent to the company.

**Direct Delivery:** Deliveries should be sent straight to the production floor for immediate use in manufactured products, so that no time spent in inspecting the parts for defects. Drivers, who bring supplies of materials, drop them off at the specific machines that will use the materials first.

***Question II:***
***How does JIT help in shortening set-up and operation times?***

**Outline the JIT approach for shortening set-up and operation times.**
Long set-ups and operation time involve indirect costs like product obsolescence, inventory carrying costs, and many defective products (because problems may not be discovered until a large number of items have already been completed). This problem will be resolved under JIT by adopting the following steps.

**Test data**: A videotape of a typical set is prepared for analysis purposes.

**Evaluation**: A team of industrial engineers and machine users examine this tape, spotting and gradually eliminating steps that contribute to a lengthy set-up.

**Motion and time study**: By eliminating unnecessary production steps and improving others after a number of iterations, it is possible to achieve substantially lower set-up times than before.

**Effects**: Reduction in set-up time has the following effects:
Reduction in the amount of work-in-process,
Reduction in the number of products that can be produced before, defects are identified and fixed, thereby reducing scrap costs.

***Question III:***
***Explain in brief the JIT approach for reducing WIP inventory.***

**JIT approach for reducing WIP inventory:**
At times, there may be huge differences between the operating speeds of different machines. This affects cost in following manner:

- Work-in-process inventory builds up in front of the slowest machines.
- Defective parts produced by an upstream machine may not be discovered until the next downstream machine operator finds them later. By that time, the upstream machine may have created more defective parts, all of which must now be destroyed or reworked.

In JIT philosophy, there are two ways to resolve the above problems.

1. **Kanban Card:** It is a notification card that a down stream machine sends to each upstream machine that feeds it with parts, authorizing the production of just enough components to fulfill the production requirements. This is also know as "pull" system, since these cards are initiated at the end of the production process pulling work authorizations through the production system. WIP cannot pile up since it can be created only with kanban authorization.

2. **Working Cells:** A Working cell is a small cluster of machines, which can be run by a single machine operator. The establishment of working cells has the following advantages:

   - The individual machine operator takes each output part from machine to machine within the cell; and thus there is no way for WIP to build up between machines.

   - The operator can immediately identify defective output which otherwise is difficult for each machine of the cell. The smaller machines used in a machine cell are generally much simpler than the large automated machinery they replace. Hence maintenance costs are reduced.

   - It is much easier to reconfigure the production facility when it is necessary to produce different products, avoiding the large expense of carefully repositioning and aligning equipment.

***Question IV:***
***"Employee Training and Development is a pre-requisite for JIT implementation" – Explain.***

**Employee Training and Development is a pre-requisite for JIT implementation:**
JIT focuses on waste reduction, inventory management and product quality. The focus of attention shifts away from performance based to high production volumes and quality. In order to make JIT effective, employee participation and co-operation is a must. For this purpose, the HR department must prepare and organise training classes to teach to employees:

How to operate a multitude of different machines?
How to perform limited maintenance on the machines without having to call in the maintenance staff?
How to spot product errors?
How to relate one's role in the entire system flows? and
When to halt the production process to fix problems?

The **effects** of proper training of employees will be:

Versatility in handling operations
Reduction in maintenance by maintenance staff
Reduction in time and increase in quality output.

***Question V:***
***State in brief the Benefits associated with JIT system.***

**Benefits associated with JIT system**

1. **Reduction in Inventory levels**: Unnecesary piling up of Raw Materials, WIP and finished goods are avoided. The focus is on production and purchase as per the firm's requirements.

2. **Reduction in Wastage of Time**: Wastage of time in various ways like inspection time, machinery set-up time, storage time, queue time, defectives rework time etc., are reduced.

3. **Reduction in Scrap Rates**: There will be sharp reductions in the rates of defectives or scrapped units. The workers themselves identify defects and take prompt action to avoid their recurrence.

4. **Reduction in Overhead Costs**: By reducing unnecessary (non value-added) activities and the associated time and cost-drivers, overheads can be greatly reduced e.g. material handling costs, rework costs, facility costs etc.

***Question VI:***
***Explain in brief the role of JIT in time reduction.***

**Role of JIT in time reduction:**
The key focus of any JIT system is on reducing various kinds of wastage of time, so that the entire production process is concentrated on the time spent in actually producing products. By reducing wastage of time, the firm effectively eliminates activities that do not contribute to the value of a product which in turn reduces the costs associated with them. Time reduction can be achieved in the following manger.

1. **Inspection Time**: All inspection time is eliminated from the system as operators conduct their own quality cheeks. Suppliers assistance and quality checks at supplier's factory eliminate the need for separate inspection or QC department in the firm.

2. **Handling Time**: All movement, which involves shifting inventory and work in process throughout the various parts of the plant, can be eliminated by clustering machines together in logical groupings called Working Cells

3. **Queue Time**: Queue time is eliminated by not allowing inventory to build up in front of machines. Kanban cards serve this purpose.

4. **Storage Time**: Clearing out excessive stocks of inventory and having suppliers deliver parts only as and when needed eliminates Storage time.

***Question VII:***
***Explain in brief the effect of JIT on Overhead Costs.***

**JIT effect on Overhead Costs**

Overhead Costs are greatly reduced with JIT operation. This is because of the following reasons:

Elimination of non value-added activities and improvement in value-added activities.
Reduction of time
Reduction in Inventory levels and associated costs
Reduction / Elimination of unnecessary cost drivers
Introduction of "Machine Cells" to identify direct costs than overhead expenses.

**The effect of JIT philosophy on Overhead is three-fold:**

1. Thorough reduction in Overhead Costs
2. Shift between Overhead Costs and Direct Costs, due to introduction of Machine Cells
3. Scientific Allocation of common overheads based on Machine Cells and Cost Drivers

**Examples**

The costs of material handling, facilities, and quality inspection decline when a JIT system is installed.

The reduction of all types of inventory results-in a massive reduction in the amount space required for warehouse facility. Hence costs associated with warehousing are reduced when the costs of staff, equipment, fixed assets, facilities, and rent associated with the warehouse are sharply cut back.

A machine cell generally produces only a small range of products, hence it is easy to assign the entire cost of each machine cell to these items. This means that the depreciation, maintenance, labour and utility costs of each cell can be charged straight to a product, which is preferable than traditional absorption costing.

***Question VIII:***
***"JIT contributes to lower inventories and associated costs" – Explain.***

**JIT contribution to lower inventories and associated costs:**
Under a JIT system, the amount of inventory retained in a company drops continuously as under:

Raw materials inventory is reduced because suppliers deliver only small quantities of parts as and when they are needed.

Work-in-progress inventory drops because the conversion to machine cells and the use of kanban cards greatly reduces the need to pile up inventory between machines.

Finished goods inventory drops because inventories are allowed to build up only if a company experiences high seasonal sales.

***Question IX:***
***"JIT contributes to reduced Capital Requirement" – Explain.***

**JIT contribution to reduced Capital Requirement**

Using JIT, a company can also reduce its investment in capital assets.

A few large machines can be replaced with a larger number of much smaller, more easily configured machines.

Equipment setup times become shorter, which in turn makes it profitable to have shorter production runs thereby eliminating an excessive investment in inventory that would have been created by excessive long production runs. This releases cash for other uses while also reducing the amount of depreciation charged to overhead.

***Question X:***
***Explain the Impact of JIT on Product Prices.***

**Impact of JIT on Product Prices:**

When a company achieves a higher level of product quality, along with ability to deliver products on the dates required, customers may be willing to pay a premium. If customers are highly sensitive to quality or delivery reliability (which are the benefits of JIT), it may be possible to increase price substantially.

If customers place a higher degree of importance on other factors, then there will be no opportunity for a price increase.

In case all firm in an industry adopt JIT, they offer the same level of quality and service. JIT philosophy, in such cases, just keeps a company from losing sales to its competitors.

The impact of a JIT system on product pricing is primarily driven by customers' perceived need for higher product quality and reliable delivery times, as well as the presence of competitors with JIT system, the same installation, and operational base.

**Identification of Machine Cells under JIT for systematic OH Cost Allocation**

a. A working Cell or a machine Cell is a small cluster of machines, which can be run by a single machine operator.

b. It designed to produce either a single product or a single component that goes into a similar product line. Therefore all costs generated by the machine cell can be charged directly to the only product it produces.

c. When a company completely changes over to the use of machine cells in all locations, the cost related to all the cells can now be changed directly to products. The balance costs left may be assigned to the Overhead Cost Pool and identified with the products through Activity Based Costing. This results in more accurate product costs.

Some **examples** of shift from Overheads to Direct Machine Cell Costs are:

a. **Depreciation**: Depreciation of each machine in a machine cell can be changed directly to a product. It may be possible to depreciate a machine based on its actual use, rather than charging off a specific amount per month.

b. **Electricity**: Power used by the machine in a cell can be separately metered and charged directly to the products that pass through the cell. Excess electricity cost charged to the facility as whole has to be charged to an overhead cost pool for allocation.

c. **Material handling**: In a JIT system, most material handling cost are limited since machine operators move parts around within their machine cells. Only costs for materials handling between cells and charged to an overhead cost pool for allocation.

d. **Operating Suppliers**: Supplies are used mostly with the machine cells to the majority of item sin this expense category can be separately tracked by individual cell and charged to products directly.

e. **Repairs and maintenance**: All maintenance costs incurred for machinery can be grouped into machine cells. By having the maintenance staff, charge their time and materials to these cells, these costs can be charged straight to products. Maintenance work on the facility will be charged to an Overhead cost pool.

f. **Supervision**: If supervision is by machine cell, the cost of the supervisor can be split among the cells supervised. However the cost of general facility management as well as of any support staff, must still be charged to an overhead cost pool.

With such a higher proportion of direct costs associated with each product managers have much more relevant information about the true cost of each product manufactured.

***Question XI:***
***"Traditional performance measurement criteria fails in a JIT system" – Explain.***

Some traditionally used performance measurement criteria are:
Machine Utilisation or Machine Capacity
Labour cost per unit of output or Output per employee
Direct labour Time Keeping and Time booking

These are not useful in a JIT environment due to the following reasons.

| **Nature of Performance Measurement measure** | **Why not applicable in JIT?** |
|---|---|
| Machine Utilisation:<br>To ensure that every asset a company purchases is being thoroughly utilized.<br>To confirm that substantial investment in machinery should be used to the utmost. | It forces production managers to produce as much output as possible, resulting in large amount of inventory piling up in the warehouse.<br>In JIT systems producing only what is actually needed is the underlying rule.<br>Machine cells in a JIT system are smaller and less costly. Hence justification of investment is not compulsory. |
| **Labour Cost per Unit output**:<br>• To optimize labour cost per unit by increasing output per employee. | • JIT system focuses on producing only what is needed, so an employee who has incentives to create vast piles of parts is producing contrary to the rules of the system.<br>• JIT focuses not on output quantity, but on the quality of output or the number of employee suggestions for improving the system. |
| **Direct Labour Efficiency** | JIT system does not focus on how fast |

| | |
|---|---|
| To closely monitor employee time and productivity.<br>To compute of labour Efficiency Variance, Mix Variance, Idle Time Variance etc. | an employee works, but only on the quality of the products manufactured.<br>Procedures like filling up time cards, use punch cards to record time etc. are non-value added activities, which are avoided under JIT as unnecessary. |

***Question XII:***
***What are the performance measures in JIT?***

Use of Specific performance measures instead of traditional measures in JIT.
The following performance measurement criteria are relevant to JIT.

**Inventory turnover**: One of the primary objectives of JIT systems is the reduction of unnecessary inventory. Hence inventory turnover is a suitable performance measure in JIT. This measure can be subdivided into separate ratios for raw materials, work in process, and finished goods.

**Set up time reduction**: The average setup time per machine can be measured periodically and plotted on a trend I Inc. The shortest possible set intervals are crucial for the success of short production runs, so this is a major JIT measurement. It is best to measure it by machine, rather than in the aggregate for all machines.

**Customer complaints**: JIT presumes optimum product quality. Hence customer complaints on product problems should be investigated immediately. The accumulation of customer complaints and their dissemination to management should be considered a major JIT measure.

**Scrap**: JIT aims to drive materials scrap rates down to exceedingly low level. The cost of scrap (especially when supported by a detailed list of items that were scrapped) is of particular concern as a JIT system is being implemented, since it helps to identify problem areas requiring further management attention.

**Cost of quality**: One focus of JIT is on creating high-quality products, so it is reasonable to keep track of the full cost of quality (which comprises defect control costs, failure costs, and the cost of lost sales) on a trend line. Managers want to see the details behind this measure so that they know where the largest quality cots still reside in the company and can then work to reduce them.

**Customer service**: This measure really has several components like delivering products on the dates required by customers shipping full orders to customers, and not having products returned because of poor quality. This measure can be summarized in a variety of ways or reported at the component level, but the main issue is to measure and post the information for all to see, so that the company focuses strongly on providing the highest possible degree of customer service.

**Ideas generated**: JIT system works best when employees provide suggestions for improvements that, when taken in total result in a vastly improved efficient operation. The amount of idea generation going on can be measured by the number of ideas per worker,

the number of ideas suggested in total, the number of ideas implemented, or the proportion of ideas suggested that are implemented.

***Question XIII:***
***What do you mean by back flushing in JIT system? Explain briefly the problems with back flushing that must be corrected before it will work properly.***

## BACKFLUSH COSTING

Traditional, normal and standard costing systems use the sequential tracking method for accounting costs. This involves recording journal entries in the same order as transactions occur, i.e. purchase, issue of materials, production, overheads absorption etc. Such systems are required in those manufacturing environment where inventory / WIP values are large.

An alternative approach to sequential tracking is Backflush Costing. It is a costing system that omits recording some or all of the journal entries relating to the cycle from purchase of direct materials to the sale of finished goods. The journal entries for the subsequent stages use normal or standard costs to work backward to flush out the cost in the cycle for which the journal entries were omitted earlier.

Since JIT systems operate in modern manufacturing environment characterised by low inventory and WIP values, usually also associated with low cost variances, the use of backflush costing is ideal when compared to sequential Tracking method.

However the following issues must be **corrected** before effective implementation of Backflush Cosing:

1. **Accurate Production reporting**: The total production figure entered into the stem must be absolutely correct, or else the wrong component types and quantities will be subtracted from stock. This is a particular problem when there is high turnover or a low level of training to the production staff that records this information.

2. **Proper Scrap reporting:** All abnormal scrap must be diligently tracked and recorded. Otherwise, these materials will fall outside the backflushing system and will not be charged to inventory. Since scrap can occur anywhere in a production process, lack of attention by any of the production staff can result in an inaccurate inventory.

3. **Lot tracing**: Lot tracing is impossible under backflushing system. It is required when a manufacturer need to keep records of which production lots were used to create a product in case all the items in a lot must be recalled. Only a picking system can adequately record this information. Some computer systems allow picking and backflushing system to coexist.

4. **Inventory accuracy**: The inventory balance may be too high at all times because the backflushing transaction that relieves inventory usually does so only once a day, during which time other inventory is sent to the production process. This makes it difficult to maintain an accurate set of inventory records in the warehouse. The success of backflushing system is directly related to a company's willingness to invest in a well-paid, experienced well-educated production staff that undergoes little turnover.

## Questions from past examinations:

**Q. 1**
What is JIT? Explain, how it eliminates wastage of resources? (November 2003) (4 Marks)

**Answer:**
Refer page 68 **Operation of JIT (Just –in-time) concept** (only first para) and page 71 **Role of JIT in time reduction.**

**Q. 2**
What do you mean by back flushing in JIT system? Explain briefly the problems with back flushing that must be corrected before it will work properly. (November 2004) (4 Marks)

**Answer:**
Refer page 74

# CHAPTER 12 - MATERIAL REQUIREMENT PLANNING (MRP)

***Question I:***
***Define MRP. What are its aims and benefits?***

Material Requirement Planning is a computerised Production Scheduling System providing a basis for production decisions.

It progressively translates the forward schedule of final product requirements (the master production schedule) into the numbers of sub-assemblies, components and raw materials required at each stage of the manufacturing cycle. (In other words, MRP involves input planning based on output budget)

**Aims and benefits of Material Requirement Planning**

1. To determine quantity and timing of finished goods production as per the master production.
2. To ascertain quantity of raw materials, sub-assemblies and components required for budged production, based on bill of materials.
3. To compute the inventories, work-in-progress, batch sizes and manufacturing and packaging lead times.
4. To control inventory by ordering bought-in components and raw materials in relation to the orders received or forecast.
5. To forecast the inventory position period-by-period for a future time period of a manufacturing operation.
6. To serve as an inventory information system helpful in planning for raw materials and component parts.
7. To generate purchase requisition notes and purchase orders through computer system automatically.

***Question II:***
***Explain briefly the data required to operate MRP system.***

**Input required to operate a MRP System:**

1. **The Master Production Schedule:** This specifies the quantity of each finished product to be produced, the time at which such items will be required for dispatch to customers.

2. **The Bill of Materials (BOM):** This specifies the consumption requirements of sub-assemblies, components and materials, for each unit of finished goods.

3. **The Inventory File/Stores Ledger:** This contains the inventory details of each sub-assembly components and materials required for each finished goods.

4. **The Routing File:** This provides details on the sequence of operations required to manufacture components, sub-assemblies and finished goods.

5. **The Master Parts File:** This contains information on the production time of sub-assemblies and components produced internally and lead time for externally acquired

items. MRP pre-supposes the use of computers and hence the above information will be required as system data files.

***Question III:***
***What are the pre-requisites for the successful operation of MRP?***

**Pre-requisites for successful operation of MRP system**

(a) **Production Schedule:** The latest production and purchasing schedules prepared should be strictly adhered to Day-to-day change from predetermined schedules will cause chaos.

(b) **Standard Materials Input:** The raw materials, sub-assemblies and components required for production should be pre-determined in quantifiable terms. Standards should be set for the consumption quantity, quality mix and yield of raw materials, for every unit of the finished output.

(c) **Workers co-operation:** Work force must be appraised of the system and the need for absolute adherence to the schedules prepared. Also necessary internal control system should be developed to ensure the total adherence to the schedule.

(d) **Accuracy of data:** Accuracy of the data supplied is vital to the MRP system. Adherence to the purchase and production schedule becomes difficult in the absence of accurate data.

***Question IV:***
***Explain briefly the method of operation of MRP system.***

MRP is a computer based inventory information system, which is used to plan and control raw materials and component parts inventories.

**Operation of a MRP system**

**STAGE 1: Pre-requisite information and system input:**

- All the required data are made available into the system.
- **The Master Production Schedule (MPS),** which states the production goal in terms of finished goods quantity for a production period, is then taken as the base for processing purposes.
- **The Bill of Materials (BOM)** file contains information about how the production of the finished goods is undertaken and is structured to :
    - **(a)** Assess all of the raw materials and component parts required to complete a product; and
    - **(b)** Describe the multiple levels of assembly or manufacturing necessary to complete a unit of finished product.
- In a BOM structure file the MRP system breaks the requirements for each proposed end product by working into its primary sub-components or sub-assemblies, which in turn are divided into further levels of sub-components or sub-assemblies, until the lowest level in the hierarchy contains only the materials purchased from outside.

- The **inventory records** file of the MRP system determines the current levels of finished goods, raw materials and component parts inventory at the beginning of a planning period. Receipts of raw materials, component parts etc. and delivery lead times during the planning period are included in the inventory records file to appropriately consider them at the time of their arrival.

**STAGE 2: System Processing and Output**

The MRP system determines the demand for materials, components and sub-assemblies at each stage of production as laid down in the MPS.

Once the scheduled production starts, the output of each department is pushed through the MRP system to the next department for (a) Processing; or (b) As inventory to be retrieved later.

From the data input, the MRP system knows what it is expected to produce (through the MPS file) how it should product it (through the BOM file), and with that it has to produce it (through the inventory records file).

The system then arithmetically combines the information to determine when the production should take place in the future planning period.

This programme starts with the finished goods-demand (from the MPS file) and 'explodes' (or converts) the demand requirements backward in time to schedule the desired production of the finished goods from raw materials and components parts with 'time-phased' adjustments for lead time requirements. This process is called Requirements Explosion.

The information provided by system processing includes:

Gross requirements of components and assembly parts

Determination of net requirements after considering scheduled receipts, projected stock levels etc.

Conversion of the net requirements to a planned order quantity using an appropriate lot size.

Planning orders in appropriate periods by backward scheduling from the required usage date by the appropriate lead time required to fulfill orders.

## Questions from past examinations:

**Q. 1**
State the requirements for operation of MRP system. (November 2002) (5 marks)

**Answer:**
Refer to Question II above.

**Q. 2**
Outline the objectives of MRP. (May 2004) (4 marks)

**Answer:** Refer to Question I above. (Only aims and benefits part)

# CHAPTER 13 – ENTERPRISE RESOURCE PLANNING

***Question I:***
***What is ERP? State the need for implementation of ERP.***

ERP refers to software, which integrates all departments and functions across a company into a single computer system that can serve all those needs of different departments.

It combines all computerized departments together with the help of a single integrated software program that uses a single database so that various departments can more easily share information and communicate with each other.

**Need for ERP:**

**Complete Automation and Faster Service:** ERP automates the tasks involved in performing a business process such as order fulfillment, which involves taking an order from a customer, shipping it and billing for it. The order process moves like a bolt of lightning through the organization, and customers get their orders faster and with fewer errors than before. Similarly, the major business processes like employee benefits or financial reporting can be speeded up.

**Standardized Processes:** Manufacturing companies find that multiple business units (departments) across the company adopt different methods and computer systems for the same product. Standardizing these using a single integrated computer system can save time and increase productivity.

**Integrated Financial Data:** ERP creates a single version of the financial position and performance that cannot be questioned because everyone is using the same system. It is very useful in analyzing the performance and deviations of different business units (responsibility centres) rather than obtaining individual reports from each such business unit.

**Standardised HR Information:** HR may not have a unified, simple method for tracking employee time and communicating with them about benefits and services. ERP can help companies with multiple business units in this regard.

**Tailor-made:** ERP systems are designed as per the requirements of individual companies based on the nature, scale and methods of operations. It is superior to other standardized application packages (software), which may not be fully useful to a multifaceted company.

**Information Management:** A good MIS should avoid information overload, ERP helps proper information management since all data are made available at one place, accessible to different users based on their individual requirements.

***Question II:***
***What are the Components of ERP?***

**Components of ERP:**
The following may be identified as the primary components (sub-systems) of ERP system:

| | |
|---|---|
| Sales and marketing<br>Master scheduling<br>Material requirement Planning<br>Capacity requirement planning<br>Bill of materials<br>Purchasing | Shop floor control<br>Accounts payable/receivable<br>Logistics<br>Asset management<br>Financial accounting |

***Question III:***
***Explain briefly the main features of ERP.***

**Features of ERP:**

1. **Integrated:** ERP facilitates company-wide information integration covering all functional areas like manufacturing, selling and distribution, payables, receivables, inventory, accounts, human resources, etc. ERP provides complete integration of systems not only across departments but also across companies under the same management.

2. **Information Sharing:** ERP bridges the information gap across organizations.

3. **Project Management:** ERP is the solution for better project management

4. **E-Com Facilities:** ERP allows automatic introduction of technologies like Electronic Fund Transfer (EFT), Electronic Data Interchange (EDI), Internet, Intranet, Video Conferencing, E-Commerce etc.

5. **Business Decision Making Solution:** ERP provides business intelligence tools like Decision Support systems (DSS), Executive Information System (EIS), Reporting, Data Mining and Early warning systems (Robots) for enabling people to make better decisions. It eliminates most business problems like material shortage, productivity enhancements, customer service, cash management, inventory problems, quality problems, prompt delivery etc.

6. **Futuristic**: ERP not only addresses the current requirements of the company but also provides the opportunity of continually improving and refining business processes.

***Question IV:***
***State the benefits of ERP.***

**Benefits of ERP:**

1. **Product Costing**: ERP system supports advanced costing methods like Standard Costing, Actual Costing, Activity based costing, thereby helping in determination of cost products accurately.

2. **Cost Monitoring and Control**: ERP can integrate all costing methods and information with finance. This provides the company with essential financial information or monitoring and controlling costs.

3. **Planning and Managing**: The ERP system simplifies complicated logistics and helps in planning for and managing different divisions in different locations as a single unit.

4. **Information Flow**: The advanced utility of the ERP system helps in processing the flow of product and financial information in several different ways.

5. **Efficient Database Management**: The ERP system aids in the efficient managing of data on warehouse, suppliers customers etc. required to run an organization effectively and profitably.

6. **Inventory Management**: Inventory reporting supports all reporting of specific and general types of stock transactions like stock transfers, reclassifications, ID changes and physical inventory results. Also ERP can manage stock and purchase requisitions selections of appropriate locations for receipts, inventory valuation, warehouse management and cost accounting.

7. **Customer Satisfaction**: ERP system defines the logistics processes flexibly and efficiently to deliver the right product from the right warehouse to the right customer at the right time – every time, thereby satisfying the customers. It also supports planning transportation, confirmation, dispatch and proof of delivery processing. Additionally, it ensures better after sales service.

8. **Competitive Edge**: ERP system helps a company to gain the Competitive Edge by (a) enabling the company to respond quickly and accurately to change in market conditions; (b) improving business process (c) ensuring quality control; (d) improved and objective production planning; intranet and Extranet Solutions.

## Questions from past examinations:

**Q. 1**
Explain briefly the main features of ERP. (May 2003 / November 2004) (4 marks)

**Answer:**
Refer Question III above

**Q. 2**
State the benefits accruing from ERP. (May 2004) (4 marks)

**Answer:**
Refer Question IV above

# CHAPTER 14 – ABC AND ABM

***Question I:***
***Define cost object and cost driver.***

**Cost Object and Cost Driver**

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

b. **Cost Driver:** It is the factor that causes a change in the cost of an activity. Cost Drivers are classified into:

1. **Resource Cost Driver:** It is a measure of the quantity of resource consumed by activity. It is used to assign the cost of a resource to an activity or cost pool.

2. **Activity Cost Driver:** It is a measure of the frequency and intensity of demand, placed on activities by cost objects. It is used to assign activity costs to cost objects.

**Examples of Cost Drivers:**

| Function | Cost Drivers |
|---|---|
| Research and Development | • Number of research projects<br>• Personnel hours on a project<br>• Technical complexities of projects |
| Customer Service | • Number of service calls<br>• Number of products serviced<br>• Hours spent on servicing products |

***Question II:***
***What are the steps involved in Activity Based Costing?***

**Steps involved in Activity Based Costing:**

**Step 1: Identify the various Activities within the organization.**
Only significant activities shall be considered for decision-making purposes.

**Step 2: Relate the Overheads to the Activities using Resources Cost Drivers**
1. Overheads will be related to Support and Primary Activities
2. Resources Cost Drivers, i.e. the quantity of resources used by an activity is used for this purpose.
3. All costs will be identified under the activities, thus creating Activity Cost Pools/Cost Buckets.

**Step 3: Apportion the costs of Support Activities over the Primary Activities**
1. This is very much like reapportionment of service department expenses to production departments.
2. Cost of support activities are spread over to primary activities to collect costs only under primary activities.
3. The base is the cost driver that is measure of how the support activities are used.

**Step 4: Determine the Activity Cost Drivers for each Activity Cost Pool**

1. Activity cost drivers used to relate the overheads collected in the cost pools to cost objects (products) should be determined.
2. This is based on the factor that drives the consumption of the activity, i.e. the answer to the question: what causes the activity to incur costs?
3. For example in production scheduling, the driver will be number of batches ordered.

Step 5: Calculate Activity Cost Driver Rate = Cost of Activity (Cost Pool) / Activity Cost Driver

1. Activity Cost Driver Rates are computed for each activity, just like overhead absorption rates.

2. The rates will be multiplied by the different amounts of each activity that each product/other cost object consumes, so as to ascertain its cost.

3. This rate can be used for the following:
   i) To ascertain cost of products, (as traditional absorption costing)
   ii) To ascertain cost of other objects such as customers/customer segments and distribution channels.

***Question III:***
***What are different types of activities?***

**Identification of activities for ABC**

**Meaning of Activities:** Activities comprise of units of work or tasks. For example, purchase of materials is an activity consisting a series of tasks like purchase requisition, advertisement inviting quotations, identification of suppliers, placement of purchase order, follow-up etc.

**Types of Activities:** Activities basically fall into four different categories, known as the manufacturing cost hierarchy. These categories were first identified by Cooper in 1990 and help to determine the type of activity cost driver required. The categories are:

| Type of Activity | Examples |
|---|---|
| **Unit level activities:**<br>These are activities for which the consumption of resources can be identified with the number of units produced. The costs of some activities (mainly primary activities) are strongly correlated to the number of units produced. | Use of indirect materials / consumables.<br>Inspection or Testing |
| **Batch level activities:**<br>The costs of some activities (mainly manufacturing support activities) are driven by the number of batches of units produced. These are activities related to setting up of a batch or a production run. The costs of such activities vary with the number of batches made, but is fixed for all units within that batch. | 1. Material ordering-where an order is placed for every batch of production.<br>2. Machine set-up costs-where machines need resetting between each different batch of production.<br>3. Inspection of Products-where the first item in every batch is inspected. |
| **Product level activities:** | • Designing the product. |

| | |
|---|---|
| The costs of some activities (often once only activities) are driven by the creation of a new product line and its maintenance. These are activities performed to support different products in the product line. | • Producing parts specifications and keeping technical drawings of products up-to-date.<br>• Advertising of individual products rather than company's name. |
| **Facility Level Activities:**<br>These are activities necessary for sustaining the manufacturing process and cannot be directly attributed to individual products. | Ground Maintenance<br>Plant Security<br>Production Manager's Salary |

**Choice of Activities for ABC:**

While the number of departments or cost centres can be smaller activities can be numerous. Hence all activities are not considered for ABC purposes. The final choice of activities depends on the following factors:

Cost of that activity should be significant / material enough to justify separate treatment.

The activity should be driven / influenced by a single cost driver. For example, material procurement cost may be driven by the number of purchase orders. However, receiving and issuing materials is not driven by the same driver and should be separately identified.

***Question IV:***
***Differentiate between Traditional Absorption Costing and ABC.***

**Difference between Traditional Absorption Costing and ABC:**

| Traditional Absorption Costing | Activity Based Costing |
|---|---|
| Overheads are first related to departments cost centres (Production and Service Cost Centres) | Overheads are first related to activities or grouped into Cost Pools. |
| Only two types of activities viz. Unit Level Activities and Facility Level Activities are identified. | All levels of activities in the manufacturing cost hierarchy viz. Unit Level, Batch Level, Product Level and Facility Level are identified. |
| This method relates overheads to cost centres i.e. locations. It is not realistic of the behaviour of costs. | This method relates overheads to the causal factor i.e. driver. Thus, it is more realistic of cost behaviour. |
| Overhead Rates can be used to ascertain cost of products only. | Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels. Etc. |

***Question V:***
***State the need, purpose and benefits of ABC.***

**Need for ABC:**

Manufacturing organizations need ABC for product costing where:

(a) Production overheads are high in relation to direct costs.
(b) There is great diversity in the product range.
(c) Products use very different amounts of the overhead resource

(d) Consumption of overhead resources is not primarily driven by volume

**Purposes and benefits of ABC**

1. To link the cost to its causal factor – i.e. the Cost Driver
2. To identify costs of activities rather than cost centres
3. To ascertain product costs with greater accuracy by relating overheads to activities
4. To overcome the inherent limitations of traditional absorption costing and use of blanket overhead rates.

***Question VI:***
***What are the steps involved in the installation of an Activity Based Costing System.***

**Steps involved in the installation of an Activity Based Costing System:**

1. **Specification of Objectives:** The motives for pursuing an ABC system must be established at the outset, Generally, the objectives are:
    a. To improve product costing where a belief exists that existing methods undercost some products and overcost others; or
    b. To identify non-value adding activities in the production process which might be a suitable focus for attention or elimination.

2. **Identification of Costs for ABC:** Direct costs, like materials and direct labour, are easily assigned directly to products. Some indirect costs that are product specific (e.g. specific advertising, dealer's commission) may be directly assigned to the product. Hence the remaining indirect costs form the focus of ABC. Such costs are indirectly assigned to the cost object (i.e. product) via Cost Pools and Activity Drivers.

3. **Process Specification:** This involves identification of different stages of the production process, the commitment of resources to each processing times and bottlenecks. This will provide a list of transactions which may or may not be defined as 'activities' at a subsequent stage.

4. **Activity definition:** The list of transactions as identified in the previous stage is analysed. This ensures aggregation or grouping of common activities and elimination of immaterial activities. Activities are categorized into Primary Activities and Support Activities. The resultant costs pools will likely-have-a number of different events or drives, associated with their incurrence.

5. **Activity driver selection:** Activity cost drivers used to relate the overheads collected in the cost pools to cost objects (products) should be determined. This is based on the factor that drives the consumption of the activity, i.e. the answer to the question; What causes the activity to incur costs? Generally a single Driver is selected for every activity even though multiple and inter related activity drivers exist.

6. **Costing:** A single representative activity driver can be used to assign costs from the activity pools to the cost objects. Such linking of total Costs to Cost objects is generally based on the activity cost driver rate.

7. **Staff Training:** The co-operation of the work force is critical to the successful implementation of ABC. Staff training should be oriented to create an awareness of the purpose of ABC. The need for staff co-operation in the concerted team effort for mutual benefit must be emphasized throughout the training activity.

8. **Review and Follow-up:** The actual operation of the ABC system should be closely monitored. Periodic Review and Follow-up action is necessary for successful implementation of the system.

***Question VII:***
***Define Activity Based Cost Management (ABM).***

**Activity Based Cost Management (ABM)**

The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM).

Through various analyses, ABM manages activities rather than resources. It determines what drives the activities of the organization and how these activities can be improved to increase the profitability.

ABM utilizes cost information gathered through ABC.

ABM is a discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. This discipline includes (a) Cost Driver analysis; (b) Activity analysis; and (c) Performance measurement.

***Question VIII:***
***What are the stages in Activity Based Cost Management (ABM).***

**Stages in Activity Based Cost Management:**

| **Stages** | **Activity** |
|---|---|
| | Identification of the activities that have taken place in the organization. |
| | Assigning costs to cost pool for each activity. |
| | Spreading of support activities across the primary activities. |
| | Determining cost driver for each activity. |
| | Managing the costs of activities. |

**Various analyses under ABM**

Cost Driver analysis identifies the factors that cause activities to be performed in order to manage activity costs.

An activity may be performed inefficiently due to a particular reason. Managers have to address this cost driver to correct the root cause of the problem.

**Activity Analysis:**

It involves identification of the activities of an organization and the activity centres (or activity cost pools that should be used in an ABC system).
Activity analysis also identifies Value Added (VA) and Non Value Added (NVA) activities.
The number of activity centres is likely to change over time as organizational needs for activity information evolve.

**Performance Analysis:**

(a) Performance analysis involves the identification of appropriate measures to report the performance of activity centres or other organizational units, consistent with each unit's goals and objectives.
(b) Performance analysis aims to identify the best ways to measure the performance of factors that are important to organizations in order to stimulate continuous improvement.

***Question IX:***
***Differentiate between Value Added and Non-value Added activities.***

**Value Added and Non-value Added activities**

| Value-added activities (VA) | Non-value-added activities (NVA) |
|---|---|
| These are activities necessary for the performance of the process. | These are additional and extraneous activities, not fully necessary for the performance of the process. |
| These represent work that is valued by the external or internal customer. | These represent work that is not valued by the external or internal customer. |
| They improve the quality or function of a product. Hence, the customers are usually willing to pay for the service. VA activities result in "Cost" and not in losses. | NVA activities do not improve the quality or function of a product or service but they can adversely affect costs and prices. NVA activities create waste, result in delay of some sort, add cost to the products or services for which the customer is not willing to pay. |
| **Example:** Making product more versatile for certain other uses. | **Examples:** Moving materials and machine set up for a production run. |

***Question X:***
***State Business applications of ABM.***

**Business applications of ABM:**

**Cost reduction:** ABM helps the organization to identify costs activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity. It is useful in identifying and quantifying process waste and providing vehicle for continuous process improvement through continuous cost reduction.

**Activity Based Budgeting:** Activity based budgeting analyses the resource input or cost for each activity. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to (both in financial and non-financial terms) those activities with major discrepancies for potential reduction in supply or resources. It is a planning control system, which seeks to support the objectives of continuous improvement.

**Business process re-engineering:** Business process re-engineering involves examining business processes, current operations of organization and making substantial changes to current organizational operations. A business process consist of linked set of activities. For example purchase of materials is a business process consisting of activities such as

purchase requisition, identifying suppliers, preparing purchase orders, mailing purchase orders and follow up. The process can be re-engineered by sending the production schedule direct to the suppliers and entering into contractual agreement to deliver materials according to the production schedule.

**Benchmarking:** It involves comparing products, services or activities with other best performing organization, either internal or external to the firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented.

**Performance measurement:** Activity performance measures consists of measures relating to costs, time, quality and innovation. For achieving product quality, some illustrative performance measures are :

| Area | Measures |
|---|---|
| Quality of purchased component | Zero defects |
| Quality of output | Percentage yield |
| Customer Awareness | No. of orders; No. of complaints |

***Question XI:***
***State the benefits of ABM.***

**Benefits of ABM:**

**Cost Reduction:** Provision of excellent basis and focus for cost reduction

**Budget implementation:** Provides operational management with a clear view of "how to implement an Activity Based budget."

**Cost Definition:** Provision of clear understanding of the underlying causes of business processing costs.

**Decision Making:** Provision of excellent basis for effectiveness of management decision-making.

**Resource utilization:** Identification of key process waste elements permit management prioritization and leverage of key resource.

***Question XI:***
***Differentiate between ABC & ABM.***

**Difference between ABC and ABM:**

| ABC | ABM |
|---|---|
| ABC refers to the technique of determining the costs of activities and the cost of output that those activities produce. | It refers to the management philosophy that focuses on the planning, execution and measurement of activities as the key to competitive advantage. |
| The aim of ABC is to generate improved cost data for use in managing a company's activities. | The ABM is a much broader concept. Its aim is to use information generated by ABC, for effective business processes and profitability. |

***Question XII:***
***"ABC is used as decision making tool"- Discuss.***

**Use of ABC as decision making tool:**

**TQM:** ABC is a complement to total quality management (TQM). It provides quantitative data that can track the financial impact of improvements implemented as part of the TQM initiative. It is suggested that ABC is the most important concept introduced since TQM.

**Product Profitability Decisions:** The expansion of product lines will mean overhead allocation to all products. Using traditional financial data, overhead burden is distributed equally across the products. ABC traces the costs back to the activity. The overhead cost of the new product is correctly reflected. This allows the existing merits while leaving the new line to justify itself.

**Facility and Resource Expansion:** Often the basis for relocation or opening of a new distribution centre is based on cost associations. Reduction in freight or other logistics costs of the new facility, staff or equipment. When the number used are enterprise based, the return might not be as expected. The ABC model can identify the specific cost elements being targeted, providing a much clearer picture from which management can act.

**HR Decision:** ABC can augment decision support for human resources. Where activity and therefore cost, can be associated to an individual, new levels of financial performance can be determined. Adding or deleting resources slots can be determined based on costs of activities as well. The added data provided through ABC can present a number of options including outsourcing, productivity improvements through automation and determination of employee/revenue ratios.

## Questions from past examinations:

**Q. 1**
State the need for emergence of ABC. (May 2004) (4 marks)

**Answer:**
The need for emergence of ABC:

- Traditional product costing systems were designed when company's manufactured narrow range of products.
- Direct material and direct labour were dominant factors of production then.
- Companies were in seller's market
- Overheads were relatively small and distortions due to inappropriate treatment were not significant.
- Cost of processing information was high.
- Today companies produce a wide range of products.
- Overheads are significant in value. Simple methods of apportioning overheadson direct labour or machine hours basis is not justified.
- Companies are in buyer's market.
- Non volume related activities like material handling, set up etc. are important and their costs cannot be apportioned on volume basis.
- Cost of processing information is low.

**Q. 2**
***Explain briefly four different categories of activities that drive the expenses at the product level. (November 2002) (3 marks)***

**Answer:**
Refer question III

**Q. 3**
***What are the areas in which activity based information is used for decision making? (November 2000) (4 marks)***

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

Pricing
Market segmentation and distribution channels
Make or Buy decisions and outsourcing
Transfer Pricing
Plant closed down decisions
Evaluation of offshore production
Capital Investment decisions
Product line profitability

# CHAPTER 15 - TOTAL QUALITY MANAGEMENT (TQM)

***Question I: Define TQM. What are the core concepts of TQM?***

**Definition**:
TQM is defined as a set of concepts and tools for getting all employees focused on continuous improvement in the eyes of the customer.

- The TQM approach highlights the need for a **customer-oriented approach** to management reporting, eliminating some or more of traditional reporting practices.
- TQM seeks to increase customer satisfaction by finding the factors that limit current performance.
- The emphasis of TQM is to design and build quality in the product, rather than allow defectives and then inspect and rectify them. The focus is on the causes rather than the symptoms of poor quality.

**Three core concepts of TQM:**

(a) **Quality Control (QC)**: It is concerned with the ***past***, and deals with data obtained from previous production, which allow action to be taken to stop the production of defective units.

(b) **Quality Assurance (QA)**: It deals with the ***present***, and concerns the putting in place of system to prevent defects from occurring.

(c) **Quality Management (QM)**: It is concerned with the ***future***, and manages people in the process of continuous improvement to the products and services offered by the organisation.

***Question II: What are the steps to be taken in the implementation of TQM?***

**Various stages / steps to be taken in the implementation of TQM:**

**Stage 1**: **Identification of customers / customer groups**: through a team approach (a technique called Multi-voting), the firm should identify major customer groups. This helps to priortise the list of customers and provides a focus of services.

**Stage 2**: **Identifying customer expectations**: Once the major customer groups are identified, their expectations are listed. The question to be answered is – what does the customer expect from the firm?

**Stage 3**: **Identifying customer decision-making requirements and product utilities**: Where the focus is on quality improvement, the overriding need is to stay close to the customers and follow their suggestions. In this way, a decision-support system can be developed, incorporating both financial and non-financial information, which seeks to satisfy user requirements. Hence, the firm finds outs the answer to – what are customer's decision – making requirements and product utilities? The answer is sought by listing out managerial perceptions and not by actual interaction with the customers.

**Stage 4: Identifying perceived problems in decision-making process and product utilities**: Using participative processes such as brainstorming and multi-voting, the firm seeks to list out its perception of problem areas and shortcomings in meeting customer requirements.

This will list out areas of weakness where the greatest impact could be achieved through the implementation of improvements. The firm identifies the answer to the question – what problem areas do we perceive in the decision-making process?

**Stage 5: Comparison with other organizations and bench marking**: Detailed and systematic internal deliberations allow the firm to develop a clear idea of their own strengths and weaknesses and of the areas of most significant deficiency. The benchmarking exercise allows the firm to see how other companies are coping with similar problems and opportunities.

**Stage 6: Customer feedback**: Stages 1 to 5 provide information base, developed without reference to the customer. This is rectified at stage 6 with a survey of representative customers, which embraces their views on perceived problem areas. Interaction with the customers and obtaining their views, helps the firm in correcting its own perceptions and refining its processes.

**Stage 7 & 8**: **The identification of improvement opportunities and Quality Improvement Process**: The outcomes of the customer survey, benchmarking and internal analysis provides the inputs for stages 7 and 8, i.e. the identification of improvement opportunities and the implementation of a formal improvement process. This is done through a six-step process called PRAISE, for short.

***Question III: What is PRAISE analysis? Briefly explain the difficulties experienced at each stage of PRAISE analysis and suggest remedial action.***

"PRAISE Analysis"
The identification of improvement opportunities and implementation of quality improvement process (Stages 7 and 8) of the TQM Process is through a six-step activity sequence, identified by the acronym 'PRAISE'.

| Step | Activity | Elements |
|---|---|---|
| 1 | Problem identification | • Areas of customer dissatisfaction<br>• Absence of competitive advantage<br>• Complacency regarding present arrangements |
| 2 | Ranking | Priorities problems and opportunities by<br>1. Perceived importance, and<br>2. Ease of measurement and solution |
| 3 | Analysis | • Ask "Why?" to identify possible causes. Keep asking "Why?" to move beyond the symptoms and to avoid jumping to premature conclusions.<br>Ask "What? To consider potential implications<br>Ask 'How much?' to quantify cause and effect |
| 4 | Innovation | • Use creative thinking to generate potential solution<br>• Operationalise these solutions by identifying<br>Barriers to implementation,<br>Available enablers, and<br>People whose co-operation must be sought |
| 5 | Solution | • Implement the preferred solution<br>• Take appropriate action to bring about the required changes<br>• Reinforce with training and documentation back-up |
| 6 | Evaluation | • Monitor the effectiveness of actions |

| | | |
|---|---|---|
| | | • Establish and interpret performance indicators to track<br>• progress towards objectives<br>• Identify the potential for further improvements and return<br>• to step 1 |

**Difficulties experienced at each step in the PRAISE process:**

| Step | Activity | Difficulties | Remedies |
|---|---|---|---|
| 1 | Problem Identification | • Effects of a problem are apparent but problem themselves are difficult to identify.<br>• Problem may be identifiable, but it is difficult to identify a measurable improvement opportunity<br>• Some problems are too vague to define e.g. morale, communication, productivity etc. | • Participative approaches like brainstorming, multi-voting, panel discussion<br>• Quantification and precise definition of problem |
| 2 | Ranking | • Difference in perception of individuals in ranking<br>• Difference in preferences based on functions e.g. production, finance, marketing etc.<br>• Lack of consensus between individuals | • Participative approach<br>• Subordination of individual to group interest |
| 3 | Analysis | Adoption of adhoc approaches and quick-fix solutions | Lateral Thinking<br>Brainstorming |
| 4 | Innovation | Lack of creativity or expertise<br>Inability to operationalise ideas, i.e. convert thoughts into action points. | Systematic evaluation of all aspects of each strategy |
| 5 | Solution | Resistance from middle mangers | Effective internal communication<br>Training of personnel and managers<br>Participative approach |
| 6 | Evaluation | Problems in implementation<br>Lack of measurable data for comparison of expectations with actual | Effective control system to track actuals<br>Feedback system |

Central to the PRAISE system are (a) quality control – the search for continuous improvements in quality – and (b) total employee involvement – the co-operation and commitment of employees. This dual approach provides a single focus – the customer – whose increased satisfaction remains the primary goal of the procedure.

***Question IV: Explain in brief the fundamental requirements for the implementation of quality improvement process. OR***
***What are the six C's for successful implementation of TQM?***

Fundamental requirements for the implementation of the TQM process:

1. **Commitment**: If a TQM culture is to be developed, total commitment must come from **top management**. It is not sufficient to delegate 'quality' issues to a single person. Quality expectations must be made clear by the top management, together with the support and training required for its achievement.

2. **Culture**: Training lies at the centre of effecting a change in culture and attitudes. Negative perceptions must be changed to encourage individual contributions and to make 'quality' a normal part of everyone's job.

3. **Continuous improvement**: TQM should be recognised as a 'continuous process'. It is not a 'one-time-program'. There will always be room for improvement, however small.

4. **Co-operation:** TQM visualises Total Employee Involvement (TEI). Employee involvement and cooperation should be sought in the development of improvement strategies and associated performance measures.

5. **Customer Focus**: The needs of external customers (in receipt of the final product or service) and also the internal customers (colleagues who receive and supply goods, services or information), should be the prime.

6. **Control**: Documentation procedures and awareness of current best practice are essential if TQM implementations are to function appropriately. Unless control procedures are in place, improvements cannot be monitored and measured nor deficiencies corrected.

***Question V: Explain in brief fundamental principles associated with four P's of quality improvement.***

**Fundamental principles associated with four P's of quality improvement**

***The problems listed for the PRAISE process, may lead to P of TQM process. It is possible that the organisation is led to Total Quality Paralysis instead of improvement. To avoid such disruption and paralysis the following principles (called the four P's) of TQM should be followed:***

(a) **People**: Some individuals are not ideally suited to the participatory process of TQM . This will be inferred from lack of enthusiasm, non-attendance at TQM meetings, failure to complete delegated work, remaining a "Mute Spectator" at TQM meetings etc. To avoid misdirection, TQM teams should consist of team spirited individuals who have a flair for accepting and meeting challenges.

(b) **Process**: it is essential to approach problem-solving practically and to regard the formal process as a system designed to prevent participants from jumping to conclusions. As such it will provide a means to facilitate the generation of alternatives while ensuring that important discussion stages are not omitted.

(c) **Problem**: Problems need to be approached in a bite-sized chunks, with teams tackling solvable problems with a direct economic impact, allowing for immediate feedback together with recognition of contribution made by individual participants.

(d) **Preparation**: Additional courses on creative thinking and statistical processes are needed in order to give participants a greater appreciation of the diversity of the process.

This training must quickly be extended beyond the immediate accounting circle to include employees at supervisory levels and also who are involved at the data input stage.

***Question VI: Explain three-point action plan for Smooth implementation of PRAISE process.***

A three-point action plan for implementation of the process is:

1. **Bite-sized chunks**: Big improvement opportunities are generally complex and require extensive inter departmental co-operation. The choice of a relatively small problem in the first instance provides a greater chance of success. Therefore, the TQM team has to proceed from small to big issues gradually.

2. **Solvable problem**: The problem selected should not be trivial, but it should be one with a potential impact and a clear improvement opportunity. Measurable progress towards implementation should be accomplished within a reasonable time in order to maintain the motivations of participants and advertise the success of the improvement itself.

3. **Recognition of participants**: The successful projects and team members should receive appropriate recognition throughout the enterprise. Prominent individuals should be rewarded for their efforts as a measure of personal recognition and as encouragement to others. The reward may be recognition itself, and sometimes monetary / non-monetary prizes may also be given.

**Control in the TQM**

The fundamental principles of TQM focus on continuous improvement, which enhance the satisfaction of customer requirements. A properly defined control function is essential for achievement of TQM objectives.

This control is prevalent in the TQM process in the following areas:

(a) **Process definition**: The definition of the process, inputs and outputs gives a framework for the writing of procedures and standard methods and also provides a focus for improvement opportunities. The clear definition and documentation of procedures facilitates job flexibility, makes control easier and increases the level of productivity.

(b) **Database**: Documentation of key data on processes is an important step in TQM. By charting processes for each activity, establishing time barriers, constraints, priorities degrees of difficulty and expected improvement times, a critical database is established.

(c) **Quality Manual**: It defines the basic philosophy of the organization, the structure and responsibilities of managers and departments and the relationship between them. It also contains the methods to be used to ensure quality, including the composition of teams and the audit procedure to be adopted.

(d) **Improved decision-making**: By providing a sound control environment, which supports business decisions with appropriate measurement and analysis, the controllership function pursues complete customer satisfaction. The aim is to achieve acknowledged industry leadership for excellence of process, personnel and service.

(e) **Control and continuous improvement**: TQM facilitates not only control, but also continuous improvement. The monitoring of the data around a process will allow modifications which makes it in-control and capable. As changes or improvements are made they are documented and the system updated so that everyone uses the current best method.

(f) **Use of Control reports**: Diagrams, Statistical quality control charts and cost of quality reports are prepared for periodic review of the TQM system in operation. The deviation from expected costs are analysed for suitable corrective action. The various types of costs to be reported are (i) Prevention Costs; (ii) Appraisal Costs; (iii) Internal failure costs; and (iv) External Failure Costs.

**Components of cost to be reported in a Cost of Quality Report**

1. **Prevention Costs**: These are incurred in preventing the production of products that do not conform to specification. They include the costs of preventive maintenance, quality planning and training and the extra costs of acquiring higher quality.

2. **Appraisal Costs**: These are incurred to ensure that materials and product meet quality performance standards. They include the costs of inspecting purchased parts, work in process and finished goods, quality audits and field test.

3. **Internal Failure Costs**: These are associated materials and products that fail to meet quality standards. They include costs incurred before the product is dispatched to the customer, such as the costs of scrap, repair, downtime and work stoppages caused by defects.

4. **External failure Costs**: These are incurred when inferior products are delivered to customers. They include the cost of handling customer complaints, warranty replacement, repairs of returned products and the costs arising from a damaged company reputation.

**Note**: Prevention and appraisal cost are called Costs of Quality Compliance while Internal and costs are called Costs of Non-compliance.

**Principles of TQM**

- Clear exposition of the benefits of a project
- Total Employee Involvement (TEI)
- Process measurement
- Involvement of all customers and contributors
- Elimination of irrelevant data
- Understanding the needs of the whole process
- Use of graphical and pictorial techniques to achieve understanding
- Establishment of performance specifications and targets
- Use of errors to prompt continuous improvement
- Use of statistics to tell people how well they are doing.

Remedies to correct misdirection in TQM

***TQM may become misdirected on the following grounds:***

(a) Focus on documentation process and ill-measurable outcomes
(b) Emphasis on quality assurance rather than improvement; and
(c) Internal-focus, which is at odds with the alleged customer orientation.

***This can be correction by reviving the customer focus with total employee involvement (TEI), oriented towards organizational goals. This will involve the following areas of thrust:***

1. Loyalty to the vision of the company through the pursuit of tough, visible goals.
2. Recognition of satisfied customers and motivated employees as the true assets of a company.
3. Delegation of decision-making to the point of responsibility by eliminating hierarchical ties of authority to allow direct and speedy response to customer needs.
4. Decentralisation of management to make best use of the creative energy of the workforce.

## Questions from past examinations:

**Q. 1**
How does TQM facilitate value addition in an organization? (Nov. 2002)

**Answer:**
Refer to Q I (only definition part) above

**Q. 2**
***Explain the critical success factors for the implementation of a programme of TQM. (May 2004)***

**Answer:**
***Critical success factors of TQM:***

The focus should be on customer needs
Everyone within the organization should be involved in TQM
The focus should be on continuous improvement
The aim should be to design and produce quality products
Introduce an effective performance measurement system that ensures continuous improvements from the customer's perspective
Existing rewards and performance measurements should be renewed to encourage quality improvements
Appropriate training and education should be given so that everyone is aware of the aims of TQM

**Q. 3**
***Define TQM. What are the six C's for successful implementation of TQM? (May 2005)***

**Answer:**
Refer to Q I (only definition part) and Q IV above

# CHAPTER 16 - VALUE CHAIN ANALYSIS (VCA)

Competitive advantage for a company means not just matching or surpassing their competitors, but discovering what the customers want and then profitably satisfying and even exceeding their expectations. As barriers to global trade are diminishing, customers can acquire the best of what they want, at an acceptable price, from anywhere in the world.

A strategic tool to measure the importance of the customer's perceived value is value chain analysis.

***Question I: Define Value Chain Analysis.***

**Porter's Definition:**

Value chain is the series of internal processes or activities a company performs, "to design, produce, market, deliver and support its product. A firm's value chain and the way its performs individual activities are a reflection of its history, its strategy, its approach of implementing its strategy, and the underlying economics of the activities themselves."

The value chain for any firm is the value – creating activities all the way from basic raw material sources, from component suppliers through to the ultimate end-use product delivered into the final consumers' hands.

**Classification of business activities for VCA purpose:**

Porter classified business activities into (a) Primary or Line activities and (b) Support activities

(a) **Primary activities** are directly involved in transforming inputs into outputs and delivery and after sales support to output. They are handled by line functions in an organisation. They include:

Material handling and warehousing
Transforming inputs into final product
Order processing and distribution
Communication, pricing and channel management, and
Installation, Repair and parts replacement

(b) **Support activities** are activities that support primary activities. They are handled by the organisation's staff functions and include:

Procurement – purchasing of raw materials, supplies and other consumable items as well as assets.

Technology Development – know-how, procedures and technological inputs needed in every value chain activity.

Human resource management – Selection, promotion and placement, appraisal, rewards; management development and labour / employee relations.

Firm Infrastructure – general management, planning, finance, accounting, legal government affairs and quality management.

***Question II: Explain Industry Value Chain.***

- Industry Value Chain refers to the series of activities, which add value to the product supplied to the industry.
- It starts with the value-creating processes of suppliers, who provide the basic raw materials and components.
- It continues with the value creating processes of different classes of buyers or end-use consumers and culminates in the disposal and recycling of materials.

***Question III:***

**Firm's competitive advantage**

a. To survive and prosper in an industry, a firm must meet two criteria (1) Supply what customers want to buy, and (2) Survive competition

b. A firm's overall Competitive Advantage is derived from the difference between Value Offered to Customers and Cost of creating that customer value.

c. This Competitive advantage takes two possible forms (1) Differentiation Advantage and (2) Low-Cost Advantage. A comparative analysis of these forms is given below:

| Differentiation Advantage | Low - Cost Advantage |
|---|---|
| It occurs when customers perceive that a firm's product offering is of higher quality, involves less risk and/or outperforms competing products offered by competitors. Customers are thus willing to pay a premium price for this product. | A firm enjoys a relative low-cost advantage if its total costs are lower than the market average. |
| **Gained by**:<br>Ability to deliver goods & services in timely manner<br>Producing better quality<br>Provision of after-sales support services<br>Offering a wider range of goods and services etc. | **Gained by:**<br>Access to low cost raw material<br>Innovative process technology<br>Access to distribution channels<br>Economies of scale<br>Superior operating management etc. |
| **Advantage can be exploited by**:<br>Increasing prices to offsets the improvement in customer benefits thus maintaining current market share; or<br><br>Pricing below the 'full-premium' level in order to build market share. | **Can be exploited by:**<br>(1) Pricing the products lower than it's competitor's so as to gain market share and maintain current profitability or,<br>(2) Matching with the price of competing products and increase its profitability. |
| Superior relative differentiation position offers the customers better value for an equivalent price. | Superior relative cost position offers customers equivalent value for a lower price. |

***Question IV: Explain, how value chain approach help an organization to assess its competitive advantage. OR***
***Explain the steps, which are involved in value chain approach for assessing competitive advantage.***

**Use of VCA to assess competitive advantage**

A company can gain competitive advantage not just by matching or surpassing its competitors, but discovering what the customers want and then profitably satisfying and even exceeding, customer expectations. This is done by a concept called Value Chain analysis (VCA).

VCA can be used to better understand which segment, distribution channels, price points, product differentiation, selling propositions and value chain configurations will yield the firms the greatest competitive advantage.

Use of VCA to assess competitive advantage involves the following analyses:

- **Internal Cost analysis** – to determine the sources of differentiation (including the cost) within internal value-creating processes
- **Internal Differentiation analysis** – to under the sources of differentiation (including the cost) within internal value-creating processes; and
- **Vertical Linkage analysis** – to understand the relationships and associated costs among external suppliers and customers in order to maximize the value delivered to customers and to minimize cost.

The following actions and steps are involved in the above analyses:

| Stage | Description |
|---|---|
| 1. | **Internal Cost Analysis:**<br>• Identify the firm's value creating processes<br>• Determine the portion of the total cost of the product or services attributable to each value-creating process.<br>• Identify the cost drivers for each process.<br>• Identify the links between processes<br>• Evaluate the opportunities for achieving relative cost advantage. |
| 2. | **Internal Differentiation Analysis:**<br>• Identify the industry's value creating processes<br>• Evaluate differentiation strategies for enhancing customer value<br>• Determine the best sustainable differentiation strategies |
| 3. | **Vertical Linkage Analysis**<br>• Identify the industry's value chain and assign costs, revenues and assets to value-creating processes.<br>• Diagnose the cost drivers for each value-creating process; and<br>• Evaluate the opportunities for sustainable competitive advantage |

**Features of this analysis:**

- **Not mutually exclusive** – Firms begin by focusing on their internal operations and gradually widening their focus to consider their competitive position within their industry.
- **Continuous** – VCA is a continuous process of gaining competitive advantage not a one-time affair.

- **Part of Strategic Planning**: VCA is a process of gathering, evaluating and communicating information for business decision-making.

**Steps involved in Internal Cost Analysis (Stage 1)**

**1. Identify the firm's value-creating processes**

- Traditionally, the firm organizes itself into departments based on cost, revenue profit and investment centers. These centers are useful for control but are not very useful for identifying value-creating processes.
- Adopting a process perspective requires a horizontal view of the organization beginning with product inputs and ending with outputs and customers.
- Processes are structured and measured sets of activities designed to produce a specified output for a particular customer or market.
- Emphasising process means focusing not on what work is done but on how work is done within the organization.
- Process Structure differs from traditional hierarchical structure and shows how the organization delivers customer value. While it is not possible to measure or improve hierarchical structure in any absolute sense, processes lend themselves to such measures as cost, time, output quality and customer satisfaction.

**2. Determine the portion of total cost of the product/service attributable to each value creating process:**

- A full-cost approach provides the best estimate of life-cycle costs for evaluating the strategic cost advantage of a firm's value-creating process.
- For estimating the full cost of each value-creating activity, full utilization of the capacity of the activity or its practical capacity is normally used. Facility managers and equipment vendors are useful sources of capacity estimates. When cost vary dramatically, companies should seek more information for a more realistic long-term estimate of capacity.

**3. Identify the cost drivers for each process**

- By listing cost drivers, a firm can assign priorities among its cost improvement initiatives.
- In order to determine its relative cost advantage, a firm should also know the cost factors of its competitors.
- Multiple cost drivers are identified for each value-creating process. These may be classified into (a) Structural cost drivers (covering aspects such as Scale, Scope, learning, Technology and Complexify etc.) and (b) Executional Cost Drivers (Capacity utilization, plant layout, Product design, Employee participation, Supplier and customer liaison, etc.)

| Structural Cost Drivers | Executional Cost Drivers |
|---|---|
| • They consist of organizational factors that determine the economic structure driving the cost of firm's product.<br>• These cost drivers reflect a firm's long-term firm in its decisions, which position the industry and marketplace.<br>• Structural cost drivers may change. | • They capture a firm's operational decisions on how and best to employ its resources to achieve its goals objectives.<br>• These cost drivers are determined by management policy, style and culture. They are comparatively short term.<br>• Executional cost drivers may improve.<br>• Example:-Worker empowerment |

| | |
|---|---|
| • Example: Large pharmaceutical companies economies of scale that lower their unit enjoy costs for expensive R&D | and flattened continuous organization help many firms in their improvement efforts. |

**4. Identify the links between processes**

- Activities within a value chain are interdependent and hence firms must identify value chain linkages among interdependent activities that may impact their total cost.
- Cost improvement programs in one value chain process may lower or increase costs and/or revenues in other processes. Transfer of goods and services from one value chain process to another increases cost. Eliminating these transfer or costs has an impact on overall costs in the subsequent chain.
- Such linkage offer sustainable competitive advantage, because of their subtle, complex and inimitable nature.

**5. Evaluate the opportunities for achieving relative cost advantage**

- Using the value chain approach, a company goes beyond simple across-the-board cuts and attempts to lower cost and improve efficiency within each value-creating process. For instance a company might negotiate lower costs of process inputs such as wages or purchases, or evaluate make-or-buy options.
- Reducing process input costs may consist of measures such as negotiating lower wages, moving production to countries with cheaper labour costs, entering into long term contracts with suppliers at reduced prices, etc. Companies also use buyer-seller partnerships to gain advantages in cost quality, flexibility, delivery and, technology.
- Using Pareto Analysis company should prioritize its value-creating processes since 20% of value creating processes often account for 80% of total costs.

**Steps in Internal Differentiation Analysis (Stage 2)**

**Identify the customers' value-creating processes**:

To pursue a superior differentiation strategy, a firm's processes must enhance the value of its customers. Therefore, a firm should carefully study the value-creating processes of its customers.

**Evaluate differentiation strategies for enhancing customer value**:

This involves identification of the value-creating processes that distinguishes a firm's products or services from those of its competitors. This can be achieved in the following areas:

(a) **Product Features** - that are aesthetically or functionally superior

(b) **Marketing Channels** – that provide desired levels of responsiveness, convenience, variety and information.

(c) **Service and Support** – tailored to meet end-user and channel member (sophistication and urgency or need).

(d) **Brand / lineage Positioning** – that lends greater appeal to the company's products on critical selection criteria.

(e) **Price:** including both net purchase price and cost savings available to the customer through the financial services market.

**iii) Determine the best sustainable differentiation strategies:**

In order to prioritize its processes as sources of differentiation, a company must determine what attributes of each process enhance customer value.

The more unique a firm's resources and skills, the more sustainable is its differentiation advantage over competitors.

**Steps in Vertical Linkage Analysis (Stage 3)**

Vertical linkage analysis is a much broader application of internal cost and differentiation analysis that includes all upstream and downstream value-creating processes throughout the industry. It considers all links from the source of raw materials to the disposal and/or recycling of the product. It involves the following steps:

1. **Identify the industry's value chain and assign costs, revenues and assets to value creating processes.**

- The firm should identify the vertical linkages in the industry value chain, for example, the petroleum industry consist of numerous value creating processes or activities, including exploration, production, refining, marketing and distribution, which define the value chain for this industry.
- One firm may participate in all parts of this value chain; another firm may participate in only a few.
- The information systems to identify and analyse these subtle relationship should be developed
- Costs, Revenues and Assets of each value-creating process may be determined based on relevant cost approach, use of market prices, transfer prices, current replacement cost of assets, etc.

2. **Diagnose the cost drivers for each value-creating process:**

- Different cost determinants should be identified for each value-creating process.
- Direct labour-based measures may be suitable for labour-intensive activities while operating hours may be appropriate for machine based activities.

**3. Evaluate the opportunities for sustainable competitive advantage:**

- Sufficient qualitative information usually exists on a firm's major value-creating processes and the strategies for each. Such information will be difficult to obtain and may also be unreliable.
- Using benchmarking processes and by understanding how other companies compete in each process of the industry value chain, a firm can use the qualitative analysis to seek out competitive niches even if financial data are unavailable.

- To evaluate the opportunities for competitive advantage in the global marketplace, firms need to consider such things as a country's values, political climate, environmental concerns, trade relations, tax laws, inflation rates and currency fluctuations.

***Question V:***
***Explain briefly the strategic framework required for value chain analysis.***

**Strategic frameworks required for value chain analysis**
Value chain analysis requires a strategic framework of focus for organizing internal and external information, for analyzing information, and for summarizing findings and recommendations.

Recent concepts from strategists and organization experts lead to three strategic frameworks for VCA.

1. Industry structure analysis:
2. Core competencies analysis and
3. Segmentation analysis

**1. Industry Structure Analysis of Michael Porter**

It is a five-factor model to organise information about an industry structure to evaluate its potential attractiveness. Under this model, the profitability of an industry or market is measured by the long term return on investment of the average firm depends largely on the following five factors that influence profitability.

**a) Bargaining power of buyers:**

The degree of buyer power generally depends on:
Customer concentration (higher concentration of customers means greater negotiation leverage).
Propensity for customers to integrate backward (higher propensity for backward integration means greater bargaining leverage);
Costs of switching suppliers (lower switching costs means greater leverage for the buyer) and
Number of alternative suppliers (higher alternatives indicate greater customer leverage.)

**b) Bargaining power of suppliers:**

Just as powerful buyers can squeeze profits by putting downward pressure on prices, suppliers squeeze profits by increasing input costs.
The same factors that determine the power of buyers also determine the power of suppliers.
The bargaining power of suppliers and buyers relative to the firm depends on the relationships between their value chains.
Identifying the specific activities involved and the nature of their strengths and relationships can give important insights into the power balance between the buyer and seller, and how it may be altered for, the firm's benefit.

**c) Threat of substitute products or services:**

Profit potential is determined by the maximum price that customers are willing to pay, which in turn depends on the availability of substitutes.

Products with few substitutes command higher prices than products with many close substitutes since customer will prefer switching in the latter case.
A thorough understanding of the value chains of buyers as they relate to the firm's product can help in assessing (and combating) the threat of substitution.

**d) Threat of new entrants:**

- When an industry is earning a return on invested capital above the cost of capital, that industry will act as a magnet to firms outside the industry.
- Unless the entry of new firms is barred, the rate of profit must fall to the competitive level.
- Even the mere threat of entry may be sufficient to ensure that established firm's constrain their prices to the competitive level.

**e) Intensity of competition:**

- Markets experiencing rapid growth typically see less intense competition
- Rival companies can usually satisfy profitability and growth without having to take market shares from their competitiors.

**2. Core Competencies Analysis**

Core competencies are created by superior integration of technological, physical and human resources,. They represent distinctive skills as well as intangible, invisible, intellectual assets and cultural capabilities. Cultural capabilities refer to the ability to manage change, the ability to learn and team working. Organisations should be viewed as a bundle of a few core competencies, each supported by several individual skills.

Core competence based diversification reduces risk and investment and increases the opportunities for transferring learning and best practice across business units.

A core competence is identified by the following tests:

**Leverage test -** Does it provide potential access to a wide variety of markets?
**Value enhancement test** – Does it make a significant contribution to the customer's perception regarding benefits of the end product?
**Imitability test** – Can it be imitated? Does it reduce the threat of imitation by competitors?

Applying the VCA approach to core competencies for competitive advantage includes the following steps:

**Validate core competencies in current businesses**: Core competencies should tie together the portfolio of end products and help the firm excel in dominating its industry. Core competencies need to be continually validated, due to continuous technological development over time.

**Export or leverage core competencies to the value chains of other existing businesses**: The same set of core competencies can be exploited in multiple businesses by exporting core competencies to the value chains of other existing businesses.

**Use core competencies to reconfigure the value chains of existing businesses**: While firms may manage their existing value chains better than their competitors, sophisticated

firms work harder on using their core competencies to reconfigure the value chain to improve payoffs. Otherwise competitors may, exploit opportunities.

**Use core competencies to create new value chains**: With strong core competencies in its existing businesses, an organization can seek new customers by developing new value chains.

### 3. Segmentation Analysis (Stage 3)

Industries are sometimes collections of different market segments. Vertically integrated industries are examples of a string of natural businesses from the source of raw material to end use by the final consumer. Not all firms ill an industry participate in all segments.

Segmentation analysis will reveal competitive advantages and disadvantages of different segments. A firm may use this information to decide whether to exit the segment, to enter a segment, reconfigure one or more segments, or embark on cost reduction/differentiation programs.

Using the value chain approach for segmentation analysis, Grant recommended five steps:

1. **Identify segmentation variables and categories**:
   The market may be divided into a number of segments using appropriate bases. Some approaches to define market segments are:

| Based on customer characteristics | Based on Product |
|---|---|
| Geographic | Use-type |
| Type of organization | Usage |
| Size of firm | Benefits sought |
| Life-style customers | Prices sensitivity |
| Age | Competition |
| Occupation | Brand Loyalty |

2. **Construct a segmentation matrix**: After customer and product-related variables have been selected for identifying different segments, a segmentation matrix can be developed. Two or more dimensions may be used to partition an industry. For example restaurants could be divided into four dimensions; types of cuisine, price range, type of service (e.g. sit-down, buffet, cafeteria, take-out, fast food) and location.

3. **Analyse segment attractiveness**: Competitive assessments using industry structure analysis or core competencies analysis can also be used to evaluate the profitability of different segments. However the competitive focus shifts to an analysis of the different segments. In addition, the interrelationship among segments must be carefully considered.

4. **Identify key success factors for each segment**: Quality, delivery, customer satisfaction market share, profitability and return on investment are common measures of corporate success. In this regard, each segment must be assessed using the most appropriate key success factors. Cost and differentiation advantages should be highlighted by these measures. Examination of differences among segments in buyers' purchase criteria reveal clear differences in key success factors.

5. **Analyse attractiveness of broad versus narrow segment scope**: The competitive advantage of each segment may be identified in terms of low cost and/or differentiation. Sharing costs across different market segments may provide a competitive advantage. Taxing a narrow segment focus may leave a firm vulnerable to competitors. A segment justifying a unique strategy may be of worthwhile size to support a business strategy.

***Question VI:***
**What are the limitations of Value Chain Analysis?**

**Non-availability of data:** Internal data on costs, revenues and assets used for value chain analysis are derived from financial information of a single period. For long-term strategic decision-making, changes in cost structures, market prices and capital investments etc. may not be readily available.

**Identification of stages:** Identifying stages in an industry's value chain, is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into tow or more stages when an outside firm does not compete in these stages is strictly judgment.

**Ascertainment of cost, revenues and assets**: Finding the costs revenues and assets for each value chain activity poses/gives rise to serious difficulties. There is no scientific approach and much depends upon trial and error and experimentation methods.

**Identification of cost drivers**: Isolating cost drivers for each value-creating activity, identifying value chain linkages across activities, and computing supplier and customer profit margins present serious challenges.

**Resistance from employees**: Value chain analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers.

**Science Vs. Art:** Value chain analysis is not an exact science. It is more "art" than preparing precise accounting reports. Certain judgments and factors of analysis are purely subjective and differ from person to person.

***Question VII:***
***Describe the role of Management Accountant in Value chain analysis.***

**Impact of VCA on Organisational and Managerial Accounting**

Management Accountants should recognize that the traditional, functional, internally oriented information system is inadequate for the firm engaged in global competition. In order to facilitate Value chain analysis, there should be a change in focus for management accounting. The Management Accountant's role will be significant in the following areas:

1. **Need for education, training and awareness:** Management Accountants should bring the importance of customer value to the forefront of management strategic thinking. They should take the initiate to bring the value chain message to major players in the firm through seminars, articles, value chain examples and company-specific applications.

2. **Exploring for information:** VCA requires expertise in internal operators and information and also demands a great deal of external information. Management accountants must seek relevant financial and non-financial information from sources outside the organization.

3. **Creativity:** Management accountants must integrate databases and potential sources of timely information on competitive forces confronting the business. This calls for innovation and creativity in gathering and analyzing information for management decisions.

4. **System design:** Designing internal and external in to assist managers in planning, monitoring and improving value-creating processes is another challenge facing management accountants.

5. **Cooperation:** Management accountants should solicit support from all senior mangers for allocating resources to develop and improve value chain-oriented information systems. The management accountant should ensure that the top management is committed to value chain analysis and the organizational changes necessary for its successful implementation.

***Question VIII:***
***Differentiate between traditional management accounting & value chain analysis.***

| | **Traditional Management Accounting** | **Value Chain analysis** |
|---|---|---|
| Focus | Internal | External |
| Perspective | Seeks cost reduction in Value added process i.e. Sale Price - Cost of Raw materials. | Seeks competitive advantage based on entire set linked activities from suppliers to end-use customs. |
| Number of Cost Drivers | A single cost driver is adopted. Cost is generally based on volume production and sales. | Multiple cost drivers are adopted i.e:<br>• Structural drivers (e.g.scale, scope, experience, technology and complexity)<br>• Executional drivers (e.g., participation management and plant layout. |
| Use of Cost Driver | Application at the overall firm level (cost-volume-profit analysis) | A set of unique cost drivers is used for each value activity. |
| Cost Containment Philosophy | Seeks adhoc cost reduction solutions by focusing on variance analysis, performance evaluation based on financial and quantitative data | View cost containment as a function of the cost drivers regulating each value activity.<br>• Exploit linkages with suppliers<br>• Exploit linkages with customers<br>• Exploit process linkages within the firm<br>• "Spend to save" |
| Cost preferences | Focus on control of manufacturing costs | Focus on gaining advantage and not only on cost control and reduction. |
| Nature of data | Internal Information | External and internal information |
| Benchmarking | Partially present Inter-finance comparison, if any, is generally restricted to financial and operational information. | Focus on full-fledged benchmarking learning from competitors but exploiting one's own strengths gain advantage. |
| Insights for | Limited to some extent | Identify cost drivers at the individual |

| | | |
|---|---|---|
| Strategic Decisions | | activity level and develop cost/differentiation advantage either by controlling those drivers better than competating by reconfiguring the value chain, Quantify and assess "supplier power" and "buyer power" a exploit linkages with suppliers and buyers. |

## Questions from past examinations:

**Q. 1**
Explain, how value chain approach help an organization to assess its competitive advantage? (November 2002) (3 marks)

**Answer:**
Refer to Question IV above. (Since the question was for three marks, students should write only points a to c)

**Q. 2**
Compare Value Chain analysis from Traditional Management Accounting (November 2003) (Marks 4)

**Answer:**
Refer to Question VIII above. (Since the question was for four marks, students are expected to write about 5 – 6 points only)

**Q. 3**
What steps are involved in value chain analysis approach for assessing competitive advantages? (May 2005) (Marks 4)

**Answer:**
Same as Q. 1 above

# CHAPTER 17 - BUDGETARY CONTROL

***Question I:***
***Define the term budget.***

**Budget** is a financial and/or quantitative statement, prepared and approved prior to a defined period of time of the policy to be pursued during that period for the purpose of attaining a given objective. It may include income, expenditure and employment of capital.

**Features:**
(a) Financial and/or Quantitative statement
(b) Futuristic – prepared and approved prior to a defined period of time
(c) Goal Oriented – for the purpose of attaining a given objective
(d) Components – income, expenditure and employment of capital

***Question II:***
***Discuss the objectives of introducing a budgetary control system in an organization.***

**The objective of budgeting are:**

a) To encourage self-study in all aspects of a company's operations.
b) To get all members of management to "put their heads" to the basic question of how the business should be run to make them a co-ordinated team operating in unison towards clearly defined objectives.
c) To force a definition and crystallization of company policies and aims.
d) To increase the effectiveness with which people and capital are employed.
e) To disclose areas of potential improvement in the company's operations.
f) To stimulate study of relationship of the company to its external economic environment for improving the effectiveness of its direction.

***Question III:***
***Define the term budgetary control.***

**Budgetary Control:**

**Definition:** Budgetary Control is defined as "the establishment of budgets, relating the responsibilities of executives to the requirement of a policy, and the continuous comparison of actual with budgeted results either to secure by individual action the objective of that policy or to provide a base for its revision."

**Salient features**:

(a) **Objectives**: Determining the objectives to be achieved, over the budget period, and the policy or policies that might be adopted for the achievement of these ends.

(b) **Activities**: Determining the variety of activities that should be undertaken for the achievement of the objectives.

(c) **Plans**: Drawing up a plan or a scheme of operation in respect of each class of activity in physical as well as monetary terms for the full budget period and its parts.

(d) **Performance evaluation**: Laying out a system of comparison of actual performance by each person, section or department with the relevant budget arid determination of causes for the discrepancies, if any.

(e) **Control Action**: Ensuring that corrective action will be taken where the plan is not being achieved and, if that be not possible, for the revision of the plan.

***Question IV:***
***Define the objectives of budgetary control.***

**Objectives of budgetary control system**
The objectives of a budgetary control system are:

(a) **Definition of Goals**: Portraying with precision, the overall aims of the business and determining targets of performance for each section or department of the business.

(b) **Defining responsibilities**: Laying down the responsibilities of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged.

(c) **Basis for performance evaluation**: Providing basis for the comparison of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures. It helps to take timely corrective measures.

(d) **Optimum use of resources:** Ensuring the best use of all available resources to maximize profit or production, subject to the limiting factors.

**Coordination:** Co-ordinating the various activities of the business and centralizing control, but also facility for management to decentralise responsibility arid delegate authority.

**Planned action:** Engendering a spirit of careful forethought, assessment of what is possible and an attempt at it. It leads to dynamism without recklessness. It also helps to draw up long range plans with a fair measure of accuracy.

**Basis for policy:** Providing a basis for revision of current and future policies.

Providing a yardstick against which actual results can be compared.

***Question V:***
***Briefly describe the Role of a Budget Officer.***

**Role of a Budget Officer:**

- Successful implementation of budgetary control system depends upon the Budget Committee.

- The Budget Committee would be composed of all functional heads and a member from the Board to preside over and guide the deliberations.

- The Budget Committee acts through the Budget Officer whose responsibilities include:

(a) **Functional Budget preparation:** To assist in the preparation of the various budgets by coordinating the work of the accounts department which normally compiles the budgets, with the relevant functional departments like Sales, Production, Plant maintenance etc.

(b) **Communication to Responsible Centres:** To forward the budget to the individuals who are responsible to adhere to them and to guide them in overcoming any practical difficulties in its working.

(c) **Coordination:** To prepare the periodical budget reports for circulation to the individuals concerned, coordinating with them in the formulation of budgets for subsequent periods.

(d) **Follow-up:** To determine the follow-up action to be taken on the budget reports.

(e) **Budget Committee Review:** To prepare an overall budget working report for discussion at the Budget Committee meetings and to ensure follow-up on the lines of action suggested by the Committee.

(f) **Board Review:** To prepare periodical reports for the Board meeting, comparing the budgeted Profit and Loss Account and the Balance Sheet will the actual results.

***Question VI:***
***What are the advantages and limitations of Budgetary Control System?***

**Advantages of Budgetary Control System**

**Efficiency:** It enables the management to conduct its business activities in an efficient manner. Effective utilization of scarce resources, i.e. men, material, machinery, methods and money – is made possible.

**Cost Control:** It is powerful instrument used by business houses for the control of their expenditure. It inculcates the feeling of cost consciousness among workers.

**Performance evaluation:** It provides a yardstick for measuring and evaluating the performance of individuals and their departments.

**Standard Costing and Variance analysis:** It creates suitable conditions for the implementation of standard costing system in a business organization. It reveals the deviations to management from the budgeted figures after making a comparison with actual figures.

**Policy formulation:** It helps in the review of current trends and framing of future policies.

**Limitations of Budgetary Control System**

**Estimates:** Budgets may or may not be true, as they are based on estimates. The assumptions about future events may or may not actually happen.

**Rigidity:** Budgets are considered as rigid document. Too much emphasis on budgets may affect day-to-day operations and ignores the dynamic state of organization functioning.

**False Sense of Security:** Mere budgeting cannot lead to profitability. Budgets cannot be executed automatically. It may create a false sense of security that everything has been taken care of in the budgets.

**Lack of coordination:** Staff co-operation is usually not available during budgetary control exercise.

**Time and Cost:** The introduction and implementation of the system may be expensive.

***Question VII:***
***Define Flexible Budget. What is the need for Flexible Budget? Explain the situations in which Flexible Budget may be used.***

**Flexible Budget:**
**Meaning:** It is a budget, which is designed to change in relation to level of activity by recognizing the difference between fixed, semi-variable and variable costs.

**Need:** The need for preparation of flexible budgets arises in the following circumstances

Seasonal fluctuations in sales and/or production, for example in soft drinks industry.
Introduction of new products, product design and versions on a frequent basis.
Industries engaged in make-to-order business like shipbuilding;
An industry which is influenced by changes in fashion; and
General change in sales
Flexible budgeting may be resorted to in the following situations:

- **New Business:** In the case of new business venture due to its typical nature it may be difficult to forecast the demand of a product accurately.

- **Uncertain Environment:** Where the business is dependent upon the mercy of nature e.g. a person dealing in wool trade may have enough market if temperature goes below the freezing point.

- **Factor market conditions:** In the case of labour intensive industry where the production of the concern is dependent upon the availability of labour.

***Question VIII:***
***What are the steps involved in the preparation of budgets?***

**Steps involved in the preparation of budgets?**

**Definition of Objectives:** Objectives should be defined precisely. They should be written out; areas of control de-marketed and items of revenue and expenditure to be covered by the budget stated. This will give a clear understanding of the plan and its scope to all those who must cooperate to make it a success.

**Identification of key (or budget) factor:** A key factor represents source whose availability is less than its requirement. Such resource constraints put a limit on the organization objective of maximum profitability. Some examples are lack of sales demand, rationing of raw material, labour shortage, plant capacity etc. For proper budgeting, the key factor must be located and estimated properly.

**Budget Committee and Controller:** Formulation of a budget usually requires whole time services of a senior executive; he must be assisted in this work by a Budget Committee, consisting of all the heads of department along with the Managing Director as the Chairman. The Controller is responsible for coordination and development of budget programmes and preparing the Budget Manual .

**Budget Manual:** The Budget manual is a schedule, document or booklet, which shows in a written form, the budgeting organization and procedure. The manual should be well written and indexed so that a copy thereof may be given to each department head for guidance.

**Budget period:** The period covered by a budget is known as budget period. Normally a calendar year or a period coterminous with the financial year is adopted as the Budget Period. It is then sub-divided into shorter periods – it may be months or quarters or such period as coincide with period of trading activity.

**Standard of activity or output:** The standards of activity levels for future period should be laid down. These are generally based on past statistics, known market changes and current conditions and forecast of future situations. In a progressive business, the achievement of a year must exceed those of earlier years. In budgeting, fixing the budget of sales and capital expenditure are most important since these budgets determine the extent of development activity.

***Question IX:***
***What is Zero Base Budgeting?***

**Zero Base Budgeting (ZBB):**

**Meaning:** It is an expenditure control device where each divisional head has to justify the requirement of funds for each head of expenditure and prepare the budget accordingly, without reference to the past budget or achievements.

It is an operating planning and budgeting process, which requires each manager to justify his entire budget requests in detail from “scratch” (hence zero-base).

**Features:**

**Wholistic:** The technique deals practically with all the elements of budget proposals.

**Analytical:** A critical evaluation of all the ongoing activities is also done afresh together with new proposals. Each manager has to justify whey he should spend any money at all.

**Priority Based:** This approach requires that all activities be identified as decision on packages, which would be evaluated by systematic analysis and ranked in order of importance.

**Review Based:** an organisation should not only make decisions about the proposed new-programmes but it should also from time to time, review the ”utility” and “appropriateness” of the existing programmes.

**Rational:** It allows for budget reductions and expansions in a rational manner and allows re-allocation of resources from low to high priority programme.

***Question X:***
***Explain the Steps in Zero Base Budgeting.***

**Steps in Zero Base Budgeting (ZBB)**

ZBB involves the following:

**Objectives:** Determination of a set of objectives is one of pre-requisite and essential step in the direction of ZBB technique.

**Coverage:** Deciding about the extent to which the technique of ZBB is to be applied, whether in all areas of organisation's activities or only in a few selected areas on trial basis.

**Decision Areas :**Identify those areas where decisions are required to be taken.

**Ranking:** Developing decision – package and ranking them in order of preference.

**Budgeting:** Preparation of budget, that is translating decision packages into practicable units items and allocating financial resources.

***Question XI:***
***What are the advantages and limitations of ZBB?***

**Advantages of ZBB:**
The advantages of zero-base budgeting are as follows.

**Priority allocation:** It provides a systematic approach for the evaluation of different activities and ranks them in order of preference for the allocation of scarce resource.

**Maximum Efficiency:** It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.

**Cost Benefit Analysis:** It provides an opportunity to the management to allocate resource for various cost benefit analysis. The chances of arbitrary cuts and enhancement are thus avoided.

**Elimination of wasteful expenditure:** The areas of wasteful expenditure can be easily identified and eliminated.

**Goal Congruence:** Department budgets are closely linked with corporate objectives.

**Management by Objectives:** The technique can also be used for the introduction and implementation of the system of 'management by objective' Thus it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

**Limitations of ZBB:**

**Lack of Coordination:** Various operational problems are likely to be faced in implementing the technique of ZBB. It requires the wholehearted support from top management.

**Old is Gold Attitude:** Generally managers are reluctant to start afresh. They tend to plan for future just by reference to past actions and budgets.

**Time Consuming:** It is time consuming as well as costly.

**Lack of trained staff:** It needs properly trained managerial personnel to do the required job.

***Question XII:***
***Explain Performance Budgeting. What are its features and advantages? OR What are its requisites?***

**Performance Budgeting:**
**Meaning:**
It is the process of analysing, identifying, simplifying and crystallizing specific performance objectives, of a job to be achieved over a period, within the framework of organizational objectives, the purposes and objectives of the job.
The technique is characterised by its specific direction towards the business objectives of the organization.

**Features and Advantages:**
Performance budgeting lays immediate stress on the achievement of specific goals over a period of time.

It aims at a continuous growth of the organisation so that it continues to meet the dynamic needs of its growing clientle.

It enables the organization to be sensitive and adaptive, preventing it from developing rigidities, which may retard the process of growth.

It requires the preparation of periodic performance reports, which compare budget and actual performance to find out existing variances.

**Important considerations in Performance Reporting:**
The important considerations in drawing up of reports and determining their scope are the following:

| | |
|---|---|
| Significance | Reliability – Are the facts in the report reliable?<br>Cause or Effect – Does it either call for action or demonstrate the effect of action |
| Timeliness | Latest time – How late can the information be and still be of use?<br>Earliest Time – What is the earliest moment at which it could be used if it were available?<br>Frequency – How frequently is it required? |
| Accuracy | How small should be an inaccuracy, which does not alter the significance of the information.<br>What doubtful elements does it contain? Could any of them or all together make a material difference? |
| Appropriateness | • Receiver – is the recipient the right person to take any action that is needed?<br>• Additional Information – Is there any other information which is required to support the information to anyone else jointly interested? |
| Discrimination | • Will anything be lost by omitting the item?<br>• Will any of the items gain from the omission? |

| | |
|---|---|
| | • Is the responsibility for suppressing the item acceptable? |
| Presentation | • Clarity – Is the report clear and unbiased?<br>• Form – Is the form suitable to the subject and to the recipient ? |

**Performance Reports:**

A. **Top Management**: (including Board of Directors and financial mangers)
Balance Sheet
Profit & Loss Statement
Position of Stock;
Disposition of funds or working capital
Capital expenditure and forward commitments together with progress of projects in hand.
Cash flow statements;
Sales, production, and other appropriate statistics

B. **Sales Management**
Actual sales compared with budgeted sales to measure performance by (a) products; (b) territories; (c) individual salesmen; and (d) customers.
Standard profit and loss, product-wise (a) for fixing selling prices and (b) to concentrate on sales of most profitable products.
Selling expenses in relation to budget and sales value analysed by (a) products; (b) territories; (c) individual salesmen; and (d) customers
Bad debts and accounts, which are slow and difficult in collection.
Status reports on new or doubtful customers.

C. **Production management**
- **To Buyer:** Price variations on purchases analysed by commodities.

- **To Foreman**

Operational Efficiency for individual operators duly summarized as departmental averages.
Labour utilization report and causes of lost time and controllable time;
Indirect shop expenses against the standard allowed; and
Scrap report

**To Works Manager**

(a) Departmental operating statement
(b) General works operating statements (Expenses relating to all works expenses not directly allocable or controllable by departments);
(c) Plant utilization report;
(d) Department scrap report; and
(e) Material usage report

**Special Reports:** These are prepared at the request of general management or at the initiative of the management accountant. Some examples are :

Taxation legislation and its effect on profits
Estimates of the earning capacity of a new project
Break-even analysis
Capital budgeting decisions

Special pricing analysis
Make or buy certain components

***Question XIII:***
***What is balanced score card? What are its advantages?***

**Balanced Score Card:**

Balanced Score Card is a set of financial and non-financial measures relating to a company's critical success factors.

It is an approach advocated by Kaplan & Norton, which provides information to management to assist in strategic policy formulation and achievement.

The **main objective** of Balanced Score Card is to provide a comprehensive framework for translating a firm's strategic objectives into a coherent set of performance measures.

**Advantages of Balanced Score Card:**

(a) **Wholistic approach:** It brings strategy and vision as the center of management focus. It helps companies to assess overall performance, improve operational processes and enable management to develop better plans for improvements. It provides management with a comprehensive picture of business operations.

(b) **Overall Agenda:** It brings together in a single management report many of the seemingly desperate elements like customer oriented, shortening response time, improving quality etc. of competitive agenda.

(c) **Objectivity:** It emphasizes the need to provide the user with a set of information, which addresses all relevant areas of performance in an objective and unbiased manner.

(d) **Management By Objectives:** The methodology of balanced score card facilitates communication and understanding of business goals and strategies at all levels of an organization. Thus it enables management by objective.

(e) **Feedback and Learning:** It provides strategic feedback and learning. The Balanced Score Card guards against subordination. It emphasizes an integrated combination of traditional and non-traditional performance measures.

(f) **System Approach:** It help senior manages to consider all important performance measure together and allows them to see whether an improvement in one area has been achieved at the expense of another.

***Question XIV:***
***Explain briefly the major components of a balanced score card.***

**Components of a balanced score card:**

A well designed balanced score card combines financial measures of past performance with measures of firm's drivers of future performance.

The specific objectives and measures of an organisation's balanced score card are derived from the firm's vision and strategy.

Generally, the balanced score card has the following perspectives from which a company's activity can be evaluated.

**Customer perspective i.e how customers see us?** In order to translate effective internal processes into organization success, customers/clients must be happy with the service they receive. The Customer perspective considers the business through the eyes of the customers, measuring and reflecting upon customer satisfaction.

**Internal perspective i.e. in what must the organization excel?** The internal perspective focuses attention on the performance of the key internal processes, which drive the business. The nature of the processes is dependent on the nature of the organization.

**Innovation and learning perspective, i.e Can we continue to improve and create value?** The value & Growth perspective is a measure of potential future performance – it direct attention to the basis of all future success – the organization people and infrastructure. Adequate investment in these areas is critical to all long-term success.

**Financial, perspective i. e. How we look to our shareholders?** The financial perspective measures the results that the organisation delivers to it shareholders.

Thus, the scoreboard provides a view of an organization's overall performance by integrating financial measures with other key performance indicators. All these four perspective provide a balanced view of the present and future performance of the business.

***Question XV:***
***What are the stages involved in the creation of a balanced score card. Explain them briefly.***

**Process of creating a Balanced Score Card:**

| Step | Description |
|---|---|
| 1 | **Identify the vision** i.e. where an organization is going. For example, the vision of a company may be to dominate the market. |
| 2. | **Identify the organisation's strategies** i.e. how an organization is planning to go there. For example, strategy may be to focus on cost efficiency, high quality and fresh investment in new technology. |
| 3. | **Define critical success factors and perspective** i.e. what we have to do well in each perspective (see Note Below for illustration of perspectives and performance measures) |
| 4. | **Identify measures**, which will ensure that every thing is going in the expected way. |
| 5. | **Evaluation** of Balanced score card i.e. ensuring what we are measuring is right. |
| 6. | **Create action plans** and plan reporting of the Balanced Score Card. |
| 7. | **Follow–up and manage** i.e. which person should have reports and how reports should look like |

A. **Customer Perspective**

| Goals | Performance |
|---|---|
| Price | Competitive price |
| Delivery | Number of on time delivery, lead time from receipt of order to delivery to customers. |
| Quality | Own quality relative to industry standards, number of defects or defect level |

| | |
|---|---|
| Support | Response time, customer satisfaction surveys |

**Internal business Perspective**

| Goals | Performance |
|---|---|
| Efficiency of manufacturing process | Manufacturing cycle time |
| Sales penetration | Annual sales vs. Plan sales, increase in number of customers in a unit of time. |
| New Product introduction | Rate of new product introduction/quarter |

C. **Innovation and Learning Perspective**

| Goals | Performance |
|---|---|
| Technology leadership | Product performance compared to competitors, number of new products with patented technology. |
| Cost leadership | Manufacturing overheads per quarter as a percentage of sales rate of decrease in cost of quality per quarter |
| Market leadership | Market share in all major markets |
| Research and development | Number of new products, numbers of patents |

D. **Financial Perspective**

| Goals | Performance |
|---|---|
| Sales | Revenue and profit growth |
| Cost of sales | Extent to which it remained fixed or decreased each year |
| Profitability | Return on capital employed |
| Prosperity | Cash flow |

***Question XVI:***
***What do you understand by benchmarking?***

**Bench Marking:**

- Benchmarking is the process of identifying and learning from the best practices anywhere in the world.
- It is powerful tool for continuous improvement in performance.
- It involves comparing firm's products, services or activities against other best performing organization, either internal or external to the firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented.
- It attempts to identify an activity that needs to be improved and finding a non-rival organization that is considered to represent world-class best practice and studying how it performs the activity.

***Question XVII:***
***Explain briefly the Different types of Bench marking.***

**Different types of Bench marking:**

(1) **Competitive Bench marking:** It involves the comparison of one's own products, processes and business results **with that of competitors**. Bench marking partners are

drawn from the same industry. To protect confidentiality it is common for the companies to undertake this type of benchmarking through associations of third parties.

(2) **Strategic Benchmarking:** It involves a systematic process by which a company seeks to improve its overall performance by examining the long-term strategies. It involves comparing high-level aspects such as developing new products and services, core competencies etc. It is similar to process benchmarking in nature but differs in its scope and depth.

(3) **Global benchmarking:** It is a benchmarking through which distinction in international culture, business processes and trade practices across companies are bridged and their ramification for business process improvement are understood and utilized. Globalisation and advances in information technology leads to use of this type of benchmarking.

(4) **Process benchmarking:** It involves the comparison of an organisation's critical business processes and operations against best practice organization that performs similar work or deliver similar services.

(5) **Functional benchmarking:** This is used when organizations look to benchmark with partners drawn from different business sectors or areas of activity to find ways of improving similar functions or work processes. This sort of benchmarking can lead to innovation and dramatic improvements.

(6) **Internal Benchmarking:** It involves seeking partners from with the same organization, for example from business units located in different areas. The main advantages are (a) Easy access to sensitive data and information (b) Availability of standardized data; and (c) Lesser requirement of time and resources. However, real innovation may be lacking.

(7) **External Benchmarking:** It involves seeking help of outside organization that are know to be best in class. It provides opportunities of learning from those who are at leading edge. However, this type of benchmarking may take up more time and resource to ensure the comparability of data and information. The credibility of the findings and the development of sound recommendation.

a. **Intra-Group Benchmarking**: Here the groups of companies in the same industry agree that similar units within the cooperating companies will pool data on their process. The processes are benchmarked against each other at or near operation level. 'Improvement Task forces' are established to identify and transfer best practice to all members of the group.

b. **Inter-industry benchmarking:** In inter-industry benchmarking a non-competing business with similar process is identified and asked to participate in a benchmarking exercise. For example, a publisher of schoolbook may approach a publisher of university level books to establish benchmarking relationship.

***Question XVIII:***
***Explain the Stages involved in the process of Benchmarking.***

**Stages in the process of Benchmarking**

**Stage 1: Planning**

(a) Determination of benchmarking goal statement: This requires identification of areas to be benchmarked, which uses the following criteria:

| Benchmark for Customer Satisfaction | Benchmark for improving Bottom line |
|---|---|
| • Consistency of product or service<br>• Process cycle time<br>• Delivery performance<br>• Responsiveness to customer requirements<br>• Adaptability to special needs | • Waste and reject levels<br>• Inventory levels<br>• Work-in-Progress<br>• Cost of sales<br>• Sales per employee |

(b) **Identification of best performance**: The next step is seeking the best. To arrive at the best is both expensive and time consuming , so it is better to identify a company, which has recorded performance success in a similar area.

(c) **Establishment of the benchmarking or process Improvement team:** This should include persons who are most knowledgeable about the internal operations and will be directly affected by changes due to benchmarking.

(d) **Defining the relevant benchmarking measures:** Relevant measures will not include the measures used by the organization today but they will be refined into measures that comprehend the true performance differences. Developing good measurement is key to successful benchmarking.

**Stage 2: Collection of data and information:** This involves the following steps

- Compile information and data on performance. They may include mapping processes.
- Select and contact partners
- Develop a mutual understanding about the procedures to be followed and, if necessary, Benchmarking Protocol with partners.
- Prepare questions
- Distribute schedule of questions to each partner
- Undertake information avid data collection by chose method for example, interview, site-visits, telephone, fax and e-mail.
- Collect the findings to enable analysis.

**Stage 3: Analysis of findings:**

Review the findings and produce tables, Charts and graphs to support the analysis

Identify gaps in performance between our organization and better performers.

Seek explanations for the gaps in performance. The performance gaps can be positive negative or zero.

Ensure that comparisons are meaningful and credible.

Communicate the findings to those who are affected.

Identify realistic opportunities for improvements. The negative performance gap indicates an undesirable competitive position and provides a basis for performance improvement. If there is no gap it may indicate a natural position relative to the performance being benchmarked. The zero position should be analysed for identifying means to transform its performance to a level of superiority or positive gap.

**Stage 4: Recommendations:**

1. **Making recommendations:**

Deciding the feasibility of making the improvements in the light of the conditions that apply within own organization.

Agreement on the improvements that are likely to be feasible

Producing a report on the Benchmarking in which the recommendations are included.

Obtaining the support of key stakeholder groups for making the changes needed.
Developing action plans for implementation.

2. **Implementing recommendations:**
   (a) Implement the action plans
   (b) Monitor performance
   (c) Reward and communicate successes
   (d) Keep key stakeholders informed of progress.

**Stage 5: Monitoring and reviewing:** This involves:
   (a) Evaluating the benchmarking process undertaken and the results of the improvement against objectives and success criteria plus overall efficiency and effectiveness.
   (b) Documenting the lessons learnt and make them available to others
   (c) Periodically re-considering the benchmarks for continuous improvement.

***Question XIX:***
***What are the Pre-requisites for successful benchmarking?***

**Pre-requisites for successful benchmarking**

1. **Commitment:** Senior managers should support benchmarking and must be committed to continuous improvements.

2. **Clarity of Objectives:** The objectives should be clearly defined at the preliminary stage. Benchmarking teams have a clear picture of their organisation's performance before approaching others for comparisons.

3. **Appropriate Scope:** The scope of the work should be appropriate in the light of the objectives resources, time available and the experience level of those involved.

4. **Resources:** Sufficient resources must be available to complete projects within the required time scale.

5. **Skills:** Benchmarking teams should have the right skills and competencies.

6. **Communication:** Stakeholder, particularly staff and their representatives are to be kept informed of the reasons for benchmarking.

***Question XX:***
***Discuss briefly the difficulties in the implementation of Benchmarking.***

**Difficulties in implementation of Benchmarking**

1. **Time consuming:** Benchmarking is time consuming and at times difficult. It has significant requirement of staff time and company resources. Companies often waste time in benchmarking non-critical functions.

2. **Lack of Management Support:** Benchmarking implementation require the direct involvement of the senior manager etc. The drive to be best in the industry or world cannot be delegated.

3. **Resistance from employees:** It is likely that there may be resistance from employees.

4. **Paper Goals:** Companies can become preoccupied with the measure. The goal becomes not to improve process but to match the best practices at any cost.

5. **Copy-paste attitude:** The key element in benchmarking is the adaptation of a best practice to tailor it to a company's needs and culture. Without that step, a company merely adopts another company's process. This approach condemns benchmarking to fail.

***Question XXI:***
***What are benchmarking code of conduct?***

**Benchmarking Code of Conduct:**

To contribute to efficient, effective, and ethical benchmarking, individuals agree for themselves and their organization to abide by the following principles for benchmarking with other organizations.

(a) **Principle of Legality**: Avoid discussion or actions that might lead to or imply an interest in restraint of trade; market or customer allocation schemes, price fixing dealing arrangements bid rigging, bribery or misappropriation. Do not discuss costs with competitors if costs are an element of pricing.

(b) **Principles of Exchange**: Be willing to provide the same level of information that you request in any benchmarking exchange.

(c) **Principle of Confidentiality**: Treat benchmarking interchange as something confidential to the individuals and organizations involved. Information obtained must not be communicated outside the partnering organization without prior consent of participating benchmarking partners. An organization's participation in a study should not be communicated externally without their permission.

(d) **Principle of Use:** Use information obtained through benchmarking partnering only for the purpose of improvement of operations with the partnering companies themselves. External use or communications of a benchmarking partner's name with their data of observed practices requires permission of that partner. Do not, as a consultant of client, extend one company's benchmarking study findings to another without the first company's permission.

(e) **Principle of first part Contact:** Initiate contacts, whenever possible, though a benchmarking contact designated by the partner company. Obtain mutual agreement with the contact on any hand off of communication or responsibility to other parties.

(f) **Principle of Third Party Contact:** Obtain an individual's permission before providing their name in response to a contact request.

(g) **Principle of Preparation:** Demonstrate commitment to the efficiency and effectiveness benchmarking process with adequate preparation at each process particularly, at initial partnering contact.

***Question XXII:***
***Explain Optimised Production Technology (OPT) and Throughout Accounting (TA).***

**Optimised Production Technology (OPT) and Throughout Accounting (TA)**

Goldratt and Core advocated a new approach to production management called Optimised Production Technology (OPT)

OPT is based on the principle that profits are expanded by increasing the throughout of the plant i.e. rate at which raw materials are turned into sales.

The OPT approach determines whatever prevents throughout being higher by distinguishing between bottleneck and non-bottleneck resources.
This approach advocates that bottleneck resources/activities should be fully utilized while non-bottleneck resources/activities should not be utilized to 100% of their capacity since it would result in increase in inventory.
The most widely recognized management accounting system developed for this purpose is known as Throughout Accounting (TA).

***Question XXIII:***
***Explain the concept and aim of Theory of Constraints.***

**Theory of Constraints (TOC):**
TOC focuses its attention on constraints and bottlenecks within the organization that hinder speedy production. The main concept is to maximize the rate of manufacturing output i.e. the throughput (Sales + Closing WIP - Opening WIP) of the organization.

This requires examination of the bottlenecks and constraints, which are defined as under:

**Bottleneck:** It is an activity within the organization where the demand for that resource is more than it's capacity to supply.

**Constraint:** It is a situational factor, which makes the achievement of objectives/throughput more difficult than it would otherwise be, e.g. lack of skilled employees, lack of customer orders or the need to achieve a high level of quality in product output.

**Relationship between Constraint and Bottleneck:** A bottleneck is always a constraint but a constraint need not be a bottleneck. For example, let the major constraint be meeting the delivery schedule for customer's orders. The bottleneck in such a case may be certain machine in the factory.

Throughput is thus related directly to the ability to cope with the constraint and to manage the bottleneck. This focus on throughput forced management to examine both the constraints and the bottleneck in order to increase throughput.

**Operation of TOC:**
The main aim of TOC is to increase throughput contribution. This can be done by techniques such as

1. Linear programming for allocating the optimum use of bottleneck resources.
2. Use of shadow prices for decision making and
3. Variance analysis using Activity Based Costing Techniques.

Thus, theory of constraint attempts to do the following:

**Objective:** Maximise Throughput Contribution (i.e. Sales revenue Loss Direct materials)
**Constraints:** subject to

Production capacity (supply constraints)
Sales demand (demand constraints)

***Question XXIV:***
***What are the key measures of Theory of Constraints?***

**Key measures advocated by the Theory of Constraints**

**Throughput contribution:** It is the rate at which the system generates profits through sales. It is defined as Sales revenues less completely variable costs. Labour costs tend to be partially fixed are excluded. Direct material costs includes purchased components and material handling costs.

**Investments (Inventory):** it is equal to the sum of material costs of direct materials inventory, work-in-progress and finished goods inventory; R&D Costs and the costs of equipment and buildings.

**Other operating costs:** It is equal to all costs (other than direct materials) incurred to earn throughput contribution. Other operating costs includes salaries and wages, rent utilities and depreciation.

***Question XXV:***
***Explain briefly the steps involved in managing bottleneck resources.***

**Key steps in managing bottleneck resource**

TOC describes the process of identifying and taking steps to remove the bottlenecks that restrict output. It considers short-run time horizons and assumes other current operating costing to be fixed costs. They key steps in managing bottleneck resources are :

1. **Identify System Bottleneck:** This involves identification of constraints, which restrict output from being expanded.

2. **Describe how to exploit the bottleneck:** Only the bottleneck can restrict or enhance the flow of products. It is therefore essential to ensure that the bottleneck activity is fully utilized. Decision regarding the optimum-mix of products to be produced by the bottleneck activity must be made.

3. **Subordinate decision:** This step requires that the optimum production of bottleneck activity should determine the production schedule of the non-bottleneck activities.

   Example: A Product requires parts processed on different machines. Some operations cannot be started until parts from previous operations are available. This results in waiting time as under:

   1. Parts that require processing at a bottleneck machine must wait in line until the bottleneck machine is free.
   2. Parts made on non-bottleneck machines must wait until parts coming off the bottleneck machines arrive.

   Hence the workers of non-bottleneck machines should not be motivated to improve their productivity if the additional output cannot be processed by bottleneck machine.

Producing more non-bottleneck output results in increase in WIP inventories and no increase in sales volume. So the preferred course of action is that bottleneck machines should setup pace for non-bottleneck machine.

4. **Bottleneck Removal or Improvement:**
   This involves either of two actions:

Remove (that is elevate) the bottleneck e.g. replacing a bottleneck machine with a faster one. If the bottleneck activity has been replaced by a new bottleneck activity it is necessary to return to step1 and repeat the process.

Increase bottleneck efficiency and capacity. This might involve providing additional training for a slow worker or changing the design of the product to reduce the processing time required by a bottleneck activity.

## Questions from past examinations:

**Q. 1**
What are the advantages and limitation of Zero base budgeting? (November 2004) (4 marks)

**Answer:**
Refer page 119

**Q. 2**
What are benchmarking code of conduct? (November 2004 (3 marks)

**Answer:**
**(As the question was for only 3 marks only following needs to be written.)**

**Bench Marking:**
- Benchmarking is the process of identifying and learning from the best practices anywhere in the world.
- It is powerful tool for continuous improvement in performance.
- It involves comparing firm's products, services or activities against other best performing organization, either internal or external to the firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented.
- It attempts to identify an activity that needs to be improved and finding a non-rival organization that is considered to represent world-class best practice and studying how it performs the activity.

**Suggested Benchmarking Code of Conduct:**
1. Principle of Legality
2. Principles of Exchange
3. Principle of Confidentiality
4. Principle of Use
5. Principle of first part Contact
6. Principle of Third Party Contact
7. Principle of Preparation

**Q. 3**

Explain the theory of constraints. (November 2003) (4 marks)

**Answer:**
Refer page 129

**Q. 4**
What do you mean by benchmarking? What are the pre-requisites for benchmarking? (November 2003) (5 marks)

**Answer:**
Refer page 124 and 127

**Q. 5**
State the main types of information which will be required by a manager to implement the balanced score card approach to performance measurement. (May 2003) (4 marks)

**Answer:**
Refer page 122

**Q. 6**
State, how is zero base budgeting superior to traditional budgeting? (November 2002) (4 marks)

**Answer:**
Write Advantages of ZBB. Refer page 119