

REVISIONARY TEST PAPER

JUNE 2012

FOUNDATION



**THE INSTITUTE OF
COST ACCOUNTANTS OF INDIA**

12, SUDDER STREET, KOLKATA-700 016

Copyright of these Revisionary Test Paper is reserved by the Institute of Cost Accountants of India and prior permission from the Institute is necessary for reproduction of these Answers either in whole or in part.

GUIDELINES TO STUDENTS

- 1. Students are advised to consult Study Notes and Text Books supplemented by the Revisionary Test Papers.**
- 2. Working Notes should be a part of Answers.**
- 3. Assumptions should be logical and clearly stated in the Answer.**

CONTENTS

FOUNDATION EXAMINATION (REVISED SYLLABUS - 2008) GROUP - IV

	<i>Page No.</i>
Paper-1 : Organization & Management Fundamentals	1 – 35
Paper-2 : Accounting	36 – 82
Paper-3 : Economics and Business Fundamentals	83 – 106
Paper-4 : Business Mathematics & Statistics Fundamentals	107 – 136

Published by :

**DIRECTORATE OF STUDIES
THE INSTITUTE OF COST ACCOUNTANTS OF INDIA
12, Sudder Street, Kolkata - 700 016**

FOUNDATON EXAMINATION

(REVISED SYLLABUS - 2008)

Paper - 1 : ORGANIZATION & MANAGEMENT FUNDAMENTALS

Section - I

[Organisation]

Q. 1. Do you agree with the following statement? Write 'Yes' or 'No', giving proper reasoning in support of your answer.

- (a) Organization invade us and shape our destinies.
- (b) Conflict refers to uncertainty in an organization.
- (c) Perception means an individual's view of reality.
- (d) Programmed decisions are not repetitive.
- (e) The organizational performance is judged in terms of goals.
- (f) Decentralization is nothing but an advanced form of delegation of authority.
- (g) Informal organistaion is a joint personal activity without conscious common purpose.
- (h) The mission statement of an organistaion refers to the target to be achieved during a period.
- (i) The need for joint decision-making is the only source of inter-group conflict.
- (j) Organization is a structure.

Answer 1.

- (a) **Yes** – We are born in organizations, educated by organizations and most of us spend much of our lives working for organization. Most what we eat, what we do, where we go, our values, hopes, dreams etc. are basically part of organization that surrounded us and influence us. In fact, organization invade us and shape our destinies.
- (b) **No** – Conflict is a process which suggests that it contains some activities leading to certain results. Conflict is structured. It provides an individual a chance to think again, undertake self-introspection and have a second look. It leads to innovation and to new direction and it energises people to mild stimulation.
- (c) **Yes** – Perception is a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment.
- (d) **No** – Programmed decisions are repetitive and routine decisions. Rules and policies are established well in advance to solve the day-to-day problems in an organization quickly. These are made by lower level managers. In organizations where the market and technology are relatively stable, and many routine and highly structured problems can be solved, programmed decisions are taken.
- (e) **Yes** – The goals of an organistaion represent the standards and targets to be achieved in a specific period.
- (f) **Yes** – When delegation is persistently and consistently practiced in an organization wide content, it results in decentralization. So decentralistaion is the effect of delegation of authority. It is an advanced form of delegation of authority.

- (g) **Yes** – Informal organization is a voluntary association of person in an establishment without being formed by the authorities in power.
- (h) **No** – Mission statement of an organization tells what it is, why it exists and the unique contribution it can make. To choose a mission is to answer the basic question : “What business we are in ?”
- (i) **No** – The source of intergroup conflict lies in :
 - (i) The need for joint decision-making, and
 - (ii) The differentiation of goals or perceptions or both.
- (j) **Yes** – Organization structure is the method of reducing the variability in behaviour in order to achieve a common purpose in a coordinated manner.

Q. 2. (a) What are the non-financial incentives of motivation.

(b) State the advantages of functional departmentation.

Answer 2. (a)

Non-financial incentives also known as psychological incentives, are usually given in the form of amenities or facilities, do not offer cash reward to the employee for any specific or measured work done. Such non-monetary benefits create psychological effect by making the working conditions and terms of employment lucrative enough to induce the employee to increase his efforts. The benefit goes to all the employees in the undertaking and is not limited to any individual, class or group.

The non-financial incentives may be offered in several ways. They are :

- (a) Favourable working conditions
- (b) Medical facilities to the individual and his family
- (c) Educational facilities
- (d) Welfare measures
- (e) Cheap grains
- (f) Subsidised canteen
- (g) Recreational amenities
- (h) Housing facilities
- (i) Pension schemes
- (j) Fund contributions
- (k) Protective clothing, liveries, uniforms etc
- (l) Tea, milk, etc for specially arduous work.

The non-monetary incentives of motivation also include: appraisal, job evaluation, ranking, classification, factor comparison, points rating, assessment centres and performance related pay.

Answer 2. (b)

The following are some of the advantages of functional departmentation :

- (i) It allow work to be carried out by individuals who are qualified and skilled in the area concerned.
- (ii) Reduces cost by reducing work duplication and use of resources in the organization.
- (iii) Each individual in the same department will acquire the same work experiences or training, communication and co-ordinating, thereby reducing problem for management.
- (iv) Efficient use of resources, economies of scale.
- (v) In-depth skill specialization and development.
- (vi) Career progress within functional departments.

- (vii) Excellent coordination within functions.
- (viii) High-quality technical problem solving.
- (ix) Motivated employees to develop their skills.
- (x) Compatible employees because of similar training and expertise.
- (xi) Excellent communication and coordination among employees within each department.

Q. 3. (a) What are the main factors influencing attitude?

(b) What do you mean by the term 'delegation of authority'? What are the basic steps in delegation?

Answer 3. (a)

The main factors influencing attitudes are as under :

- (i) Personality factors.
- (ii) Social factors
- (iii) Organizational factors
- (iv) Economic factors
- (v) Political factors.

Answer 3. (b)

A manager alone cannot perform all the tasks assigned to him. In order to meet the targets, the manager should delegate authority. Delegation of Authority means division of authority and powers downwards to the subordinate. Delegation is about entrusting someone else to do parts of your job. Delegation of authority can be defined as subdivision and sub-allocation of powers to the subordinates in order to achieve effective results.

Delegation is the assignment of authority and responsibility to another person to carry out specific activities. Delegation is normally from a manager to a subordinate. However the person who delegated the work remains accountable for the outcome of the delegate work. It allows a subordinate to make decisions, i.e. it is a shift of decision-making authority from one organizational level to a lower one.

The process of delegation has to go through the following steps :

Assignment of responsibilities :

This is the most crucial step that trigger delegation. In this step the superior authority list out the responsibilities to be assigned to the subordinate by answering the questions with reliable reasons:

- What to delegate?
- When to delegate?
- Whom to delegate? and
- How to delegate?

Granting of Authority :

Mere assigning of responsibilities alone cannot ensure execution of such responsibilities by the subordinate. For smooth execution of the assigned responsibilities, the subordinate would require authority. Therefore assigning of responsibility and granting of authority should go together to the subordinate.

Ensuring of Accountability :

Delegation of Authority does not become complete with assigning of responsibilities and granting of authority. The superior is required to build accountability on the part of the subordinate to ensure that assigned responsibilities are carried out and delegated authority is used judiciously. This part should be taken care of in the M&E plan and also through regular and effective performance appraisal.

Q. 4. (a) What is Contingency theory?**(b) What is conflict? What are the levels of conflicts in any organization ? How can conflict be managed successfully?****Answer 4. (a)**

Contingency theory is a behavioral theory that claims that there is no single best way to design organizational structures. The best way of organizing e.g. a company, is, however, contingent upon the internal and external situation of the company.

The contingency approach to organizational design tailors the design of the company to the sources of environmental uncertainties faced by the organization. The point is to design an organizational structure that can handle uncertainties in the environment effectively and efficiently.

Therefore, previous theories such as Weber's theory of bureaucracy and Taylor's scientific management approach sometimes fail because they neglect that effective management styles and organizational structures are influenced by various aspects of the environment: the contingency factors. Therefore, there can not be ONE optimal organizational design for every company, because no companies are completely similar, and because every company faces its own set of unique environmental contingencies that result in different levels of environmental uncertainties.

Some important contingencies for companies are listed below :

1. Technology
2. Suppliers and distributors
3. Consumer interest groups
4. Customers and competitors
5. Government
6. Unions

When making an analysis of the contingencies in the environment, a PESTEL analysis could also be very helpful.

Contingency theory has historically sought to develop generalizations about the formal structures that would fit the use of different technologies. This focus was put forward by Joan Woodward (1958), who argued that technologies directly determine organizational attributes such as span of control, centralization of authority, and the formalization of rules and procedures.

Theorists such as P.R. Lawrence and J. W. Lorsch found that companies operating in less stable environments operated more effectively, if the organizational structure was less formalized, more decentralized and more reliant on mutual adjustment between various departments in the company. Likewise, companies in uncertain environments seemed to be more effective with a greater degree of differentiation between subtasks in the organization, and when the differentiated units were heavily integrated with each other.

On the other hand, companies operating in more stable and certain environments functioned more effectively if the organization was more formalized, centralized in the decision-making and less reliant on mutual adjustment between departments. Likewise, these companies do probably not need a high degree of differentiation of subtasks and integration between units.

Tom Burns and G.M. Stalker found similar results in their research, where organizations operating in more stable environments tend to exhibit a more mechanistic organizational structure, where companies operating in more dynamic and uncertain environments tend to show a more organic organizational structure.

Business leaders should therefore look at the contingencies of the environment, and assess whether or not the organization is capable of handling the uncertainties of the environment, and whether or not the organization is able to process the required amount of information.

Answer 4. (b)

Conflict occurs whenever :

- Disagreements exist in a social situation over issues of substance.
- Emotional antagonisms cause frictions between individuals or groups.

Types of conflict.

- **Substantive conflict.**
 - A fundamental disagreement over ends or goals to be pursued and the means for their accomplishment.
- **Emotional conflict.**
 - Interpersonal difficulties that arise over feelings of anger, mistrust, dislike, fear, resentment, etc.
- **Interpersonal conflict.**
 - Occurs between two or more individuals who are in opposition to one another.
- **Intergroup conflict.**
 - Occurs among members of different teams or groups.

Interorganizational conflict.

- Occurs in the competition and rivalry that characterize firms operating in the same markets.
- Occurs between unions and organizations employing their members.
- Occurs between government regulatory agencies and organizations subject to their surveillance.
- Occurs between organizations and suppliers of raw materials.

Functional (or constructive) conflict.

- Results in positive benefits to individuals, the group, or the organization.
- Likely effects:
 - Surfaces important problems so they can be addressed.
 - Causes careful consideration of decisions.
 - Causes reconsideration of decisions.
 - Increases information available for decision making.
 - Provides opportunities for creativity.

Dysfunctional (or destructive) conflict.

- Works to the disadvantage of individuals, the group, or the organization.
- Likely effects :
 - Diverts energies.
 - Harms group cohesion.
 - Promotes interpersonal hostilities.
 - Creates overall negative environment for workers.

Indirect conflict management approaches.

- Reduced interdependence.
- Appeals to common goals.
- Hierarchical referral.
- Alterations in the use of mythology and scripts.

Q. 5. (a) What Is Free-form Organisation?**(b) What are the four pillars of classical theory of organization?****Answer 5. (a)**

Like formal and informal organisation, a free organisation is an organisation where there is mutual understanding between employees and everyone is independent to share internal matters of concern along with suggestions to improve the conditions therein. Understanding the increasing number of disputes between labour union and higher authorities, this form has been introduced in this sector. Although there are some policies and regulations framed so that it shouldn't be overlooked in sense of social and personal welfare of the economy as well as organisation.

Answer 5. (b)

Four pillars of classical theory of organization are as follows :

(i) Division of Labor

- Adam Smith was the first who emphasized the importance of division of labor.
- He indicated that a worker who produces 20 pins a day, might produce more through division of labor.
- Smith estimated that there were about 18 different jobs involved in the production of pins.
- By assigning different jobs to different workers, 10 workers could produce 48000 pins a day.
- Smith's concept of division of labor became the basis of a theory of organizational efficiency.

(ii) The scalar and functional processes

- deals with the vertical and horizontal growth of an organization.
- the scalar process refers to the growth of the chain of command, the delegation of authority and responsibility and unity of command.
- the functional process refers to the division of the organization into specialized parts and the regrouping of the parts into compatible units.

(iii) Structure

- Classical Organization theory usually deals with two basic structures: Line and Staff
- Line functions are those which have direct responsibility in the accomplishment of the objectives.
- only Line functions have the power or authority to initiate and carry out organizational activities.
- Staff has no authority over other parts of the organization. It only advises and serves.
- staff is available to and can be used by all units of the organization.
- staff are expertise who have special knowledge, skills and experience.

(iv) Span of Control

- refers to the number of subordinates an administrator can effectively supervise.
- acc. to Classical Org. theory no supervisor can directly supervise the work of more than five or at the most six subordinates.

Q. 6. (a) Authority and responsibility are one and the same thing. Discuss.**(b) Explain the term "attitudes"? How attitudes are formed?****Answer 6. (a)**

Authority and responsibility are not the same thing. The difference between these two are as follows :

RESPONSIBILITY :

Responsibility is the obligation to accomplish the goals related to the position and the organization. Managers, at no matter what level of the organization, typically have the same basic responsibilities when it comes to managing the work force: Direct employees toward objectives, oversee the work effort of employees, deal with immediate problems, and report on the progress of work to their superiors. Managers' primary responsibilities are to examine tasks, problems, or opportunities in relationship to the company's short-and long-range goals. They must be quick to identify areas of potential problems, continually search for solutions, and be alert to new opportunities and ways to take advantage of the best ones. How effectively goals and objectives are accomplished depends on how well the company goals are broken down into jobs and assignments and how well these are identified and communicated throughout the organization.

AUTHORITY :

Authority is seen as the legitimate right of a person to exercise influence or the legitimate right to make decisions, to carry out actions, and to direct others. For example, managers expect to have the authority to assign work, hire employees, or order merchandise and supplies.

As part of their structure, organizations have a formal authority system that depicts the authority relationships between people and their work. Different types of authority are found in this structure: line, staff, and functional authority. Line authority is represented by the chain of command; an individual positioned above another in the hierarchy has the right to make decisions, issue directives, and expect compliance from lower-level employees. Staff authority is advisory authority; it takes the form of counsel, advice, and recommendation. People with staff authority derive their power from their expert knowledge and the legitimacy established in their relationships with line managers. Functional authority allows managers to direct specific processes, practices, or policies affecting people in other departments; functional authority cuts across the hierarchical structure. For example, the human resources department may create policies and procedures related to promoting and hiring employees throughout the entire organization.

Authority can also be viewed as arising from interpersonal relationships rather than a formal hierarchy. Authority is sometimes equated with legitimate power. Authority and power and how these elements are interrelated can explain the elements of managing and their effectiveness. What is critical is how subordinates perceive a manager's legitimacy. Legitimate authority occurs when people use power for good and have acquired power by proper and honest means. When people perceive an attempt at influence as legitimate, they recognize it and willingly comply. Power acquired through improper means, such as lying, withholding information, gossip, or manipulation, is seen as illegitimate. When people perceive the authority of others as illegitimate, they are less likely to willingly comply.

Answer 6. (b)

Attitude :

A predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual's choice of action, and responses to challenges, incentives, and rewards (together called stimuli).

Four major components of attitude are (1) Affective: emotions or feelings. (2) Cognitive: belief or opinions held consciously. (3) Conative: inclination for action. (4) Evaluative: positive or negative response to stimuli.

Your attitude includes your cognitive thoughts and beliefs about a given subject, the feelings and emotions that the subject provokes in you, and your tendency towards engaging in an activity or avoiding the activity entirely. Your attitude is your motivation. There are different theories on how you developed your attitudes and how to change them. Each suggests different things about how you shaped your own attitudes.

Functionalist Theory

- In 1938, Daniel Katz offered the functionalist theory for attitude formation. He believed that attitudes have a functional role in the individual's life, believing that people develop their attitudes in order to serve a specific purpose. He also believed people change their attitudes once those attitudes no longer serve their intended purpose. Katz held that attitudes can be instrumental, knowledge, express values or work as a defense to the individual's ego. For instance, if you have a very positive attitude about your favorite movie, the attitude serves as an excuse to watch the movie regularly. However, once you no longer want to watch the movie anymore, your attitude would change.

Learning Theory

- Learning theory suggests that people learn their attitudes from outside sources, such as a child learning to hold a view because they see it in their parents or through a subconscious association from classical conditioning. Learning theory suggests that your attitudes are not likely to change unless you observe a situation that forces you to rethink your attitudes. As an example, if you purchase a new car and notice that every time you turn it on, the engine makes a terrible noise, your attitude towards your car would change as you associate it with that terrible noise.

Cognitive Dissonance Theory

- Cognitive dissonance is the theory that states that when people's actions are different from their attitudes, a natural anxiety will grow within them. Cognitive dissonance suggests that people seek to return to a happy state in their life, where their attitudes and actions are in harmony. For instance, if you went to work every day with a mindset that you hated your job, you would be acting in a way that opposes your attitude. Cognitive dissonance theory suggests that you would be miserable and seek to change either your actions or your attitude in order to bring the two into alignment.

Self-perception Theory

Self-perception theory suggests that people can learn about their own attitudes by watching their actions. The idea is that people are always acting in compliance with their attitudes. This theory is very reliant on self-evaluation. As an example, if you notice yourself looking for reasons to avoid going to work or calling in for no real reason, you can identify that you have a very negative attitude towards your job.

Q. 7. (a) Differentiate between objectives and goals.

(b) Explain any four principles of formal organization.

Answer 7. (a)

Goals vs Objectives

When you have something you want to accomplish, it is important to set both goals and objectives. Once you learn the difference between goals and objectives, you will realize that how important it is that you have both of them. Goals without objectives can never be accomplished while objectives without goals will never get you to where you want to be. The two concepts are separate but related and will help you to be who you want to be.

Definition of Goals and Objectives

Goals 'are long-term aims that you want to accomplish. Objectives 'are concrete attainments that can be achieved by following a certain number of steps. Goals and objectives are often used interchangeably, but the main difference comes in their level of concreteness. Objectives are very concrete, whereas goals are less structured.

The Differences between Goals and Objectives

When you are giving a presentation to a potential or current employer, knowing the difference between goals and objectives can be crucial to the acceptance of your proposal. Here is an easy way to remember how they differ :

Goals “ has the word ‘go’ in it. Your goals should go forward in a specific direction. However, goals are more about everything you accomplish on your journey, rather than getting to that distant point. Goals will often go into undiscovered territory and you therefore can’t even know where the end will be.

Objectives “ has the word ‘object’ in it. Objects are concrete. They are something that you can hold in your hand. Because of this, your objectives can be clearly outlined with timelines, budgets, and personnel needs. Every area of each objective should be firm.

Measuring Goals and Objectives

Goals “unfortunately, there is no set way in which to measure the accomplishment of your goals. You may feel that you are closer, but since goals are de facto nebulous, you can never say for sure that you have definitively achieved them.

Objectives ‘can be measured. Simply phrase your objective in the form of a question. For example, ‘I want to accomplish x in y amount of time’ becomes ‘Did I accomplish x in y amount of time?’ This can easily be answered in a yes or no form.

Examples of Goals and Objectives

Goals ‘I want to be a better ball player. I want to learn more about Chinese history. I want to maximize my professional performance.

Objectives ‘I want to memorize the periodic table before my next quiz. I want to increase my sales by 10% this month. I want learn to play ‘Freebird’ on the guitar.

Summary :

- (1) Goals and objectives are both tools for accomplishing what you want to achieve.
- (2) Goals are long term and objectives are usually accomplished in the short or medium term.
- (3) Goals are nebulous and you can’t definitively say you have accomplished one whereas the success of an objective can easily be measured.
- (4) Goals are hard to quantify or put in a timeline, but objectives should be given a timeline to be more effective.

Answer 7. (b)

Principles of Formal Organisation :

1. Unity of objective.

An organisation structure is sound when it facilitates the accomplishment of objectives. Therefore, the organisation as a whole and every part of it must be geared to the basic objectives of the enterprise.

2. Specialisation or division of work.

The activities of every member of the organization should be confined, as far as possible, to the performance of a single function.

3. Span of control.

Every manager should have a limited number of subordinates reporting to him directly. Generally, the span should be narrow for complex work and wide for simple and routine work. Span should be neither too wide nor too narrow.

4. Scalar principle.

There should be a clear chain of command extending from top to the bottom of the organisation. Every subordinate should know who his superior is and who his subordinates are.

5. Functional definition.

The duties (functions), authority and responsibility of every position should be clearly defined so as to avoid duplication of work and overlapping of functions.

6. Exception principle.

Only exceptional matters which are beyond the authority of lower level persons should be referred to higher levels. Routine matters should be dealt with by executives at lower levels. This is also known as authority level principle.

7. Unity of command.

Each subordinate should have only one superior whose command he has to obey. This is necessary to ensure discipline and to fix responsibility for results.

8. Balance.

A proper balance between centralisation and decentralisation should be kept. Each function in the organisation should be developed to the point at which the value received is at least equal to costs.

9. Efficiency.

The organisation structure should facilitate the achievements of objectives at minimum possible cost. It should permit the optimum use of resources.

10. Flexibility.

The organisation structure should be adaptable enough to accommodate technical and other changes in the environment. Therefore, complicated procedures, red tape and complexity of control should be avoided. At the same time, the organisation structure should be reasonably stable so as to withstand changes.

11. Continuity.

Proper arrangements should be made for the training and development of executives.

12. Facilitation of leadership.

Organisation structure should be so devised that there is enough opportunity for the management to give effective leadership to the enterprise.

13. Parity of authority and responsibility.

In every position, the authority and responsibility should correspond. Adequate authority should be delegated to all levels and wherever authority is delegated the person should be held responsible.

14. Coordination.

The organisation structure should facilitate unity of effort and co-ordination among different individuals and groups. Channels of communication should be open and clear.

Q. 8. (a) What do you understand by “Positive Reinforcement” and “Negative Reinforcement” in an organisation?

(b) What are the determinants of personality?

Answer 8. (a)

Positive & Negative Reinforcement :

Positive reinforcement occurs when a particular stimulus is presented after a behavior, and the behavior increases as a result. The word positive does not mean “good” in this case, but means that something is added. Positive reinforcement comes in many forms, including concrete reinforcers, social reinforcers, and activity reinforcers. A concrete reinforcer is something tangible that can be seen. For example, if Charlotte does all of her homework, her mom gives her a sticker.

A social reinforcer is a gesture from another person in response to a behavior. For example, if Adam slam-dunks a basketball, his friend gives him a high five.

An activity reinforcer is an opportunity to engage in a fun activity. People will do something they don't enjoy for a chance to do something that they do enjoy. For example, if Jennifer cleans her room, her mom will take her out for icecream.

Negative reinforcement is when a particular stimulus is removed after a behavior, and this causes the behavior to increase as a result. Negative in this sense does not mean "bad", but that something is subtracted or taken away.

For example, if Megan's mom is always nagging her to wash the dishes (nagging is the stimulus) and when Megan does the dishes, her mom stops nagging her, then negative reinforcement has occurred. From now on, Megan is more likely to do the dishes if only to avoid her mother's nagging.

Answer 8. (b)

Personality does not evolved by a single factor. It is a mixture of a lot of things. Some of those factors are psychological, some are physical, some are biological and some are even hereditary.

DETERMINANTS :

1. Brain

Brain is one of the most important factors of personality determinant. It is generally believed that the father and the child adopt almost the same type of brain stimulation and the later differences are the result of the environment in which the child has been grown up.

Electrical Stimulation of the Brain (**ESB**) and Split Brain Psychology (**SBP**) and the outcomes of genetic transmissions and are the tools that are used by the management of any organization to mould and amend the employee's behavior to a more positive and proper one.

2. Physical Factors

One of the most important factors in determining personality is the '**Physical Characteristics**' of an individual. It is believed that this factor plays a vital role in determining one's behavior in any organization. Physical features may involve the height of a person (short or tall), his color (white or black), his health status (fat or skinny) and his beauty (handsome or ugly).

These factors are involved when interacting with any other person and thus contribute in the personality development in many ways.

3. Social Factors

Social factors also play a vital role in determining one's personality. The things that revolve and evolve around us on a regular basis determine our personality. The society that we live in, the cultural environment that we face daily, the community we get interacted to, all are included in this factor. Relationships, co-ordination, co-operation, interaction, environment in the family, organizations, workplaces, communities, societies all contribute in way or another as personality determinants.

4. Cultural and Religious Factors

The culture in which one lives in, that may involve traditional practices, norms, customs, procedures, rules and regulations, precedents and values, all are important determinants of personality.

Moreover, the creed, religion and believes are also very important factors of personality determinants.

5. Heredity Factor

Perhaps, the most surprising and astonishing factor is the "Heredity Factor".

Q. 9. (a) Why Should a Company Have a Mission Statement?

(b) What is the relationship between staffing and human resource management.

Answer 9. (a)

A mission statement is vital to the success of a company as a whole. It can unify a company and push them to new heights. Creating a mission statement is just as important for a small company starting out.

Answer 9. (b)

The managerial function of staffing relates to the total management system. The demands for managers are compared with available talent through the management inventory. On the basis of this analysis, external and internal sources are utilized in the process of recruitment, selection, placement, promotion and separation. Other essential aspects of staffing are appraisal, career strategy, and training and development of managers. Staffing affects leading and controlling. It requires an open system approach. It is carried out within the enterprise, which, in turn, is linked to the external environment. There should be a proper link & cooperation between the internal and the external environment so as to achieve the desired goals and objectives of the organization.

Section - II [Management]

Q. 10. (a) Match the following :

<i>Column I</i>	<i>Column II</i>
A technique of planning	Conservative style
Grapevine	C.P.M.
Cautions dispositions	What business are we in
Functions of Management	Complement to organizational structure
Control technique	Process of planned change
Informal group	Budgeting
Industrial relations	Subsidized canteen
Non-financial incentives	Industrial peace and democracy
Mission	Henry Fayol
Unfreezing	Informal communication

(b) Write the full form of the following abbreviation :

- (i) OJT
- (ii) KSFs
- (iii) MBO
- (iv) OPEC
- (v) CSF
- (vi) GST
- (vii) PESB
- (viii) GD
- (ix) GNP
- (x) OD

Answer 10. (a)

Column I	Column II
A technique of planning	Budgeting
Grapevine	Informal communication
Cautions dispositions	Conservative style
Functions of Management	Henry Fayol
Control technique	C.P.M.
Informal group	Complement to organizational structure
Industrial relations	Industrial peace and democracy
Non-financial incentives	Subsidized canteen
Mission	What business are we in
Unfreezing	Process of planned change

Answer 10. (b)

- (i) **OJT** – On-the-job training
- (ii) **KSFs** - Key success factors
- (iii) **MBO** - Management by objectives
- (iv) **OPEC** – Organisation of Petroleum Exporting Countries
- (v) **CSF** – Critical success factor
- (vi) **GST** – General system theory
- (vii) **PESB** – Public enterprises selection board
- (viii) **GD** – Group dynamics
- (ix) **GNP** – Gross National Product
- (x) **OD** – Organistaion development

Q. 11. (a) Fill in the blanks with appropriate word/words :

- (i) Planning substitutes order for and
- (ii) Human resource is regarded as an of an organization.
- (iii) Leadership style permits quick decision making.
- (iv) Planning is looking ahead whereas control is
- (v) Is a systematic attempt to probe the future by inference from known facts.

(b) Define, in just a sentence, the following :

- (i) **Misconduct**
- (ii) **Vestibule training**
- (iii) **Coordination**
- (iv) **Span of control**
- (v) **Stick and carrot approach**

Answer 11. (a)

- (i) Chaos and confusions
- (ii) Important asset
- (iii) Autocratic
- (iv) Looking back
- (v) Forecasting

Answer 11. (b)

- (i) Misconduct means willful violation of rules and regulations.
- (ii) In this method of training, a training centre called “Vestibule” is set up and actual jobs are simulated in it.
- (iii) Coordination means binding together, unifying, synchronizing and harmonizing all activity and effort of an enterprise in order to achieve some predetermined objectives. Coordination, thus stresses upon the balancing of various activities, harmony in the working of all the units, unified and blended approach, pulling together the enterprise, timely communication to each other and upon the required coordination.

- (iv) Span of control refers to the limit of number of employees that a superior can effectively manage at a specific time.
- (v) Two opposite theories of motivation, the first is negative and the second is positive.

Q. 12. "Management is neither a pure science nor a fine art". Comment.

Answer 12.

Science or Art : Management therefore has a philosophy of its own and is one of the latest forms of social science. A question arises whether management will be treated as an art or as a science like an artist every manager has to apply his skill or ingenuity and knowledge acquired by him from some basic principles, in order to achieve some desired results. A manager has to acquire some knowledge about economics, statistics, accounts, costing, psychology as well as some knowledge about that subject with which his enterprise is connected, be it engineering, chemistry, or constructions etc. At the same time he must have a clear mind not to be influenced by any one of these. He is just like a painter who has to use the different colours with the help of his ingenuity so that a picture is portrayed. Therefore, management seems to be an art because art refers to the way of doing specific things. It is a know-how and a 'behavioural knowledge'. Chester Bernard says 'It is the function of the arts to accomplish concrete ends, effect results, produce situations that would not come about without the deliberate efforts to secure them. These must be mastered and applied by those who deal in the concrete and for the future'. So an art has to be mastered and then to be applied with the help of some imagination to create something. Management satisfies all these characteristics.

Taylor created a sensation when he, through his principles of scientific management convinced people that management could be developed as a scientific methodology applicable universally to every form of human organization. Charles Babbage pointed out that there was necessity for work measurement and cost determination to make management scientific. Taylor started extensive study in machines tools, time motion etc. to find out perfection in performance, just like a scientific experiment in a laboratory. There were efforts to establish, 'cause and effect' relationships in managerial problems. Science is a kind of organised knowledge which help establishing cause and effect relationship in all the phenomena. It is a systematized body of knowledge, based on some definite principles which are capable of general application. It has its own rules and laws which are universal and infallible. Chester Bernard writes, 'The function of the sciences, on the other hand, is to explain the phenomena, the events, the situations, of the past. Their aim is not to produce specific events, effects or situations but explanations which we call knowledge.' Science consists of observation, analysis, classification, experiment, measurement, verification, etc. working upon some basic principles to find out explanations of event but it does not create anything out of individual ingenuity. Since Taylor, with his mechanical logic of efficiency has come into the field, one has to believe that management satisfies all the characteristics of a science.

The dubiousness deepens. If we consider management as an art then apparently we are correct because, after all, management mainly deals with human elements of an organization, with their likes, dislikes, aspirations, emotions, rigidities and such other sentimental complexities. A business is born, it grows and it lives like an organism. It is full of creativity. But at the same time it is based upon some principles and past experiences. Such principles however (a) are not absolute like those of a natural science like physics or chemistry; (b) are not really universal because they differ from country to country or industry to industry owing to differences in environments; (c) are constantly in the process of changing with changes of time; (d) are subject to the influence of other behavioural sciences like sociology, psychology etc.

On the other hand, if we consider management as a science then apparently we are correct because like any other science it has its own principles which can be taught and people can be trained in management like a technician. But, if at all management can be called a science, it is a science of its own class or it is a limited science because management unlike a science, cannot rise about human sentiments and the

principles of management are subject to limitations as described above. Some people compare management as a science with medical science. A medical practitioner has to learn medical science through teaching and laboratory work but whether he will be a successful practitioner that depends on his personal ability of application of the skill. Good reading of medical books only does not make a man a good practitioner. Similarly, a doctor without knowledge of medical science is a 'quack'. Same is the position of a manager. He needs some training but mere training does not make a man an efficient manager. In either case, both theory and practice are necessary.

Conclusion

In conclusion we can say that management is both a science and an art. 'Science advances by knowledge, proves, predicts, defines and measures. Art advances by practice, feels, guesses, described and opines'. These characteristics of science and art are intermingled in management. The art of management is founded on scientific principles, Terry says "In essence, a manager is as much an artist as a scientist..... In a certain sense it can be said that the art of management begins where the science of management stops."

Q. 13. (a) Differentiate oral communication and written communication.

(b) What is the meaning of 'Controlling'? What are its importance?

Answer 10. (a)

The differences between oral and written communication are :

Oral Communication	Written Communication
1. It refers to verbal message.	1. It refers to written message.
2. It cannot be verified as there is no evidence.	2. It can be verified from the written message.
3. There is a chance for loss of information in case of distant places.	3. There is no probability for loss of message irrespective of distance covered.
4. Less time is involved.	4. More time is involved.
5. It is a personal communication.	5. It is an impersonal communication.
6. It is used at the operational level of management.	6. It is used at the top and middle-level of management.
7. It may not be precise.	7. It can be expressed in precise terms.
8. Taking action is very difficult.	8. Taking action is easier.

Answer 10. (b)

Control can be defined as the process of monitoring activities to ensure that they are being performed as according to plans and correcting any significant deviations.

In management context, control refers to the evaluation of performance and the implementation of corrective actions to accomplish organizational objectives.

The modern concept of control states a system that not only provides historical record of what has happened to the business as a whole but also identify the reasons why it has happened and provides data that enables the management to take corrective steps, if there be any deviation from the plan.

"Management control is a systematic efforts to set performance standards with planning objectives, to design information feedback systems, to compare actual performance with these predetermined standards,

to determine whether there are any deviations and to measure their significance, and to take any action required to assure that all corporate resources are being used in the most effective and efficient way possible in achieving corporate objectives".
– Robert J. Mockler

"Controlling is the measuring and correcting of activities of subordinates to ensure that events conform to plans".
– Koontz and O'Donnel

"Control is the process of checking about the agreed standards or plans with a view to ensuring adequate progress or satisfactory performance".
– E.F.L. Brech

"Controlling is determining what is being accomplished that is, evaluating the performance and, if necessary applying corrective measures so that performance takes place according to plans". – Terry and Franklin

Importance of Controlling

The control function is gaining importance in today's organizations due to several factors. These factors include the need for accountability in organizations, the need to detect environmental changes that significantly affect organizations, the growing complexity of present day organisations and the need to identify operational errors in organizations to avoid incurring excessive costs.

In addition to these above factors, controlling plays an important role in helping managers detect irregularities, identify opportunities, handle complex situations, decentralize authority, minimize costs and cope with uncertainty.

- (i) **Detecting irregularities** – Control helps managers to detect irrelevant and undesirable irregularities such as increasing labour turnover, product defects or cost over runs.
- (ii) **Identifying opportunities** – Control helps managers identify areas in which things are going better than expected. This will keep the management alert to possible future opportunities.
- (iii) **Handling complex situations** – The growing complexity of business organizations can be handled in the best possible way through effective control.
- (iv) **Decentralize Authority** – Control helps in decentralizing authority. Decisions taken at different levels are controlled effectively.
- (v) **Minimize Costs** – Control helps in reducing wastes, optimum utilization of available resources and thereby reduces / minimizes costs.
- (vi) **Coping with uncertainty** – Effective control helps to cater the situations of uncertainty.

Q. 14. "Co-ordination is the essence of all managerial functions"- explain.

Answer 14.

Coordination is the essence of all managerial functions. It is the mother function in which all other functions are embedded.

Planing is an exercise in coordination between the present condition and the desired future condition of the organisation. Planing is also meant to provide for consistency between the goals sought and the means of achieving them. The end products of planning-objectives, strategies, policies, programmes, procedures, rules, etc.- serve as means of coordination of organisation activity spread over several work units and authority levels.

Organising is concerned with structuring organisational activities, authority relationships and rules. Authority, which is vested in managerial positions along the hierarchy, is an important coordination device. Further, organisation implies differentiation and integration of activities and authority roles to facilitate smooth workflow. Integration is another term of coordination. Similarly, coordination is sought to be carried out with its help of such concepts as span of control, chain of command and committees.

Coordination also premeates the staffing function. Efforts are made to bring about a match between jobs and people in terms of skills and aptitudes through processes of job specification, recruitment, selection, training, placement and promotion.

The managerial function of directing which involves communication, motivation and leadership is also an exercise of coordination. Managers strive to get things done through people- right things, at the right time in the right manner. Individual and group efforts need to be coordinatedd in such a manner that organisational objectives are achieved in a most efficient and effective manner, while at the same time, satisfying some of the important personal needs and aspirations of people.

Management control is directly relevant for coordination. The control function, which is concerned with setting standards of performance, its measurement and evaluation and correction of deviations significantly, contributes to coordination. As a steering process, managerial control enables the organisation to be on the predetermined path and also to be adaptive and dynamic in relation to the external environment.

Q. 15. Discuss Linkert’s system of management.

Answer 15.

Rensis Likert and his associates studied the patterns and styles of managers for three decades at the University of Michigan, USA, and identified a four-fold model of management systems. The model was developed on the basis of a questionnaire administered to managers in over 200 organizations and research into the performance characteristics of different types of organizations. The four systems of management system or the four leadership styles identified by Likert are:

- **System 1 - Exploitative Authoritative:** Responsibility lies in the hands of the people at the upper echelons of the hierarchy. The superior has no trust and confidence in subordinates. The decisions are imposed on subordinates and they do not feel free at all to discuss things about the job with their superior. The teamwork or communication is very little and the motivation is based on threats.
- **System 2 - Benevolent Authoritative:** The responsibility lies at the managerial levels but not at the lower levels of the organizational hierarchy. The superior has condescending confidence and trust in subordinates (master-servant relationship). Here again, the subordinates do not feel free to discuss things about the job with their superior. The teamwork or communication is very little and motivation is based on a system of rewards.
- **System 3 - Consultative:** Responsibility is spread widely through the organizational hierarchy. The superior has substantial but not complete confidence in subordinates. Some amount of discussion about job related things takes place between the superior and subordinates. There is a fair amount of teamwork, and communication takes place vertically and horizontally. The motivation is based on rewards and involvement in the job.
- **System 4 - Participative:** Responsibility for achieving the organizational goals is widespread throughout the organizational hierarchy. There is a high level of confidence that the superior has in his subordinates. There is a high level of teamwork, communication, and participation.

Q. 16. Management is a profession – Discuss.

Answer 16.

In recent years there has been further consideration as to whether management can be regarded as a profession. The conflicting arguments can be considered only if a profession is defined.

The following main points seem relevant in the discussion :

- there must exist a body of principles, skills and techniques and specialized knowledge;
- there must be formal methods of acquiring training and experience;

- an organization should be established which forms ethical codes for the guidance and conduct of members.

If the above standards are considered, then management cannot really be called a profession. There are no licenses for managers, nor is there an accepted code of ethics, but there are tendencies towards professionalism and these will undoubtedly increase. Mary Parker Follett regarded a profession as connoting a foundation of science and a motive of service.

P.F. Drucker does not agree that it is desirable for management to be a profession. He states: 'management is a practice, rather than a science or profession, though containing elements of both'. He feels that economic performance and achievement are the proper aims of management and that manager's primary responsibility is to manage a business. A manager should not, therefore, devote time to objectives such as professionalism which lie outside the enterprise.

The solution may lie in a balanced approach. At present there are trends towards professionalism, seen in the development of skills and techniques, more formal training facilities and the greater use of management consultants and specialized associations.

There have been attempts in recent years to specify codes of conduct for managers.

These are the following :

1. to act loyally and honestly in carrying out the policy of the organization and not undermine its image or reputation;
2. to accept responsibility for their own work and that of their subordinates;
3. not to abuse their authority for personal gain;
4. not to injure or attempt to injure the professional reputation, prospects or business of others;
5. always to comply strictly with the law and operate within the spirit of the law;
6. to order their conduct so as to uphold the dignity, standing and reputation of the institute.

Other points refers to dealing honestly with the public, promoting the increase in competence and the standing of the profession of management, and recognizing that the organization has obligations to owners, employees, suppliers, customers, users and the general public. Guides to good practice include.

7. establishing objectives for themselves and their subordinates which do not conflict with the organization's overall objectives;
8. respecting confidentiality of information and not using it for personal gain;
9. making full disclosure of a personal interest to their employer,
other points refer to helping and training subordinates, ensuring their safety and well-being, honouring contracts to customers and suppliers, ensuring correct information is produced, not tolerating any corrupt practice, and, finally, to setting up a disciplinary structure to implement the code.

Q. 17. Discuss the role of performance appraisal.

Answer 17.

The process of formally assessing someone's work and providing feedback on his or her performance is performance appraisal. The most important factor is how this process can assist in maintaining a quality workforce. The distinction between two purposes of performance ap-praisal is important.

- **Evaluation** : Letting people know where they stand relative to objectives and standards.
- **Development** : Assisting in the training and continued personal development of people.

In respect to “evaluation” performance appraisal focuses on past performance and measurements of results against standards. This documents performance for the record, and establishes a basis for allocating performance rewards. It places the manager in a judgmental role of giving a direct evaluation of another person’s performance accomplishments.

The “development” side of performance appraisal, by contrast, focuses on future performance and the clarification of success standards. It is a way of discovering performance obstacles and identifying training and development opportunities. This places the manager in a counseling role focusing on a subordinate’s developmental needs. This is the aspect of performance appraisal that contributes most positively to training and development as a human resource management function.

It uses a performance-based approach using, wherever possible, objective standards of measurement. The basis of the system is that every manager is given a clear idea of the results expected. A detailed job description and targets required are agreed with the superior. Appraisal is made by comparing results with targets.

Fundamentally, management achieves objectives through people. If, therefore, the objectives of people could be linked with those of management, a harmony of objectives would result to benefit all.

Management by objectives (MBO) was an idea expounded by Drucker in the 1950s, it had a participative connotation and required many managers to change their basic dispositions or ‘style of management’.

It is based on the assumption that managers will be more effective and will be more committed to objectives if they are themselves involved in establishing them.

It also presupposes that they work in an organization that encourages self-control and self-development.

McGregor and Herzberg adopt the approach of the need first to change management style or attitudes and behavior, and then other changes may occur.

MBO is not yet practiced on a very wide scale, although it has been widely talked and written about. Larger companies, as may be expected, use it to a greater extent than small companies. The main feature of the idea is the recognition of the importance of company strategy, especially the function of marketing. More details of how to change management style will be mentioned later.

Key result areas for individual managers must reflect the overall strategy, which is reflected in the marketing programme.

Human resource planning, sometimes called personnel planning, is the process of analyzing staffing needs and identifying actions to satisfy these needs over time. Simply put, organisations must have human resource plans that operationally support the implementation of strategies and advance the accomplishment of key objectives.

Q. 18. (a) What is the difference between direction and delegation?

(b) What are the requirements of a good system of motivation?

Answer 18. (a)

Direction is aided by delegation of authority. Orders may be issued formally or informally, and may be general or specific. They should all be enforceable by the employment of sanctions. Delegation can be regarded as a more general form of direction than issuing orders. In some cases detailed authority may be granted (e.g., to do a specific job); in others it may be broad (e.g., to discipline subordinates). It will, of course, be broader at the top of the pyramid of organization and more detailed towards the bottom.

Answer 18. (b)

Some requirements of a good system are :

- subordinates must be induced to work and produce more;
- a good system must be comprehensive in providing for the satisfaction of all needs;

- the system must be flexible in order to account for varying requirements of people who need different stimuli, e.g., some would work harder for more pay; others for status only;
- Provision must be made for financial opportunities — particularly those giving more personal freedom, e.g., shares in the company; security is a vital element. It means more than the promise of a job and a wage. A recent survey showed that if people knew the situation in their industry, i.e., where they stood in relation to the firm, and if more information were made available by managers, morale would be higher.

The confidence of workers must be won by management and one important factor is the right environment to create the right physiological climate, e.g., equitable arrangement of workflow, rest periods, heating, lighting and ventilating, etc.

Government regulations have helped in this respect (e.g., Factory and Offices, Shops and Railway Premises Acts), and have also, to a large extent, ensured that the primary needs are catered for (e.g., contracts of employment and redundancy payments). The working environment is now safer and a person's livelihood is safeguarded to some extent. People now are more interested in secondary needs (e.g., a worthwhile job, good conditions and promotion) and this may be seen in trade-union negotiations.

The desire for social relationships is often a neglected consideration. The need of a job which gives a person a respected position in society and enables social relationships to develop is very important and must be recognised by managers.

Basic needs can be attained only if the job is secure; this, coupled with a good level of wages, is needed. Other needs, e.g., self-respect, group participation, can then be developed. In this context, job descriptions (reflecting status), e.g., rodent inspector not rat catcher; all have a part to play. Self-esteem is helped by letting subordinates participate in the work and decisions of the superior. Status can be shown by extra holidays, job title, method of payment (monthly or weekly) (**Note** — there is a trend towards 'staff status for manual workers, e.g., 'sub-staff for 'bearer'), provision of a company car, parking and travel facilities.

The problem of motivation is a strictly human problem. It is very complex and the results of positive attempts to motivate are rarely predictable. What motivates one worker may have no effect at all on another, or may even cause antagonism. Workers in a group will react differently from the individual worker to any particular stimulus. Further, the group is less likely to be reasonable and may be more intransigent than the individual. It is also true that what motivates positively on one occasion may fail entirely on another, even with the same worker or group of workers.

In consequence, the theories propounded in this chapter must be viewed with caution and applied only in conjunction with previous experience of the worker or workers concerned. It must also be remembered that most of the research studies into motivation have been carried out on workers at shop-floor level and so some of the findings cannot be transferred uncritically to the problems involved in motivating managers and supervisors.

Finally, for any scheme to improve motivation to be successful it must be continually monitored. Consequently, some form of appraisal must be put in place — otherwise it will gradually become ineffective.

Q. 19. (a) What do you mean by centralization and decentralization of authority?

- (b) Discuss briefly, in this context, the factors affecting the degree of decentralization in modern organizations.**

Answer 19. (a)

An important factor leading to effective organization is the degree of centralization or decentralization of authority.

The two terms 'centralisation' and 'decentralisation' refer to a philosophy of organization and management that focuses on either the selective concentration (centralization) or the dispersal (decentralization) of authority within the structure of an organization. In fact, the question of where authority resides with

such a stricture is of crucial importance for organizational effectiveness. This question is sought to be resolved through an operational philosophy of management-either to concentrate authority for decision making in the hands of only one individual or a handful of people or force it down the organization structure into the hands of quite a large number of people.

Definition of Centralisation and Decentralisation

Like the concept of delegation the concept of decentralization has to deal with the degree to which authority is concentrated or dispersed. 'Delegation' is a narrow concept. In general, it refers to the extent to which individuals delegate authority and responsibility to people reporting directly to them. On the other hand, 'decentralisation' is a much broader concept. It usually refers to the extent to which top-level management delegates authority downward to divisions, branches, or lower-level organizational units.

In short, centralization refers to concentrating the power and authority near the top, or in the head, of an organization. In the contrary, decentralization is dispersing the power and decision-making to successively lower levels of the organization.

In decentralized organizations, a greater proportion of major decisions is made at lower levels.

It may be noted that no organization is completely centralized or decentralized. Empirical study reveals that the extent of either ranges from high centralization to high decentralization.

Answer 19. (b)

The degree of centralization or decentralization within an organization depends on a number of different usually but interrelated factors. These factors and some others may now be briefly reviewed :

- 1. The philosophy of management :** Those top managers who are highly autocratic in their approach usually desire strong centralized control. They prefer to be surrounded by a strong central staff and reserve the most important and major decisions for the highest organizational levels. On the contrary, some managers highly value the virtues of a decentralized organization.

In a large enterprise the responsibility for making decision is put not with a few top level executives but with individual managers and functional employees who have the best possible information necessary to arrive at sound decisions and take prompt action. When such authority is delegated-along with the required responsibility and accountability – the employees feel that they have challenging and dignified positions. They, in turn, bring out their full resources and enthusiastic cooperation for making organizations more effective.

- 2. History of organizational growth :** In general, organizations that grow internally tend toward centralization because this was their basic approach to start with. For example, Hindusthan Motors grew internally and now tend to have higher degrees of centralization than organizations that have grown externally through merger with and acquisition of other firms (such as the ITC Ltd). There are so many loosely managed and are acquired by strong companies with the expectation that strong centralization from the parent company will make it economically viable.
- 3. Geographical dispersion :** The more widely dispersed the operations of a company geographically, the greater the degree of decentralization. For example, Nestles Corporation, which operates throughout the world, is the example of highly decentralized corporation. In this context we may note that the more flexible the interpretation of company policy at the lower levels, the greater the degree of decentralization. Decentralization permits lower-level managers to have a greater degree of decision making latitude and to adapt to local conditions affecting their units.
- 4. Availability of effective controls :** In general, organizations that lack effective measure of controlling lower-level units will tend toward higher centralization since they find it very difficult to monitor the performance on lower-level units.

5. Quality of managers : Decentralisation requires greater number of more qualified managers, since managers will be permitted to enjoy greater latitude in making their own decisions at lower levels. Thus the less a subordinate has to refer to his (her) manager prior to a decision, the greater the decentralization.

On the contrary, in organizations in which there is a scarcity of highly qualified managers and specialists, the strategy usually followed is to centralize the decision-making process (i.e., to maintain decision-making authority at higher organizational levels).

6. Diversity of products and services : Finally, the diversity of products and services also exerts some influence on the degree of decentralization achieved in an organization. In short, the more diverse the range of products or services offered, the product and service range, the more feasible centralization is.

Q. 20. Communication is continuous process. Explain.

Answer 204.

Effective communication is a vital tool of management because without it all attempts to carry on other activities of an organisation will fail. Without communication nothing can happen: no instructions can be given, no orders taken, no contact made with superiors or subordinates and no information provided or received. Only by communicating effectively can any activity of any kind be planned, organised and carried through. The only exception to this is the individual working entirely alone with no contact at all with any other person. Further, the communication carried on must be understandable and acceptable to both parties.

Communication has been defined in many ways, and there is no simple, all-embracing definition. It could, however, be said to be the transmission and reception of a message or idea from one party to another in such a fashion that it is 'mutually understandable'. The key words here are 'mutually understandable'. Because, unless both parties to a communication are of one mind as to what the communication means, there is no communication at all. This definition also implies that the sender of the communication is quite clear about what the message is intended to convey; much communication is 'non-communication' simply because the transmitter's mind is imprecise on the subject of the communication. It follows, therefore, that unless management can make itself properly understood throughout the undertaking then the proper functioning of the organisation will be impaired.

It is usual to think of communication in an organisation as being vertical or horizontal. Vertical communication is that which flows downwards from the top and upwards from the bottom of the organisation, and horizontal communication is that which flows across and between departments at more or less the same management level.

It has been said that management is concerned with the way jobs are done *through other people*. Communication, therefore, is the means whereby people in an organisation exchange information regarding the operations of an enterprise. It is the interchange of ideas, facts, and emotions by two or more persons by the use of words, letters and symbols.

Every aspect of management requires good communication but it is particularly important in directing and will be treated in this section for convenience.

It is widely considered that the organising element of management should concern itself with the system and environment within which communication functions. Management of the communication process requires not only attention to the media of communications, but to the personal interrelationships of people in the organisation.

Chester Barnard stressed the need for communication to occupy a central place in organisation theory 'because the structure, extensiveness and scope of organisation are almost entirely determined by communication techniques'. Communication can be regarded as the foundation upon which organisation

and administration must be built. Barnard again stressed that 'the first executive function is to develop and maintain a system of communication'.

Q. 21. (a) State the functions of effective leadership.

(b) What is human resource management? What are its objectives?

Answer 21. (a)

The functions of effective leadership are :

- (i) It acts as a motive power or force to group efforts.
- (ii) Effective leadership is providing the social skill transforms the management into a social process.
- (iii) Authority alone is not enough to generate the initiative and resourcefulness necessary for work performance.
- (iv) Effective leadership not only influences the subordinates it is also influenced by their problems, feelings, and aspirations.
- (v) Leadership emerges as a natural process in any group of human beings.
- (vi) Effective leadership economy, its role is wide and comprehensive.
- (vii) Effective leadership is the personal embodiment of an impersonal organization and represents the organization and its purpose to the employees and also to the outside world.
- (viii) Good administrative work also depends upon effective leadership.
- (ix) Leadership interprets the wishes of management and they are interpreted to elicit their managers and convey them to different employees to win their enthusiastic support.
- (x) Effective leadership has the ability to arrive at prompt and correct decision.

Answer 21. (b)

Human resources may be defined as the total knowledge, skills, creative abilities, talents and aptitudes of an organization's workforce, as well as the values, attitudes, approaches and beliefs of the individuals involved in the affairs of the organization. It is the sum total or aggregate of inherent abilities, acquired knowledge and skills represented by the talents and aptitudes of the persons employed in the organization. The human resources are multidimensional in nature. From the national point of view, human resources may be defined as the knowledge, skills, creative abilities, talents and aptitudes obtained in the population; whereas from the viewpoint of the individual enterprise, they represent the total of the inherent abilities, acquired knowledge and skills as exemplified in the talents and aptitudes of its employees.

Human Resource Management :

Human Resource Management has come to be recognized as an inherent part of management, which is concerned with the human resources of an organization. Its objective is the maintenance of better human relations in the organization by the development, application and evaluation of policies, procedures and programmes relating to human resources to optimize their contribution towards the realization of organizational objectives.

In other words, HRM is concerned with getting better results with the collaboration of people. It is an integral but distinctive part of management, concerned with people at work and their relationships within the enterprise. HRM helps in attaining maximum individual development, desirable working relationship between employees and employers, employees and employees, and effective modeling of human resources as contrasted with physical resources. It is the recruitment, selection, development, utilization, compensation and motivation of human resources by the organization.

Human Resource Management : Objectives

- To help the organization reach its goals.
- To ensure effective utilization and maximum development of human resources.
- To ensure respect for human beings. To identify and satisfy the needs of individuals.
- To ensure reconciliation of individual goals with those of the organization.
- To achieve and maintain high morale among employees.
- To provide the organization with well-trained and well-motivated employees.
- To increase to the fullest the employee's job satisfaction and self-actualization.
- To develop and maintain a quality of work life.
- To be ethically and socially responsive to the needs of society.
- To develop overall personality of each employee in its multidimensional aspect.
- To enhance employee's capabilities to perform the present job.
- To equip the employees with precision and clarity in transaction of business.
- To inculcate the sense of team spirit, team work and inter-team collaboration.

Q. 22. (a) State the relationship between staffing and human resource management.

(b) What is the relation between planning and forecasting?

Answer 22. (a)

The managerial function of staffing relates to the total management system. The demands for managers are compared with available talent through the management inventory. On the basis of this analysis, external and internal sources are utilized in the process of recruitment, selection, placement, promotion and separation. Other essential aspects of staffing are appraisal, career strategy, and training and development of managers. Staffing affects leading and controlling. It requires an open system approach. It is carried out within the enterprise, which, in turn, is linked to the external environment. There should be a proper link & cooperation between the internal and the external environment so as to achieve the desired goals and objectives of the organization.

Answer 22. (b)

Without some guidance as to what may happen in the future both short-range and long-range planning would be mere guesswork. Forecasting is, therefore, essential in order that management may carry out its planning function. Forecasting on its own is sterile. Only when its findings are utilized in the formulation of plans for the future is it fruitful. It follows, also, that more accurate the forecasting the higher is the possibility of producing reliable plans and the greater, therefore, is the likelihood of attaining set goals. Those responsible for developing plans for an organisation's future will, inevitably, rely heavily on forecasts, but the final responsibility for the results of the plans will rest with the planners. They will, therefore, combine their own experience and knowledge of their firm and its industry with the forecasts available.

By this means they will produce plans, both short-range and long-range, in which they have confidence and which will set and maintain the firm's course towards the achievement of its objectives.

In the exercise of their function the planners must try to anticipate likely problems that may arise to upset their plans. It is not enough to set a plan into action and expect it to run smoothly. Its progress must be constantly checked and controlled.

Performance must be monitored and compared with the plan over the period of its life. And reasons for deviations discovered. In this connection, forecasting is, again, a tool that can be usefully employed, particularly in long-range planning.

Forecasting should be looked upon as a continuing exercise, and forecasts should be available at regular intervals, monthly, quarterly, half-yearly or annually- as the circumstances appertaining to a particular planning area demand. Those responsible for planning can then compare the latest forecasts with those on which they based their original plans. By doing this they are able to ascertain whether any modifications are required to their plans to meet changing circumstances; thus they may avoid problems before they arise.

Q. 23. (a) What is meant by the structure of an organization?

(b) What is Linking Pin structure?

Answer 23. (a)

The organization structure is the basic framework within which the executive's decision-making behaviour occurs. The quality and nature of the decisions made are influenced by the nature of the structure. Organization, as an element of management, is concerned with the grouping of activities in such a manner that enterprise objectives are attained- the assignment of these activities to appropriate departments and the provision for authority, delegation and coordination. It is important to note that, in order to accomplish goals, activities must be grouped logically and authority should be granted so that conflicts do not occur.

Answer 23. (b)

Rensis Likert recommended an overlapping form of organizational structure in which a 'linking-pin' function is performed to integrate the activities of the various sub-systems in the organization. Each supervisor or manager is a member of two groups at the same time, e.g., directors who are also heads of their own departments. They are members of the higher level groups and also members of their own group. They are a linking pin, joining groups together, and serve as channels of communication and influence.

Q. 24. What is meant by span of organization (or span of control)? What is the significance of the concept?

Answer 24.

A department is a specific area or branch over which a manager has authority for the performance of specified variables. Departmentation was necessary as a single person was unable to manage 'too many' subordinates, i.e., his span of control was too wide. This span of control, or, preferably, span of management responsibility, is simply the number of subordinates that an executive supervises. It is important to note that the phrase refers to executive or supervisory subordinates over whom an individual has authority, and not to subordinate operating personnel. There are, of course, other factors than the number of subordinates to consider, e.g., the abilities of supervisors and subordinates.

V.A.Graicunas published a paper in 1993 emphasizing the complexity the complexity of managing more than a few subordinates. The more individuals that are added to the span of reporting executives, the greater the increase in the number of relationships. He put his theory in mathematical terms for emphasis and calculated that, with six subordinates, there were 222 relationships, with seven, over 490 relationships. The maximum number of relationships is shown by a formula, but this will never be attained in reality. The actual number of relationships is not so important as the demands made upon a manager's time, and how frequently they occur.

The number of subordinates that a superior can manage must be determined by every organization. L.Urwick considered the ideal number to be 4 for all superior authorities and between 8 to 12 at the lowest level of organization. There are many other suggestions which tend to concentrate on the span near the top of an enterprise, but the fact is that many companies which are considered well managed have varying spans of control.

The greater the number of levels can result in :

- Communication problems, particularly due to misinterpretation of decisions when passed from one level to another;
- Planning and control becomes more difficult;
- Costs of maintaining staff at the various levels may be high.

In view of the numerous variables that affect the management situation, it is unlikely that there will be an agreed limit to the number of subordinates that can be effectively supervised by a manager.

The following list of factors tend to influence the number and frequency of relationships, but an overriding factor is how effectively a manager makes use of time spent in dealing with subordinates :

- The **nature of work**, e.g., the more repetitive the work, the greater the number that can be controlled.
- The **ability and training** of subordinates and supervisors.
- **Degree of delegation** exercised, in particular the clarity of delegation. If there is a poor organization structure making it difficult to delegate authority to a specific task, more time will be needed to make such delegation effective.
- The **degree of change** in the organisation's environment. If work changes fast, e.g., in financial markets, then narrow spans of control will enable action to be communicated more efficiently.
- **Effectiveness of communication and the amount of personal contact.** The greater the number of face-to-face encounters, the less time there is to plan and organize. The question which is relevant here is whether so much time be spent at meetings.

Narrow spans of control result in tall organizational structures, having many levels of supervision. Tall structures (narrow spans) have advantages of close supervision and control and fast communication between subordinates and superiors.

Disadvantages are high costs due to the numerous levels, superiors may get too involved in the work of subordinates and undue delay may be caused because information has to be carried through several levels, upwards and downwards. Flat structures (wide spans) have the advantage of supervisors having to delegate and ensure clear policies are laid down. Disadvantages include the possible loss of control by the supervisor and the need for high-quality managers as their work load tends to be so high that bottlenecks may occur. Numerous research studies have not produced definitive conclusions as to whether tall or flat structures are best. Extremely tall or flat structures are the exceptions and usually growth is directed so that the dimensions are kept in reasonable balance. An important objective of organizational planning should be simplicity which helps communications and can reduce overhead costs.

Q. 25. What are the different types of authority?

Answer 25.

The different types of authority are :

- Formal authority is conferred by law or delegated within an organization.
- Functional authority is based upon specialized knowledge.
- Personal authority based upon seniority or leadership.

Another method of analysis is to show the kinds of authority which correspond to the structure types, i.e., line, function and staff.

This authority can be regarded as the main authority in an organization; it is the ultimate authority to decide upon matters affecting others and is the main feature of the superior-subordinate relationship. Line authority is not absolute; it must be applied with discretion, within the limits of delegated authority and must relate to the performance of jobs which lead to the attainment of the objectives of the organization.

Staff authority is not easy to describe. Its scope is very limited as there is no right to command. It is concerned with assisting and advising and is used where line authority becomes inadequate and occurs in all but the smallest companies. Specialized skills are used to direct or perform those activities which the line manager cannot so effectively perform. Staff authority is subordinate to line authority and its purpose is to aid the activities which are directed and controlled by the line organization. A human resources officer, for example, has line authority over his own staff, but he cannot control production workers, even on human resource matters/ examples of staff departments are legal, public relations and human resources; the heads are staff executives who exercise staff authority. It is worth noting that, if these departments did not exist, or were abolished, their functions would have to be performed in the line, where they originally existed.

This type of authority is subordinate to line authority but, in comparison with staff authority, it confers upon the holder the right to command in matters relating to the function. It, therefore, has a limited right to command and helps the superior to delegate authority to command to specialists, without bestowing full line authority. Where organizations have a central head office and branches or divisions, functional authority is often used. For example, a head office human resources director renders staff functions for the whole company, but he usually exercises functional authority on human resource matters in his relationships with branch human resources officers. This, of course, ensures uniform policy.

It was mentioned previously that the staff specialist gives advice to his line superior. One modification of this occurs where the superior delegates authority to the staff specialist to deal directly with line personnel. For example, where the staff specialist is showing how to deal with labour problems, he may also consult with line executives and aid in putting the recommendations into effect.

True functional authority occurs when the staff assistant is delegated specific authority to prescribe procedures and processes or policy to be followed by operating departments, for example, where a finance director is given authority to procedures and the nature of the accounting records to be kept by the production sales departments. Such authority should be restricted authority. It is possible for some line managers to exercise functional authority over some process in another line department; a sales manager may exercise functional authority over aspects of manufacturing, e.g., packaging.

It is often said that most organizations have line and staff structure. This denotes the interrelation of operational and functional responsibilities. But it is not always easy to determine which department is line or which is staff, as some operations do not conform to specific boundaries and probably only by examining the intentions and actions of the person who is delegating can it really be known. Confusion may occur if a staff executive is given implied authority to act in the name of the delegating executive and it may then appear that the staff executive is exercising line authority. Perhaps the degree of closeness to the primary objectives of a company can be used to distinguish between line and staff functions. For example, the closer to basic activities, e.g., production and selling, the more activities are line; assisting activities may be deemed staff.

In view of the difficulty surrounding the definition and operation of line and staff it is better not to use such confusing terms.

In considering the limits of authority, an obvious limitation is that action must conform with the policies and programmes of the company. In many cases, specific limitations are made (e.g., not to take on more staff without the approval of a superior). The reason why a subordinate accepts a superior's decision has been considered by many authorities. One line of thought is that there is an 'area of acceptance' wherein the subordinate is willing to accept the superior's instructions.

Q. 26. Distinguish among line, staff and functional authority.

Answer 26.

An issue of much importance to modern management is the distinction among different types of authority. In an organization different types of authority are created by the relationships among individuals and among departments.

There are three types of authority :

Line Authority : Line authority defines the relationships between superior and subordinate, i.e., the authority that managers exercise over their immediate subordinates. It is a direct supervisory relationship. Managers who supervise operating employees or other managers have line authority. It is command authority and corresponds directly to the chain of command. It flows downward through the organizational levels directly from a superior to his subordinates.

It may be noted that both line and staff department managers exercise line authority over their immediate subordinates. In other words, all practicing managers exercise line authority over their employees.

Staff Authority : Staff authority is advisory in nature. The role of some managers is to provide advice or technical assistance. They are granted advisory authority. Such authority is the right possessed by staff units or specialists to advise, recommend, or counsel line personnel. It does not provide any basis for direct control. It is clear that within the staff manager's own department, he (she) exercises line authority over the subordinates of the department.

In short, staff authority does not give the staff members the authority to dictate to the line or command them to take certain actions. It is, in fact, most frequently directed upward, toward those above the staff members. It is important to note that this is the most common type of staff relationship with line departments and is dependent on the degree of influence of the staff.

Functional Authority : Perhaps the strongest relationships that staff can have with line units is functional authority. It is authority delegated to an individual or department over specific activities undertaken by personnel in other departments. For example, the personnel department may give functional authority to monitor and receive compliance in operating departments for recruitment, selection and performance appraisal systems.

When granted functional authority by top management, a staff specialist has the right to command line units in those matters regarding functional activity in which the staff specializes.

There are other examples of different staff specialists exercising functional authority. Cost accounting department, for instance, usually can require certain reports at a certain time from line managers. Likewise, the production scheduling department may be given the power to determine which jobs the production departments are to do and the priorities of those jobs.

An important implication of functional authority is that when such authority is granted to staff units, the principle of unity of command is violated. As a result, various organizational conflicts arise.

Furthermore, the excess use of functional authority may undermine the integrity of the line departments which are ultimately accountable for results. This explains why functional authority that is granted to staff is to be exercised only in crucial matters.

Q. 27. (a) What is the difference between direction and delegation?**(b) Mention the qualities a good leadership.****Answer 27. (a)**

Direction is aided by delegation of authority. Orders may be issued formally or informally, and may be general or specific. They should all be enforceable by the employment of sanctions. Delegation can be regarded as a more general form of direction than issuing orders. In some cases detailed authority may be granted (e.g., to do a specific job); in others it may be broad (e.g., to discipline subordinates). It will, of course, be broader at the top of the pyramid of organization and more detailed towards the bottom.

Answer 27. (b)

No two persons would ever agree on the desired qualities, as almost every human strength or virtue will be quoted. The elements of persuasion, compulsion and example may be considered to be essential to

effect leadership. It has also been said that a leader should make it his job to be known to all and that it is more important to be recognised than to be popular.

Lord Montgomery, in his book *Path to Leadership*, described a leader as :

‘...one who can be looked up to, whose personal judgement is trusted, who can inspire and warm the hearts of those he leads, gaining their trust and confidence and explaining what is needed in language which can be understood.’

Chester Barnard in *Functions of an Executive* considers a leader should have the following attributes — skill, technology, perception, knowl-edge, physique, memory, imagination, determination, endurance and courage.

It must be carefully noted that the leadership qualities that are needed in a particular situation are not usually found in any one individual. There-fore, if a particular vacancy has to be filled, the strengths and weaknesses of the person being appointed should be considered, along with his peers.

The successful leader therefore can be considered to be perceptible and flexible and able to act appropriately, *i.e.*, in one situation he is strong, in another he is permissive. It is worth noting also that the formal status of an individual does not indicate the ability he has to influence others, as such ability is rather a combination of his position and his personality.

Q. 28. (a) What is the basis for effective discipline?

(b) What is administrative management? Mention, in this context, Fayol’s 14 principles of management.

Answer 28. (a)

A basis for effective discipline is good motivation and sound, clearly-given instructions. It is essential for good communications to be used in order to let staff know what they are required to do.

Ideally, discipline should be based upon cooperation and a high morale, which will ensure that rules and conditions are obeyed willingly. By virtue of his position, a superior has the right to command and enforce obedience, if necessary. This gives him the right to punish, because of the harm which may be done to the group’s purpose.

Discipline can be obtained by rewards as well as by punishment, but, usually, punishment is expected if accepted norms of behavior are not upheld. Disciplinary action should contribute towards improved behavior, but certain matters must be noted :

- behavior expected must be made known and this is best done in the period of induction;
- discipline should be exercised fairly, with no favoritism or excessive penalties and as soon after the breach as possible. (Some methods of disciplining are by reprimand, downgrading, suspension, refusing a wage increase, transfer or dismissal).
- management should not break rules itself. A good example is essential;
- the quality of discipline can vary with the type of leadership and the understanding of the common purpose of the organization.

Answer 28. (b)

Fayol was a qualified mining engineer and managing director of a large French company. A year after the death of Taylor (1916) he published *General and Industrial Management*. Fayol, unlike Taylor, started in management and attempted to develop a science of administration for management. He believed that there was universal science of management applicable to ‘commerce, industry, politics, religion, war or philanthropy’. He was one of the first practicing managers to draw up a list of management principles.

Fayol thought principles would be useful to all types of managers, but he did not consider that a manager needs anything more than a knowledge of management principles in order manage successfully. At higher

levels he said managers depended less upon technical knowledge of what they were managing and more on a knowledge of administration.

Fayol worked independently in France during the period scientific management was developing in the U.S.A. He trained as an engineer but realized that management of an enterprise required skills other than those he had studied. He emphasized the role of administrative management and concluded that all activities that occur in business organizations could be divided into six main groups :

1. Technical (production, manufacturing).
2. Commercial (buying, selling, exchange).
3. Financial (obtaining and using capital).
4. Security (protection of property and persons).
5. Accounting (balance sheet, stock-taking, statistics, costing).
6. Managerial (planning, organizing, commanding, co-ordination, controlling).

He concluded that the six groups of activities are interdependent and that it is the role of management to ensure all six activities work smoothly to achieve the goals of an enterprise.

Q. 29. Advertising today is a large enterprise. It is both an industry in itself and a tool used by a wide range of people. It represents a very considerable expenditure and so has to be approached carefully and efficiently.

Answer 29.

Advertising is widespread because it serves a purpose.

- for commercial business, to sell goods and services
- for recruitment, to obtain staff.
- by central government, to inform the public.
- by local authorities, to announce local services
- for books, or travel, or education courses
- for financial services or entertainment
- by companies to announce their results or new ventures
- for health-care products or services
- by individuals, to buy and sell personal goods.

Advertising communicates a message or proposition, which can contain or combine different purposes, of which two are the key characteristics :

- advertising seeks to inform
- advertising seeks to persuade

Many advertisers want many things. Advertising is multi-faced. To be effective, advertising programmes need to be specific in their goals, specific in their audiences and specific in their means.

- To create awareness.
- To create or develop favorable attitudes.
- To develop a brand identity.
- To position a product in a market.

- To create demand.
- To build up enquiries.
- To support distributors.
- To sustain the organization.
- To launch new products.
- To offset completion.

Advertising fails to satisfy the following circumstances :

- It is not a solve-all or universal fix-it for all business problems.
- Advertising ultimately is only as strong as the product or service it advertises.

Advertising helps problem solving.

- Advertising is indeed part of a wider marketing or corporate process.
- It cannot create demand when other elements have failed factors.
- Advertising can help stimulate a market, but this is usually a market that already has some being or some latent potential.

Advertisement may be considered to be a social waste for the following reasons :

- Higher prices
- Artificial living
- Growth of monopolies
- Misleading
- Unethical
- Waste of national and natural resources.

Q. 30. Write short notes on :

- (i) Limits of coordination**
- (ii) Working groups**
- (iii) Bureaucracy**
- (iv) Organization charts**
- (v) Vertical Structuring**

Answer 29.

- (i)** Coordination of specialised group activities is a must if the management of a modern business is to prove effective.

There are, however, certain limitations to the degree of coordination that can be achieved in an organisation. The following five points may be noted in this context :

1. The uncertainty of the future, due to natural phenomena such as rain or acts of God, as also unpredictable behaviour of individuals and the people.
2. The confused and conflicting ideals and whimsical nature of corporate leaders.
3. The lack of administrative skill and technique.
4. The large number of variables involved as also incomplete knowledge and inadequate information.
5. The lack of orderly method of developing and adopting new ideas and programmes.

- (ii) There are various types of working group in an organization; some are fairly similar in nature, others have quite distinct features. Matrix or project groups have already been discussed and boards of directors and committees are considered elsewhere in the book. Other types of group working are dealt with below.

An important aspect of the study of organizations is the study of people's behavior in groups. This can give indications of why certain groups are effective and others are not. Research studies have been many in this area, one of the first being the Hawthorne Experiments.

Where two or more persons who interact with and influence each other join together, they can be said to form a group. They need a common aim or purpose which may be permanent or temporary.

Advantages :

Groups provide security, social satisfaction for members, support individual needs and promote communication, formally or informally (e.g., through the grapevine). They are also liable to show all the problems found in our consideration of committees. So it can be seen that a study of group concepts is important for studying aspects of communication, motivation and leadership.

- (iii) The term 'bureaucracy' was first introduced by Max Weber. The term is usually used in the context of public administration. But it has relevance in a private organization as well. Under a bureaucracy the organization has the following six characteristics :

1. Tasks are divided into several highly specialized jobs.
2. A rigorous set of rules has to be followed to ensure predictability and eliminate uncertainty in task performance.
3. There are clear authority- responsibility relationships that have to be maintained.
4. Superiors take impersonal attitude in dealing with subordinates.
5. Employment and promotions are based on performance evaluation and merit rating.
6. Lifelong employment is taken as an accepted fact.

Unproductive bureaucracies often become subject of criticism, but in certain circumstances, bureaucratic structures appear to be very effective because they provide order and guidance. But critics argue that highly specialized tasks become monotonous; rules are often unnecessarily restrictive; managers cannot always take impersonal attitudes; finally, it often becomes difficult to identify the more efficient workers.

In short, the older the organization the more bureaucratic it becomes!

- (iv) Organization charts are an endeavor to record the formal relationships in an organization, showing some of the relationships, the main lines of communication and the downward flow of authority and responsibility through all the levels of the management hierarchy.

- Thought is needed in constructing charts, as this exercise forces executives to think more specifically about organizational relationships.
- Records and charts provide information to people who wish to know about the enterprise and are useful in instructing new personnel on company organization.
- They form a basis for organizational change and, by projection into the future, can aid the evaluation of organizational planning as strengths and weaknesses can be observed.
- They soon become out-of-date.
- Human relationships cannot be shown on paper, even when they can be defined and described.
- They introduce rigidity into relationships, as people tend to keep within their charted area and become too conscious on boundary lines. (This is one reason why the American Chrysler Corporation deferred using organization charts for a long time. They wished to encourage the

crossing of lines of authority and to retain flexibility).

- Costs of preparation, storing and studying charts may be more than their benefits are worth.
- They introduce status problems. People may not wish comparisons to be made between themselves and others. (The author recently asked a human resources manager why his company had no organization chart. He replied in one word, 'Politics'.)

If the above disadvantages are considered carefully most of them can be overcome and, if the charts are carefully compiled, kept up-to-date and regarded purely as an aid, they can be of assistance to management.

There are certain conventions which are generally in use in the compilation of charts. Line relationships are shown by a continuous line. A position, function or unit is often enclosed by a 'box'. Sometimes names of personnel occupying positions are also included in the box. Broken or dotted lines are used to denote functional relationships and vertical and horizontal lines link boxes.

- (v) The vertical structuring of the organization results in a decision-making hierarchy specifying the respective roles of managers at different levels in organizational hierarchy. It shows who is in charge of each task, of each specialty area, and of the organization as a whole. Different levels of management (such as the lower level, middle level and the top level) are established in the organization – from bottom to top. From these levels emerge the chain of command or hierarchy of decision-making levels in the company.

Essentially the chain of command depicts the authority- responsibility relationships that establish links between supervisors and subordinates throughout the whole organization. It flows from the chief executive officer down to the lowest in the organization.

FOUNDATON EXAMINATION

(REVISED SYLLABUS - 2008)

Paper - 2 : ACCOUNTING

Section I : Financial Accounting

- Q. 1.(a) In each of the following one of the alternatives is correct, indicate the correct one :
- (i) When benefit of a revenue expense extend beyond an accounting year, it is called
 - (A) Revenue Expenditure
 - (B) Capital expenditure
 - (C) Deferred Revenue Expenditure
 - (D) Recurring profit
 - (ii) The convention that states that the accounting practice should be followed consistently over the years
 - (A) Consistency
 - (B) Conservation
 - (C) Materiality
 - (D) Disclosure
 - (iii) Which of the following is a non-monetary asset?
 - (A) Account Receivable
 - (B) Account Payable
 - (C) Demand Bank Deposits
 - (D) Patents and Trademarks
 - (iv) This is more of a convention than a concept, it proposes that while accounting for various transactions, only those which may have material effect on profitability or financial status of the business should have special consideration for reporting, this concept is known as
 - (A) Concept of Consistency
 - (B) Concept of Conservation
 - (C) Concept of Materiality
 - (D) Concept of Disclosure
 - (v) Accounting for Fixed Assets is related to
 - (A) AS 7
 - (B) AS 14
 - (C) AS 10
 - (D) AS 21

- (vi) The maximum amount beyond which a company is not allowed to raise funds, by issue of share is
- (A) Issued Capital
 - (B) Reserve Capital
 - (C) Subscribed Capital
 - (D) Authorised Capital
- (vii) Accounts dealing with transaction relating to persons or an organization is called
- (A) Personal Account
 - (B) Nominal Account
 - (C) Real Account
 - (D) Representative Personal Account
- (viii) An account is said to have a debit balance if :
- (A) The amount of the debits exceeds the amount of the credits.
 - (B) There are more entries on the debit side than on the credit side.
 - (C) Its normal balance is debit without regard to the amounts or number of entries on the debit side.
 - (D) The last entry of the accounting period was posted on the debit side.
- (ix) Residual value is the :
- (A) value of the asset when it is purchased.
 - (B) value of the asset at the end of its useful life.
 - (C) cost of the asset.
 - (D) allocation of the cost.
- (x) The Trial Balance checks :
- (A) Arithmetical Mistakes
 - (B) Honesty of the book keeper
 - (C) Valuation of Closing Stock
 - (D) Nature of business

Answer 1.

- (i) (C) Deferred Revenue Expenditure
- (ii) (A) Consistency
- (iii) (D) Patents and Trademarks
- (iv) (C) Concept of Materiality
- (v) (C) AS 10
- (vi) (D) Authorised Capital
- (vii) (A) Personal Account
- (viii) (A) The amount of the debits exceeds the amount of the credits.
- (ix) (B) value of the asset at the end of its useful life.
- (x) (A) Arithmetical Mistakes

Q. 2. (a) Match the following :

<i>Column I</i>	<i>Column II</i>
(i) AS-2	(A) Consolidated Financial Statements
(ii) AS-14	(B) Segment Reporting
(iii) AS-21	(C) Accounting for Amalgamations
(iv) AS-17	(D) Disclosure of Accounting Policies
(v) AS-1	(E) Valuation of Inventories

Q. 2. (b) Indicate whether the following statements are *True* or *False*.

- (i) Loan taken for 4 years is a current liability.
- (ii) Joint venture is a temporary partnership.
- (iii) The WDV of an asset depreciated on reducing balance method can never become zero.
- (iv) Income received in advance is an asset.
- (v) Provision for Doubtful Debt is an asset for the business.
- (vi) A drawer himself may be the payee of a bills of exchange/ cheque.
- (vii) Single entry system recognizes two effects of a transaction.
- (viii) Statement of Affairs is a Statement of Loans and Advances.
- (ix) Amount set apart to meet losses due to bad debt is a Provision.
- (x) Sales - Cost of Goods sold = Net Profit.

Answer 2. (a)

- (i) — (E)
- (ii) — (C)
- (iii) — (A)
- (iv) — (B)
- (v) — (D)

Answer 2. (b)

- (i) **False.**
- (ii) **True.**
- (iii) **True.**
- (iv) **False.**
- (v) **False.**
- (vi) **True.**
- (vii) **False.**
- (viii) **False.**
- (ix) **True.**
- (x) **False.**

Q. 3. In each of the following, indicate the correct answer :

(i) The Balance in the capital account of a business at the beginning of the year is ₹ 1,40,000. During the year, the owner has introduced a further capital of ₹ 70,000. If the balance in the capital account at the end of the year is ₹ 2,85,000, the profit made by the business during the year is :

- (A) ₹ 1,25,000
- (B) ₹ 1,00,000
- (C) ₹ 75,000
- (D) ₹ 50,000

Workings :

$$\begin{aligned} \text{Profit} &= \text{Closing Capital} - \text{Opening Capital} - \text{Additional Capital} \\ &= ₹ 2,85,000 - ₹ 1,40,000 - ₹ 70,000 \\ &= ₹ 75,000 \end{aligned}$$

(ii) In preparing the bank reconciliation statement for the month of June 2011, AB Company has the following data :

Particulars	₹
Balance as per bank statement	15,375
Deposit in transit	1,250
Outstanding Cheques	1,725
Bank service charges	100

- (A) ₹ 25,000
- (B) ₹ 20,000
- (C) ₹ 15,000
- (D) ₹ 16,000

Workings :

$$\begin{aligned} \text{Cash Book Balance} \\ &= ₹ 15,375 + ₹ 1,250 - ₹ 1,725 + ₹ 100 \\ &= ₹ 15,000 \end{aligned}$$

(iii)

Particulars	₹
Opening Capital	58,000
Closing Capital	53,000
Net profit during the year	5,000

If the above figures are drawn from the books of a trader, then his drawings, if any, are

- (A) ₹ 5,000
- (B) ₹ 3,000
- (C) ₹ 10,000
- (D) ₹ 2,000

Workings :

Drawings

= Opening Capital + Profit – Closing Capital

= ₹ 58,000 + ₹ 5,000 – ₹ 53,000 = ₹ 10,000

Based on the following answer question 3. (iv) to 3. (vi)

The following information is taken from the books of a trader

Particulars	₹
Opening balance of Debtor	9,000
Opening balance of Creditor	8,000
Closing balance of Creditor	10,000
Closing balance of Debtor	9,000
Payment made during the year	10,000
Credit sales	20,000
Cash sales	5,000

(iv) The total net sales during the year are :

(A) ₹ 25,000

(B) ₹ 19,000

(C) ₹ 5,000

(D) ₹ 20,000

Workings :

Net sales = Credit sales + Cash sales = ₹ 20,000 + ₹ 5,000 = ₹ 25,000

(v) Credit purchases made during the year were :

(A) ₹ 8,000

(B) ₹ 9,000

(C) ₹ 11,000

(D) ₹ 17,000

Workings :

Credit purchase = Closing trade creditors + Payment to trade creditors – Opening trade creditors
= ₹ 9,000 + ₹ 10,000 – ₹ 8,000 = ₹ 11,000

(vi) Payments received from the debtors were :

(A) ₹ 9,000

(B) ₹ 10,000

(C) ₹ 19,000

(D) ₹ 20,000

Workings :

Opening debtors + Credit sales – Closing debtors = ₹ 9,000 + ₹ 20,000 – ₹ 10,000 = ₹ 19,000

Based on the following answer question 3 (vii) to 3 (ix)

The following information is extracted from M Company – (a) Capital Employed ₹ 1,00,000

(b) Normal rate of profit 10% (c) Present value of annuity of Re. 1 for five years at 10% - ₹ 3.78

(d) Net profit for five years :

1 st year	₹ 14,400
2 nd year	₹ 15,400
3 rd year	₹ 16,900
4 th year	₹ 17,400
5 th year	₹ 17,900

(vii) Goodwill of the business as per annuity method is :

- (A) ₹ 24,192
 (B) ₹ 18,000
 (C) ₹ 28,000
 (D) ₹ 24,000

Workings :

Goodwill of the business as per annuity method = ₹ 6,400 × 3.78 = ₹ 24,192

Computation of Super Profit :

	Amount ₹
Profit for the past 5 years ₹ (14,400 + 15,400 + 16,900 + 17,400 + 17,900)	<u>82,000</u>
Average Profit (₹ 82,000/5)	16,400
Less : Normal Profit	<u>10,000</u>
Super Profit	6,400

(viii) Goodwill of the business as per three years purchase of super profits is :

- (A) ₹ 22,680
 (B) ₹ 32,000
 (C) ₹ 64,000
 (D) ₹ 22,000

Workings :

Goodwill of the business as per three years purchase of super profits = ₹ 6,400 × 5 = ₹ 32,000

(ix) Goodwill as per capitalization of super profits is :

- (A) ₹ 22,680
 (B) ₹ 32,000
 (C) ₹ 64,000
 (D) ₹ 22,000

Workings :

Goodwill as per capitalization of super profits = ₹ 6,000 × 100/10 = ₹ 64,000

(x) From the following informations, compute the Value of Deficiency of Stock

Goods sent to consignment 50 Study materials @ ₹ 100.

Expenses incurred by consignor :

Freight ₹ 1,000

Insurance ₹ 1,000

Expenses incurred by the Consignee :

Clearing ₹ 1,000

Storage ₹ 500

Consignee sold 30 books and he informed that a deficiency of 5 units disclosed by his actual physical stock taking.

(A) ₹ 200

(B) ₹ 1,000

(C) ₹ 800

(D) ₹ 500

Workings :

Valuation of Unsold Stock :	₹
Total Cost	5,000
Add : Consignor's Expenses	2,000
Add : Consignees non-recurring expenses	1,000
	8,000

Value of Stock = ₹ 8,000 × 15/50 = ₹ 2,400

Value of Deficiency of Stock = ₹ 8,000 × 5/50 = ₹ 800

Note : Deficiency is considered as an abnormal Loss and since it has been detected at the consignee's godown, his non-recurring expenses are also included for valuation.

Answer 3.

- (i) — (C) ₹ 75,000
- (ii) — (D) ₹ 15,000
- (iii) — (C) ₹ 10,000
- (iv) — (A) ₹ 25,000
- (v) — (C) ₹ 11,000
- (vi) — (C) ₹ 19,000
- (vii) — (A) ₹ 24,192
- (viii) — (B) ₹ 32,000
- (ix) — (C) ₹ 64,000
- (x) — (C) ₹ 8,000

Q. 4. (a) On 1st July, 2007 a company purchased a machine for ₹ 3,90,000 and spent ₹ 10,000 on its installation. It decided to provide depreciation @ 15% per annum, using written down value method. On 30th November, 2010 the machine was dismantled at a cost of ₹ 5,000 and then

sold for ₹ 1,00,000. On 1st December, 2010 the company acquired and put into operation a new machine at a total cost of ₹ 7,60,000. Depreciation was provided on the new machine on the same basis as had been used in the of earlier machine. The company closes its books of account every year on 31st March.

Prepare Machinery Account and Depreciation Account for four accounting years ended 31st March, 2011.

Answer 4. (a)

Machinery Account

Date	Particulars	Amount	Date	Particulars	Amount
2007		₹	2008		₹
July 1	To Bank A/c	3,90,000	March 31	By Depreciation A/c (for 8 months @15% p.a.)	40,000
"	To Bank (Installation exp.)	10,000	"	By Balance b/d	3,60,000
		<u>4,00,000</u>			<u>4,00,000</u>
2008			2009		
April 1	To Balance b/d	3,60,000	March 31	By Depreciation A/c (on ₹ 3,60,000 @15%)	54,000
		<u>3,60,000</u>		By Balance b/d	3,06,000
					<u>3,60,000</u>
2009			2010		
April 1	To Balance b/d	3,60,000	March 31	By Depreciation A/c (on ₹ 3,06,000 @15%)	45,900
		<u>3,60,000</u>		By Balance c/d	2,60,100
					<u>3,60,000</u>
2010			2010		
April 1	To Balance b/d	2,60,100	Nov. 30	By Depreciation A/c (on ₹ 2,60,100 @15% for 8 months)	26,010
Nov. 30	To Bank (dismantling charges)	5,000	"	By Bank (sale proceeds)	1,00,000
	To Bank (total cost of new machine)	7,60,000	"	By Profit and Loss A/c (loss on disposal of machine)	1,39,090
		<u>10,25,100</u>	2011		
			March 31	By Depreciation A/c (on ₹ 7,60,000 for 4 months @15%)	38,000
			"	By Balance c/d	7,22,000
					<u>10,25,100</u>
2011					
April 1	To Balance b/d	7,22,000			

Depreciation Account

Date	Particulars	Amount	Date	Particulars	Amount
2008 March 31	To Machinery A/c	₹ 40,000	2008 March 31	By Profit and Loss A/c- (Transfer)	₹ 40,000
2009 March 31	To Machinery A/c	54,000	2009 March 31	By Profit and Loss A/c- (Transfer)	54,000
2010 March 31	To Machinery A/c	45,900	2010 March 31	By Profit and Loss A/c- (Transfer)	45,900
2010 Nov. 31	To Machinery A/c	26,010	2011 March 31	By Profit and Loss A/c- (Transfer)	64,010
2011 March 31	To Machinery A/c	38,000			
		64,010			64,010

Working Notes :

Written down value of machine on 1 st April, 2010	₹ 2,60,000
Less : depreciation for 8 months	₹ 26,010
Written down value of machine on 30 th November, 2010	₹ 2,34,090
Add : dismantling charges	₹ 5,000
	₹ 2,39,000
Less : Sale proceeds of Machine	₹ 1,00,000
Loss on disposal of machine	₹ 1,39,000

Q. 4. (b) M/s Bill commenced business on 1st Jan, 2008, when they purchased machinery for ₹ 14,00,000. They adopted a policy of (i) charging depreciation at 15% p.a. on diminishing balance basis, and (ii) charging full years' depreciation on additions.

Over the year, their purchases of plant have been :

Date	₹
1.8.2009	3,00,000
30.9.2012	4,00,000

On 1.1.12 It was decided to change the method of rate of depreciation to 10% on straight line basis with retrospective effect from 1st January 2008, the adjustment being made in accounts for the year ending 31st December 2012.

Calculate the difference in depreciation to be adjusted in the Plant and Equipment Account on 1st January 2012, and show the ledger account for the year 2012.

Answer 4. (a)

Statement showing the difference in depreciation due to change in method

Particulars		Book-value as per diminishing balance method @ 15%	Book-value as per proposed straight line method @10%	Depreciation @ 15% under diminishing balance method	Depreciation @ 10% on straight line method
		₹	₹	₹	₹
1.1.2008	Book Value	14,00,000	14,00,000		
31.12.2008	Depreciation	2,10,000	1,40,000	2,10,000	1,40,000
1.1.2009	W.D.V	11,90,000	12,60,000		
1.8.2009	Additions	3,00,000	3,00,000		
		14,90,000	15,60,000		
31.12.2009	Depreciation	2,23,500	1,70,000	2,23,500	1,70,000
1.1.2010	W.D.V	12,66,500	13,90,000		
31.12.2010	Depreciation	1,89,975	1,70,000	1,89,975	1,70,000
1.1.2011	W.D.V	10,76,525	12,20,000		
31.12.2011	Depreciation	1,61,479	1,70,000	1,61,479	1,70,000
		9,15,046	10,50,000	7,84,954	6,50,000

Difference of depreciation due to change in method = ₹ 7,84,954 – ₹ 6,50,000 = ₹ 1,34,954.

Dr.

Plant and Equipment Account

Cr.

Date	Particulars	Amount	Date	Particulars	Amount
2012		₹	2012		₹
July 1	To Balance b/d	9,15,046	Dec. 31	By Depreciation A/c	2,10,000
"	" Profit & Loss A/c (Dep. Overcharged)	1,34,954		" Balance c/d	12,40,000
Sept. 10	To Bank A/c - Additions	4,00,000			
		14,50,000			14,50,000

[@ 10% on (₹ 14,00,000 + ₹ 3,00,000 + ₹ 4,00,000) = ₹ 21,00,000] = ₹ 2,10,000.

Q. 5. A machine, which originally costs, and stands in the book on 1.1.2011 at ₹ 1,50,000 is sold for ₹ 70,000 on 30.6.2011. ₹ 60,000 was set aside by the firm for depreciation of the machine upto 31.12.2010. On 1.7.2011 a new machine is purchased for ₹ 2,00,000. The firm closes its books on 31st December every year and provides for depreciation @ 10% p.a. on the original cost of machinery.

Show Journal entries and Ledger Accounts.

Answer 5.

In the books of

Journal Entries

Date	Particulars	L.F.	Amount (₹)	Amount (₹)
2011 June 30	Bank A/c To Machinery (Sale proceeds of machinery)	Dr.	70,000	70,000
	Depreciation A/c To Provision for Depreciation A/c (Depreciation on machinery sold provided at 10% for 6 months upto the date of sale)	Dr.	7,500	7,500
	Provision for Depreciation A/c (₹ 60,000 + ₹ 7,500) To Machinery A/c (Depreciation provision transferred)	Dr.	67,500	67,500
	Loss on Sale of Machinery A/c To Machinery A/c (Loss on sale of machinery)	Dr.	12,500	12,500
July 1	Machinery A/c To Bank A/c (Purchase of machinery)	Dr.	2,00,000	2,00,000
Dec. 31	Depreciation A/c To, Provision for Depreciation A/c (Depreciation on new machinery provided at 10 % for 6 months)	Dr.	10,000	10,000
	Profit & Loss A/c To Depreciation A/c To Loss on sale Machinery A/c (Transfer of depreciation and loss on sale)	Dr.	30,000	17,500 12,500

Dr.

Machinery Account

Cr.

Date	Particulars	Amount ₹	Date	Particulars	Amount ₹
1.1.2011	To Balance b/d	1,50,000	30.6.2011	By Bank A/c	70,000
1.7.2011	To Bank A/c	2,00,000		By Provision for Depreciation A/c	67,500
				By Loss on sale of Machinery A/c	12,500
			31.12.2011	By Balance c/d	2,00,000
		<u>3,50,000</u>			<u>3,50,000</u>
1.1.2012	To Balance b/d	2,00,000			

Dr. **Provision for Depreciation Account** Cr.

Date	Particulars	Amount ₹	Date	Particulars	Amount ₹
30.6.2011	To Machinery A/c - Transfer	67,500	1.1.2011	By Balance b/d	60,000
31.12.2011	To Balance c/d	10,000	30.6.2011	By Depreciation A/c	7,500
			31.12.2011	By Depreciation A/c	10,000
		<u>77,500</u>			<u>77,500</u>
			1.1.2012	By Balance b/d	10,000

Q. 6. The total of the debit side and of the Trial Balance of a firm as at Decmber 31st, 2011 is ₹ 166,59,000 and that of the credit side is ₹ 42,47,000.

After several checkings and re-checkings the following mistakes are discovered :

Item of Account	Correct Figure (as it should be) ₹ '000	Figure as it appears in the Trial Balance ₹ '000
Opening Stock	1,490	1,480
Repairs	6,178	6,178 (but appears on the debit side)
Rent and Rates	216	240
Sundry Creditors	607	590
Sundry Debtors	806	831

Ascertain the correct total of the Trial Balance.

Answer 6.

Particulars	Debit ₹ '000	Credit ₹ '000
Total as per Trial Balance	16,659	4,247
Opening Stock understated ₹ (1,490-1,480)	(+) 10	
Repairs being credit balance (income) but shown as debit balance	(-) 6,178	(+) 6,178
Rent and Rates overstated ₹ (240-216)	(-) 24	—
Sundry Creditors understated ₹ (607-590)	—	(+) 17
Sundry debtors overstated ₹ (831-806)	(-) 25	—
Correct total of Trial Balance	10,442	10,442

Q. 7. Prepare Bank Reconciliation Statement as on 30th September, 2011 from the following particulars :

	₹
Bank balance as per Pass Book	8,000
Cheque deposited into bank, but no entry was passed in the Cash-book	400
Credit side of bank column cast short	200
Insurance Premium paid directly by the bank under the standing advice	500
Bank Charges debited twice in the Cash Book	40
Cheque issued but not presented to the bank for payment	800
Cheque received entered twice in the Cash-book	500

Answer 7.

Bank Reconciliation Statement as on 30th September, 2011

Particulars	Amount ₹	Amount ₹
Bank Balance as per Pass Book		8,000
<i>Add :</i> (i) Credit side of bank column cast short	200	
(ii) Insurance Premium paid directly not recorded in the cash book	500	
(iii) Bank Charges entered twice in the cash book	120	<u>1,320</u>
(iv) Cheque received entered & twice in the Cash-book	<u>500</u>	9,320
<i>Less:</i> (i) Cheque deposited into Bank but no entry was passed in the cash book	400	<u>1,200</u>
(ii) Cheque issued but not presented to the bank	<u>800</u>	
Bank Balance as per Cash Book		<u>8,120</u>

Q. 8. (a) On 1st April, 2011, M/s. Durga & co. had a provision for Bad Debts of ₹ 3,335 against their bookdebts. During the year ended 31st March, 2012, ₹ 3500 proved to be bad and they desire to maintain the Provision for Bad Debts at 5% book debts which stood at ₹ 1,40,000 before any adjustment for Bad Debts.

Show the Journal entries on 31st March, 2012, in the books of the firm to record these adjustment.

Answer 8. (a)**M/s. Durga & Co.****Journal**

Date	Particulars	L.F.	Dr. ₹	Cr. ₹
2011 April 1	Bad Debts A/c To Sundry Debtors A/c (Bad Debts during the year written off)	Dr.	3,500	3,500
	Provision for Bad & Doubtful Debts A/c To Bad Debts A/c (Bad Debts written off transferred)	Dr.	3,500	3,500
	Profit & Loss A/c To Provision for Bad & Doubtful Debts A/c (Amount of additional provision made for bad debts so as to increase the balance of the provision to an amount equal to 5% of Sundry Debtors)	Dr.	6,990	6,990

Working Note :

Amount of additional provision to be made is ascertained as follows:

Provision required on 31 st March, 2012:	₹
5% (₹ 1,40,000 - ₹ 3,500)	6,825
Add : Bad debts written off	<u>3,500</u>
	10,325
Less : Existing provision on 1 st April, 2011	<u>3,335</u>
	<u>6,990</u>

Q. 8. (b) From the following information determine amounts to be transferred to Profit & Loss Account :

	₹
Sundry Debtors as on 31.03.2012	50,000
Provision for bad debt as on 01.04.2011	8,000
Bad debts written off during the year 2011-12	2,000
Recovery of Bad debts earlier written off	2,000

Provision for bad and doubtful debt is maintained @ 10%.

Answer 8. (b)**Provision for Bad and Doubtful Debt Account**

Particulars	Amount ₹	Particulars	Amount ₹
To Bad debts	2,000	By Balance b/d	8,000
To Profit & Loss A/c (Excess provision written back)	1,000		
To Balance c/d	5,000		
	<u>8,000</u>		<u>8,000</u>

Profit & Loss Account

Particulars	Amount ₹	Particulars	Amount ₹
		By Provision for Bad and Doubtful Debt A/c (Excess provision written back)	1,000
		By Bad Debt Recovery A/c	2,000
	<u>3,000</u>		<u>3,000</u>

Q. 9. Rectify the following errors detected after preparation of Trial Balance :

- (i) ₹ 800 spent on repair of furniture has been debited to furniture account.
- (ii) A furniture worth ₹ 4,000 purchased for office use is debited to purchase account.
- (iii) Sales return from Mr. A ₹ 1,500 has been omitted.
- (iv) A cheque of ₹ 8000 issued to Mr. D has been dishonoured and not recorded in the books.
- (v) ₹ 800 received from Mr. K (earlier written as bad debts) has been credited to Mr. K's account.
- (vi) Total of discount column on credit side of cash book not posted ₹ 10,000.
- (vii) ₹ 5,000 received from Mr.X recorded in cash book cash column as well as Bank column.
- (viii) A sale of ₹ 490 to Mimi has been credited to her account as ₹ 390.
- (ix) Discount received ₹ 1,320 had been debited to discount allowed account.
- (x) On one stock-sheet at 31st Dec. 2011 a sub total of ₹ 2,983 had been carried forward as ₹ 2,938 and another sheet had been over-cast by ₹ 100.

Answer 9.**Journal Entries**

	Particulars		Dr. ₹	Cr. ₹
(i)	Repair A/c To Furniture A/c (Being correction of routine repair wrongly treated as capital expenditure)	Dr.	800	800
(ii)	Furniture A/c To Purchase A/c (Being correction of furniture bought wrongly entered in purchases account)	Dr.	4,000	4,000
(iii)	Sales Return A/c To Mr. A A/c (Being correction of sales return omitted from books)	Dr.	1,500	1,500
(iv)	Bank A/c To Mr. D A/c (Being recording of dishonour of cheque issued)	Dr.	8,000	8,000
(v)	Mr. K A/c To Bad Debt Recovered A/c (Being correction of revenue receipt treated as capital receipt)	Dr.	800	800
(vi)	Suspense A/c To Discount Received A/c (Being rectification of non-posting of total of sales return book)	Dr.	10,000	10,000
(vii)	Suspense A/c To Bank A/c (Being rectification of error in recording the amount received)	Dr.	5,000	5,000
(viii)	Mimi A/c To Suspense A/c (Being sale of ₹ 490 wrongly credited to account of Mimi as ₹ 390)	Dr.	880	880
(ix)	Suspense A/c To Discount Allowed A/c To Discount Received A/c (Being rectification of error in recording the amount of discount received)	Dr.	2,640	1,320 1,320
(x)	No Entry (see working notes)			

Working Notes :

As stock is generally recorded at the time of finalisation of accounts and not at the time of preparation of Trial Balance, no rectification is required for over/under –casting of stock sheet. Stock Reconciliation Statement may also be prepared to ascertain the correct value of stock at the time of preparation of financial statement.

Q. 10. (a) Pass Journal Entries in the books of Mr. Ananda Dey for the year ended 31st Dec. 2011**2011**

- Dec. 1 Started business with a capital of :**
Cash ₹ 3,000; Bank ₹ 4,000; Plant ₹ 12,000; Creditors ₹ 4,000 and debtors ₹ 8,000.
- “ **3 Purchased a plant for ₹ 50,000, Cost of Carriage ₹ 500; and installation expenses being paid for ₹ 1,500.**
- “ **4 Purchased furniture for resale from X Ltd. ₹ 3,000.**
- “ **5 Purchased furniture for office decoration ₹ 8,000.**
- “ **8 Sold Furniture out of those meant for resale to X Ltd. For ₹ 4000.**
- “ **10 Returned a part of furniture out of those meant for resale to X Ltd. for ₹ 400.**
- “ **14 Goods drawn by the proprietor for her own use for ₹ 1,000.**
- “ **18 Goods distributed as free samples ₹ 500.**
- “ **19 Paid ₹ 4,000 into business bank account from private cash.**
- “ **22 A table purchased for ₹ 500 for the personal use of Mr. Dey.**
- “ **25 Withdrawn cash from business for private use ₹ 1,000.**
- “ **27 Paid salary to Mr. X ₹ 3,000.**
- “ **29 Paid advertisement to Amrita Bazar Patrika for ₹ 500.**
- “ **30 Mr. Dey encashed his Savings Deposit certificate of ₹ 5,000 and utilized ₹ 3,000 to pay wages to workers.**
- “ **31 Life Insurance Premium paid by Mr. Dey for ₹ 1,000.**

Answer 10.(a)**Journal Entries**

Date	Particulars	L.F.	Amount (₹)	Amount (₹)
2011 Dec. 1	Cash A/c Bank A/c Plant A/c Debtors A/c To Creditors A/c To Capital A/c (bal. fig.) (Business started with a capital of ₹ 23,000 consisting of Cash, Bank, Plant, Debtors and Creditors)	Dr. Dr. Dr. Dr.	3,000 4,000 12,000 8,000	4,000 23,000
3	Plant A/c To Cash A/c (Plant purchased for Cash ₹ 50,000, carriage paid ₹ 500 and installation expenses being ₹ 1,500)	Dr.	52,000	52,000

Date	Particulars	L.F.	Amount (₹)	Amount (₹)
4	Purchase A/c To X Ltd. A/c (Purchase of furniture meant for resale)	Dr.	3,000	3,000
5	Furniture A/c To Cash A/c (Furniture purchased for office decoration)	Dr.	8,000	8,000
8	Cash A/c To Sales A/c (Sold part of furniture meant for resale)	Dr.	4,000	4,000
10	X Ltd. To Return Outward A/c (A part of furniture, meant for resale, returned to X Ltd.)	Dr.	400	400
14	Drawings A/c To Purchase A/c (Goods taken by the proprietor for his own use)	Dr.	1,000	1,000
18	Advertisement A/c To Purchase A/c (Goods distributed as free sample)	Dr.	500	500
19	Bank A/c To Capital A/c (Further capital introduced in the business)	Dr.	4,000	4,000
22	Drawing A/c To Cash A/c (A table purchased for personal use)	Dr.	500	500
25	Drawing A/c To Cash A/c (Cash withdrawn from business for private use)	Dr.	1,000	1,000
27	Salary A/c To Cash A/c (Salary paid to Mr. X)	Dr.	3,000	3,000
29	Advertisement A/c To Cash A/c (Advertisement paid for cash)	Dr.	500	500
30	Wages A/c To Capital A/c (Further capital introduced in the business)	Dr.	3,000	3,000
31	Drawing A/c To Cash A/c (Life Insurance Premium paid)	Dr.	1,000	1,000

Q. 10.(b) Anik and Aniket decided to work a joint venture for the sale of electric motors.

On 1st May 2011, Anik purchased 100 electric motors at ₹ 175 each and dispatched 75 motors to Aniket incurring ₹ 500 as freight and insurance charges. 5 electric motors were damaged in transit. On 1st Feb. 2012, ₹ 500 were received by Anik from the insurance company, in full settlement of his claim. On 15th March 2012, Anik sold 25 electric motors at ₹ 225 each. He received ₹ 10,000 from Aniket on 1st April 2012.

On 15th May 2012, Aniket took delivery of the electric motors and incurred the following expenses :

Clearing Chares ₹ 170; Repair charges to electric motors damaged in-transit ₹ 300; Godown rent for 3 months ₹ 600.

He sold the electric motors as :

1.2.2012	5 damaged motors ₹ 170 each
	20 motors at ₹ 200 each
15.3.2012	10 motors at ₹ 315 each
1.4.2012	40 motors at ₹ 250 each

It is agreed that they are entitled to a commission of 10% on the respective sales effected by them; that the profits and losses shall be shared between Anik and Aniket in the ratio of 2:1. Aniket remits Anik the balance of amount due on 30th April 2012.

You are required to show the Memorandum Joint Venture Account only.

Answer 10.(b)**Memorandum Joint Venture Account**

Date	Particulars ₹	Amount ₹	Date	Particulars ₹	Amount
2011			2012		
May 1	To Anik : Cost of Motors (100 × ₹ 175)	17,500	Mar. 15	By Anik : Sale of Motors (25 × ₹ 225)	5,625
May 15	To Anik : Freight and Insurance Aniket :	500	Feb. 1	By Aniket : Sale of Motors 5 × ₹ 170 = ₹ 850 20 × ₹ 200 = ₹ 4,000 10 × ₹ 315 = ₹ 3,150 40 × ₹ 250 = ₹ 10,000	18,000
	Clearing Charge 170				
	Repairs 300				
	Ground Rent <u>600</u>	1,070			
April 15	To Anik: Commission @ 10%	563	April 1	By Anik : Insurance Claim	500
	To Aniket Commission@10%	1,800			
" 30	To Profit on Venture :				
	Anik (2/3) 1,795				
	Aniket (1/3) <u>897</u>	2,692			
		<u>24,125</u>			<u>24,125</u>

- Q. 11. (a) Goods sent on consignment 800 kg. @ ₹ 12 per kg. Expenses paid by the consignor : Freight ₹ 700 and insurance ₹ 500. 150 kg. were destroyed in transit due to an accident. Claim admitted by the Insurance Company was ₹ 1200. The consignee sold 550 kg. @ ₹ 15 per kg. and incurred the following expenses: Unloading ₹ 130, Godown rent is ₹ 500 and Selling Expenses ₹ 300. Pass Journal Entries relating to loss in transit in the books of the consignor.**

Answer 11.(a)

Journal

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Loss in Transit A/c To Consignment A/c (Value of goods lost In transit)	Dr.	2,025	2,025
?	Insurance Claim A/c To Loss in Transit A/c (Claim accepted by Insurance Company for loss in transit)	Dr.	1,200	1,200
?	Profit & Loss A/c To Loss in Transit A/c (Balance of abnormal loss not covered by insurance transferred to Profit & Loss A/c)	Dr.	825	825

Working Notes :

Cost of 800 kg. @ ₹ 12 per kg.	₹ 9,600
<i>Add:</i> Expenses prior to loss:	
Freight	₹ 700
Insurance	₹ 500
	₹ 1,200
	₹ 10,800

Value of Loss in transit: (150 kg.)
 $(150\text{kg.}/800\text{kg.} \times ₹ 10,800) = ₹ 2025$

Loss in transit i.e. ₹ 2025 – amount recoverable from Insurance Company i.e. ₹ 1200
 = Loss to be charged to Profit & Loss A/c is ₹ 825.

- Q. 11. (b) Mahendra of Mumbai and Dipak of Delhi entered into a joint venture on 1.4.2011 for the purpose of buying second hand cars, reconditioning and selling them as Diesel airconditioned cars. Mahendra has agreed to buy second hand cars, reconditioning them and fit diesel engines. Dipak has agreed to fix air conditioners and sell them at Delhi. They have agreed to share the profits and losses equally and settle their accounts at the end of each year. The following are the details of purchases, sale and expenses incurred by Mahendra and Dipak during the year 1.4.2011 to 31.3.2012**

Particulars	Mahendra ₹	Dipak ₹
Cost of 10 cars purchased at average price	6,00,000	
Reconditioning Expenditure	54,000	
Cost of 10 diesel engines	36,000	
Labour Charges	21,600	38,400
8 Air conditioners purchased		4,80,000
Buying commission @ 5%	30,000	
Selling commission @ 5%		72,000
Sale value realized on sale of 8 cars		1,44,000
Expenses incurred :		
Freight-local	12,000	9,600
Delhi	36,000	
Rent- Office	12,000	12,000
Garage	14,400	24,000
Insurance	19,200	24,000
Miscellaneous expenses	7,200	12,000

Dipak sent cheque for ₹ 7,20,000 to Mahendra on 1.3.2012. Of the balance of two cars , one car met with accident on the way to garage before reconditioning and the insurance company settled that claim at ₹ 36,000 as a total loss. The old petrol engines were sold @ ₹ 600 per engine and one diesel engine was sold at ₹ 3,600 by Mahendra . All of them were sold before 31.3.2012. Mahendra retained the balance of one car as a non-airconditioned diesel car for his personal use which was priced at average cost. Mahendra/ Dipak settled the balance due to/by them on 31.3.2012 by sending crossed cheque as the case may be. Calculate the cost of Second Hand Non-Airconditioned Diesel Car.

Answer 11.(b)

Calculation of the cost of Second Hand Non-Airconditioned Diesel Car.

	₹
Cost of Car	60,000
Reconditioning Charges	(₹ 54,000/9)
Diesel engine	(₹ 36,000/10)
Labour Charges	(₹ 21,600/9)
Buying Commission	(₹ 30,000/10)
Local Freight incurred by Mahendra	(₹ 12,000/10)
Local Insurance	(₹ 19,200/10)
Office Rent, Garage Rent and Misc. Expenses [(₹ 12,000 + ₹ 14,400 + 7,200)/9]	3,733
Total	81,853

Q. 12. (a) Ram and Rahim entered into a joint venture for purchase and sale of electronic goods, sharing profits and losses in the ratio of 3:2. They also agreed to receive 5% commission on their individual sales and the following information was extracted from the records :

July 1, 2010 : Ram Purchased goods worth ₹ 19,00,000 financed to the extent of 90% out of his funds and balance by loan from his uncle Mr. M

August 1, 2010 : Ram sent goods costing ₹ 17,00,000 to Rahim and paid ₹ 14,100 as freight. Rahim paid ₹ 1,34,100 to Ram.

October 1, 2010: Rahim sold all the goods sent to him. Ram paid the loan taken from his uncle, including interest of ₹ 3,500.

All sales, by either party, were made at a uniform profit of 40% above cost. On November 30, 2010, they decided to close the venture by transferring the balance of goods unsold, lying with Ram at a cost of ₹ 90,000 to a wholesale dealer.

You are required to prepare the Memorandum Joint Venture Account, and Joint Venture with Ram in the books of Rahim and joint venture with Rahim in the books of Ram. They further disclosed that goods worth ₹ 40,000 were taken personally by Ram at an agreed price of ₹ 50,000.

Answer 12.(a)

Memorandum Joint Venture Account

Date	Particulars	Amount	Date	Particulars	Amount
2011		₹	2010		₹
July 1	To Ram-Purchase 17,10,000 Loan-Purchase 1,90,000	19,00,000	Oct. 1	By Rahim-Sale Proceed (₹ 17,00,000+40% of ₹ 17,00,000)	23,80,000
Aug. 1	To Ram-Freight	14,100			
Oct. 1	To Ram -Interest on loan To Rahim-Commission (@ 5% on ₹ 23,80,000)	3,500 1,19,000	Nov. 30	By Ram-Stock taken By Ram-Sale Proceeds (₹ 19,00,000 - ₹ 17,00,000) - ₹ 90,000 - ₹ 40,000) = ₹ 70,000 + ₹ 70,000×40%)	50,000 98,000
Nov. 30	To Ram-Commission (@ 5% on ₹ 98,000)	4,900			
"	To Profit on Venture : Ram - (3/5) 3,45,900 Rahim- (2/5) 2,30,600	5,76,500	"	By Stock (Transferred to wholesle Dealer)	90,000
		<u>26,18,000</u>			<u>26,18,000</u>

**In the Books of Ram
Joint Venture with Rahim**

Date	Particulars	Amount	Date	Particulars	Amount
2011		₹	2010		₹
July 1	To Bank A/c (Purchase of goods)	19,00,000	Aug. 1	By Cash A/c	1,34,100
Aug. 1	To Bank A/c (Freight)	14,100	Nov. 30	By Stock taken	50,000
Oct. 1	To Bank A/c (Interet on Loan)	3,500	"	By Stock transferred to Wholesale dealer	90,000
Nov. 30	To Commission To Share of Profit	4,900 3,45,900		By Bank (Sale Proceeds) A/c By Bank (Final settlement) A/c	98,000 18,96,300
		<u>22,68,400</u>			<u>22,68,400</u>

Q. 13. AA and BB were in need of funds. On 1st January AA drew a bill for ₹ 50,000 for 3 months on BB. On 4th January AA got the bill discounted at 10% p.a. and remitted half of the proceeds to BB. At maturity, BB could not meet the bill, instead, AA accepted BB's bill for ₹ 30,000 on 4th April for two months. This was discounted by BB at 12% p.a. Out of this, ₹ 4,900 was paid to AA after deducting ₹ 100 discounting charges. Due to financial crisis, AA became insolvent and the bill drawn on him was dishonoured and his estate paid 50%. Days of grace for discount purposes may be ignored. Give journal entries in the books of AA. Also prepare BB's Account in AA's books and AA's Account in the books of BB.

Answer 13.

**Journal Entries
In the books of AA**

Date	Particulars	L.F.	Amount ₹	Amount ₹
Jan. 1	Bills Receivable A/c To BB A/c (Being the bill for ₹ 50,000 drawn on BB)	Dr.	50,000	50,000
Jan. 4	Bank A/c Discount A/c To Bills Receivable A/c (Being bill discounted @ 10% p.a)	Dr. Dr.	48,750 1,250	50,000
Jan. 4	BB A/c To Bank A/c To Discount A/c (Being half the proceeds sent to BB)	Dr.	25,000	24,375 625
April 4	BB A/c To Bills Payable A/c (Being the bill of BB accepted)	Dr.	30,000	30,000
April 4	Bank A/c Discount A/c To BB A/c (Being proceeds received from BB)	Dr. Dr.	4,900 100	5,000
July 7	Bills Payable A/c To BB A/c (Being the bill dishonoured)	Dr.	30,000	30,000
	BB A/c To Bank A/c To Deficiency A/c (Being 50% payments made to BB and unpaid balance transferred to Deficiency A/c)	Dr.	30,000	15,000 15,000

Dr. BB's Account in the books of AA Cr.

Particular	Amount ₹	Particular	Amount ₹
To Bank A/c	24,375	By Bills Receivable A/c	50,000
To Discount A/c	625	By Bank A/c	4,900
To Bills Payable A/c	30,000	By Discount A/c	100
To Bank A/c	15,000	By Bills Payable A/c	30,000
To Deficiency A/c	15,000		
	<u>85,000</u>		<u>85,000</u>

Dr. AA's Account in the books of BB Cr.

Particular	Amount ₹	Particular	Amount ₹
To Bills Payable A/c	50,000	By Bank A/c	24,375
To Bank A/c	4,900	By Discount A/c	625
To Discount A/c	100	By Bills Receivable A/c	30,000
To Bank A/c	30,000	By Bank A/c	15,000
		By Bad Debts A/c	15,000
	<u>85,000</u>		<u>85,000</u>

Q. 14. (a) On 4-4-2011, a bill of exchange for ₹ 20,000 drawn by Amar on Aman and discounted on 1-1-2011 for ₹ 19,000 was dishonoured. ₹ 100 paid by the bank to get the fact of dishonoured noted on the bill. Pass journal entries in the books of Amar and Aman.

Answer 14. (a)

Journal of Amar

Date	Particulars	L.F.	Dr.	Cr.
			Amount ₹	Amount ₹
1.1.2011	Bill Receivable A/c To Aman A/c (For acceptance received from Aman)	Dr.	20,000	20,000
	Bank A/c Discount A/c To Bill Receivable A/c (For discounting of bill for ₹ 19,000)	Dr. Dr.	19,000 1,000	20,000
4.3.2011	Aman A/c To Bank A/c (For dishonour of bill and noting charges)	Dr.	20,100	20,100

Journal of Aman

Date	Particulars	L.F.	Dr.	Cr.
			Amount ₹	Amount ₹
1.1.2011	Amar A/c To Bills Payable A/c (For acceptance in favour of Amar)	Dr.	20,000	20,000
1.4.2011	Bills Payable A/c Noting Charges A/c To Amar A/c (For amount of bill dishonoured and noting charges payable to Amar)	Dr. Dr.	20,000 100	20,100

Q. 14. (b) Rim drew a bill for ₹ 1,000 on Bhim who duly accepted the same. Rim endorsed the bill to Kim who again endorsed it to his creditor Prim. Prim discounted the bill for ₹ 980. On the date of maturity, the bill being dishonoured was taken over by Rim and the noting charges amounted to ₹ 30.

Show the necessary Journal entries in the books of these parties to record the transaction.

Answer 14. (b)

Rim's Journal

Date	Particulars	L.F.	Dr.	Cr.
			Amount ₹	Amount ₹
?	Bills Receivable A/c To Bhim A/c (Bill accepted by Bhim)	Dr.	1,000	1,000
	Kim A/c To Bills Receivable A/c (Acceptance of Bhim endorsed to Kim)	Dr.	1,000	1,000
	Bhim A/c To Bank A/c (Bill accepted by Bhim directly taken over from the bank on dishonour and noting charges paid by the bank)	Dr.	1,030	1,030

Bhim's Journal

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Rim A/c To Bills Payable A/c (Acceptance of Rim's bill)	Dr.	1,000	1,000
	Bills Payable A/c Sundry Charges A/c To Rim A/c (Rim's bill accepted but not met on maturity and noting charges payable)	Dr. Dr.	1,000 30	1,030
	Bills Receivable A/c To Rim A/c (Bill received from Rim)	Dr.	1,000	1,000
	Prim A/c To Rim A/c (Bill received from Rim endorsed to Prim)	Dr.	1,000	1,000

Prim's Journal

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Bills Receivable A/c To Kim A/c (Bill received from Kim)	Dr.	1,000	1,000
	Bank A/c Discount on bills A/c To Bills Receivable A/c (Bill received from Kim discounted)	Dr. Dr.	980 20	1,000

Bank's Journal

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Bills Discounted A/c To Prim's Current A/c To Discount on bills A/c (Prim's bill discounted)	Dr.	1,000	980 20
	Rim A/c To Bills Discounted A/c To Cash A/c (Bill dishonoured and taken over by Rim, noting charges being ₹ 30)	Dr.	1,030	1,000 30
	Cash A/c To Rim A/c (Cash received from Rim)	Dr.	1,030	1,030

Q. 15. (a) The Income and Expenditure Account of South Indian Club is :

Dr. Income and Expenditure Account for the year ended 31st December 2011 Cr.

Expenditures	₹	Income	₹
To Salaries	2,200	By Subscriptions	3,000
To General Expenses	700	By Donations	1,100
To Depreciation	400		
To Excess of income over expenditure	300		
	<u>4,100</u>		<u>4,100</u>

Adjustments were made in respect of the following :

Subscription for 2010 unpaid at 1st Jan.2011, ₹ 400; ₹ 200 of which was received in 2011.

Subscription paid in advance at 1.1.2011 ₹ 100.

Subscription paid in advance at 31.12.2011 ₹ 80.

Subscription for 2011 unpaid at 31.12.2011 ₹ 140.

Sundry Assets at beginning of period ₹ 2,800, Sundry Assets after depreciation ₹ 2,900 at the end of the period.

Cash Balance at 1st January 2011 ₹ 320.

Prepare Receipt and Payments account.

Answer 15. (a)

In the books of South Indian Club

Dr. Receipt and Payments Account for the year ended 31st December 2011 Cr.

Receipts	Amount ₹	Payments	Amount ₹
To Balance b/d	320	By Salaries	2,200
To Donation	1,100	By General Expenses	700
To Subscription (cash received)	3,040	By Sundry Assets	400
		By Balance c/d	1,160
	<u>4,460</u>		<u>4,460</u>

Working Notes :

(1) Subscription Account

Dr. Cr.

Receipts	Amount ₹	Payments	Amount ₹
To Balance b/d	400	By Balance b/d	100
To Income & Expenditure A/c	3,000	By Balance (unpaid for 2010)	200
To Balance (paid in advance to 2012)	80	(₹ 400 - ₹ 200) c/d	
		By Cash Received (bal fig.)	3,040
		By Balance (b/d 2011) c/d	140
	<u>3,480</u>		<u>3,480</u>
To Balance b/d : For 2010	200 140	By Balance (b/d 2012)	80

(2) Sundry Assets Account

Dr.		Cr.	
Particulars	Amount ₹	Particulars	Amount ₹
To Balance b/d	2,800	By Depreciation A/c	300
To Purchase A/c (bal. fig.)	400	By Balance c/d	2,900
	<u>3,200</u>		<u>3,200</u>

Q. 15. (b) Ujjwal Vavishwa Club was holding a building valuing ₹ 10 lakhs as on 31.03.2011

- Building Fund stands ₹ 8 lakhs and Cash at Bank is ₹ 15 lakhs as on 01.04.2011
- During the year 2011-12 donation received for the building fund is ₹ 20 lakhs

Give the journal entries and the effect in the Balance Sheet as on 31.03.2012

If (i) It purchases building of ₹ 15 lakhs during 2011-12

(ii) It purchases building of ₹ 30 lakhs during 2011-12

Answer 15. (b)

(i) Journal entries (₹ in Lakhs)

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Bank A/c Dr. To Donation for Building Fund A/c (Donation received for Building Fund)		20	20
	Building A/c Dr. To Bank A/c (Building purchased utilizing the Building Fund)		15	15
	Building Fund A/c Dr. To Capital Fund A/c (Being the capital expenditure transferred to the Capital Fund)		15	15

Balance Sheet as on 31.03.2012

Liabilities	Amount ₹ (lakh)	Assets	Amount ₹ (lakh)
Capital Fund	₹ ?	Building	₹ 10.00
Add : Building Fund	<u>15.00</u>	Add : Purchase of building	<u>15.00</u>
(Amount transferred)		Bank	15.00
Building Fund	8.00	Add : Donation Received	<u>20.00</u>
Add : Donation	<u>20.00</u>		35.00
	28.00	Less : Purchase of Building	<u>15.00</u>
Less : Amount transferred to Capital Fund	<u>15.00</u>		20.00
	13.00		

(ii) Journal entries (₹ in Lakhs)

Date	Particulars	L.F.	Amount ₹	Amount ₹
?	Bank A/c To Donation for Building Fund A/c (Donation received for Building Fund)	Dr.	20	20
	Building A/c To Bank A/c (Building purchased utilizing the Building Fund)	Dr.	30	30
	Building Fund A/c To Capital Fund A/c (Being the capital expenditure transferred to the Capital Fund)	Dr.	28	28

Balance Sheet as on 31.03.2012

Liabilities	Amount ₹ (lakh)	Assets	Amount ₹ (lakh)
Capital Fund	₹ ?	Building	₹ 10.00
Add : Building Fund (Amount Transferred)	28.00	Add : Purchase of building	30.00
Building Fund	8.00	Bank	15.00
Add : Donation	20.00	Add : Donation Received	20.00
	28.00		35.00
Less : Amount transferred to Capital Fund	28.00	Less : Purchase of Building	30.00
			5.00

Section II : Costing

Q. 16. Fill in the blanks :

- (i) Notional Profit is the difference between the value of work-in-progress certified and the _____ .
- (ii) _____ Capacity refers to that part of practical capacity which cannot be utilized due to abnormal reasons like lack of product demand, shortage of raw materials, shortage of labour, shortage of power etc.
- (iii) _____ _____ is that form of specific order costing under which each batch is treated as a cost unit and costs are accumulated and ascertained separately for each batch. Each batch consists of a number of like units.
- (iv) _____ Loss are generally not controllable.
- (v) Variable costs are fixed _____ .
- (vi) _____ method of issuing stock considers the purchase price of stock which entered the godown last.
- (vii) Raw Material consumed = (Opening Stock of Raw Material + Raw Material Purchased _____) .
- (viii) Machine Hour Rate for a Machine= Budgeted Production overheads allotted and apportioned to a machine/ _____ .
- (ix) Rent of a Show Room is to be allocated on the basis of _____ .
- (x) Margin of Safety = Sales – $\frac{\text{P}}{\text{V Ratio}}$.

Answer 16.

- (i) Cost of Work-in-progress certified.
- (ii) Idle
- (iii) Batch Costing
- (iv) Normal
- (v) Per unit
- (vi) LIFO
- (vii) Closing Stock of Raw Material
- (viii) Budgeted Machine Hours
- (ix) Average space occupied by each product.
- (x) Fixed Cost

Q. 17. Answer the following :

- (i) Calculate total passenger kilometer from the following information :
Number of buses 8, number of days operating in a month 25; round trips made by each bus per day 8, distance covered 7 kilometer (one side), Capacity of bus 50 passengers, normally 90% of capacity utilization.
- (ii) The following data are available in respect of material M for the year ended 31st March, 2012.
Opening stock ₹ 90,000, Purchases during the ₹ 4,20,000, Closing Stock ₹ 1,10,000.
Calculate : (a) Inventory Turnover Ratio; (b) the number of days for which the average inventory is held.

- (iii) Calculate the Cost of work Uncertified in each of the following alternative cases :
- Total Cost incurred to date ₹ 1,20,000, Cost of Work Certified ₹ 1,00,000.
 - Total Cost incurred to date ₹ 1,20,000 to complete 60% of the contract work. However, architect gave certificate only for 50% of the contract price.
- (iv) From the following information, calculate Economic Batch Quantity for a company using batch costing :
- | | |
|----------------------------------|-------------|
| Annual Demand for the components | 25000 units |
| Setting up cost per batch | ₹ 100 |
| Manufacturing cost per unit | ₹ 200 |
| Carrying cost per unit | 7% p.a. |
| Insurance Cost per unit | 2% p.a. |
| Obsolescence | 1% p.a. |
- (v) Calculate Break Even Sales from the following information :
- | | Year I | Year II |
|-------------|----------|----------|
| Total Sales | ₹ 20,000 | ₹ 30,000 |
| Total Cost | ₹ 17,600 | ₹ 21,600 |
- (vi) A Company sells two products, P and Q. The sales mix is 5 units of P and 3 units of Q. The contribution margin per unit are ₹ 40 for P and ₹ 30 for Q. Fixed Costs are ₹ 3,48,000 per month. Compute the Break-Even Point.
- (vii) Bonus paid under the Halsey Plan with bonus at 50% for the time saved equals the bonus paid under the Rowan system. When will this statement be correct?
- (viii) Calculate the Cost of Goods Produced in each of the following alternative cases :
- Works Cost ₹ 80,000, Office & Administration overheads 25% of Works cost.
 - Office & Administration overheads ₹ 50,000 being 20% of Cost of Goods Produced.
- (ix) A machine was purchased from a manufacturer who claimed that his machine could produce 73 tons in a year consisting of 365 days. Holidays, breakdown, etc., were normally allowed in the factory for 65 days. Sales were expected to be 50 tons during the year and the plant actually produced 51 tons during the year. Compute :
- Actual Capacity
 - Practical Capacity
 - Normal Capacity
- (x) For PQR Ltd. if the margin of safety is ₹ 3,60,000 (45% of sales) and P/V ratio is 40% Calculate Total Variable Cost and Break Even Sales :

Answer 17.

- (i) Passenger kilometer = $(8 \times 25 \text{ days} \times 8 \text{ trips} \times 2 \text{ rounds} \times 7 \text{ kilometer} \times 50 \text{ passengers} \times 90\% \text{ capacity utilization}) = 10,08,000$.
- (ii) (a) Inventory Turnover Ratio = $\text{Cost of stock of raw material consumed} / \text{Average stock of raw material}$
 $= ₹ 4,00,000 / ₹ 1,00,000 = 4 \text{ times}$

- (b) Average number of days for which the average inventory is held (Inventory Holding Period)
= $365 \text{ days} / 4 = 91 \text{ days}$.

Working Notes :

$$\begin{aligned} \text{Cost of stock of raw material consumed} &= \text{Op. Stock} + \text{Purchases} - \text{Closing Stock} \\ &= ₹ 90,000 + ₹ 4,20,000 - ₹ 1,10,000 = ₹ 4,00,000 \end{aligned}$$

$$\begin{aligned} \text{Average stock of raw material} &= (\text{Opening Stock} + \text{Closing Stock}) / 2 \\ &= (₹ 90,000 + ₹ 1,10,000) / 2 = ₹ 1,00,000 \end{aligned}$$

- (iii) (a) Cost of work Uncertified = Total cost incurred to date - Cost of Work Certified

$$= ₹ 1,20,000 - ₹ 1,00,000 = ₹ 20,000$$

- (b) Cost of work Uncertified

$$\begin{aligned} &= (\% \text{ of Work Certified} / \% \text{ of Total Work done till date}) \times \text{Total cost incurred till date} \\ &= ((60\% - 50\%) / 60\%) \times ₹ 1,20,000 = ₹ 20,000. \end{aligned}$$

- (iv) Carrying Cost per unit = $(7\% + 2\% + 1\%) = 10\%$

$$\text{EBQ} = \sqrt{2AS/C} = \sqrt{2 \times 25,000 \times ₹ 100 / 10\% \text{ of } ₹ 200} = 500 \text{ units.}$$

- (v) (a) Profit / Volume Ratio = Difference in Profit / Difference in Total sales $\times 100$

$$= ((₹ 8,400 - ₹ 2,400) / (₹ 30,000 - ₹ 20,000)) \times 100 = 60\%$$

- (b) Fixed Cost = Contribution - Profit = $60\% \text{ of } ₹ 20,000 - ₹ 2,400 = ₹ 9,600$

- (c) Break Even Sales = Fixed Cost / Profit Volume Ratio = $₹ 9,600 / 60\% = ₹ 16,000$

- (vi) Let $5x = \text{No. of units of P}$ and $3x = \text{No. of units of Q}$

$$\text{BEP in } x \text{ units} = \text{Fixed Cost} / \text{Contribution} = ₹ 3,48,000 / ((5 \times ₹ 40) + (3 \times ₹ 30)) = 1,200 \text{ units}$$

$$\text{BEP of P} = 5 \times 1,200 = 6,000 \text{ units}$$

$$\text{BEP of Q} = 3 \times 1,200 = 3,600 \text{ units}$$

- (vii) **Bonus Under Halsey Plan** = Standard wages rate $\times 50/100 \times \text{Time Saved} \dots(i)$

Bonus Under Rowan Plan

$$= \text{Standard wage rate} \times (\text{Time saved} / \text{Time allowed}) \times \text{Time taken} \dots(ii)$$

Bonus under Halsey Plan will be equal to Bonus under Rowan Plan when the following conditions are satisfied :

$$\text{Standard wage rate} \times (50/100 \times \text{Time Saved})$$

$$= \text{Standard wage rate} \times (\text{Time saved} / \text{Time allowed}) \times \text{Time taken}$$

$$\text{Or, } \frac{1}{2} = \text{Time Taken} / \text{Time Allowed}$$

$$\text{Or, } \text{Time Taken} = \frac{1}{2} \text{ Time allowed}$$

Hence, when the time taken is 50% of the time allowed, the bonus under Halsey and Rowan Plans is equal.

- (viii) (a) Cost of Goods Produced = Works Cost + Office & Administration overheads

$$= ₹ 80,000 + 25\% \text{ of } ₹ 80,000 = ₹ 1,00,000$$

- (b) Cost of Goods Produced = $₹ 50,000 / 20\% = ₹ 2,50,000$.

- (ix) (a) Actual Capacity = 51 tons;
 (b) Practical Capacity = (73 tons/365 days) × 300 days = 60 tons;
 (c) Normal Capacity = 50 tons
- (x) Sales = ₹ 3,60,000/45% = ₹ 8,00,000
 Break Even Sales = ₹ 8,00,000 – ₹ 3,60,000 = ₹ 4,40,000
 Variable Cost = ₹ 8,00,000 × (100 – 40)% = ₹ 4,80,000

Q. 18. (a) A company manufactures 7,500 units of a product per month. The cost of placing an order is ₹ 200. The purchase price of raw material is ₹ 20 per kg. The re-order period is 6 to 8 weeks. The consumption of raw materials varies from 100 kg to 450 kg per week, the average consumption being 275 kg. The carrying cost of inventory is 20% per annum.

You are required to calculate :

- (i) Re-order quantity
- (ii) Re-order level
- (iii) Maximum level
- (iv) Minimum level
- (v) Average stock level

Answer 18. (a)

A = Annual requirement = (Average consumption per week × 52 weeks) = (275kgs × 52 weeks) = 14,300 Kgs

O = Ordering cost per order = ₹ 200

C = Carrying cost per unit per annum = ₹ 20 × 20% = ₹ 4

(i) Reorder Quantity: $EOQ = \sqrt{2 \cdot A \cdot O / C} = \sqrt{2 \times 14,300 \text{ kgs} \times ₹ 200 / ₹ 4} = 1,196 \text{ kgs. (Approx)}$

(ii) Re-order level = (Maximum Consumption × Maximum Re-Order Period)
 = 450 kg per week × 8 weeks = 3,600 kgs.

(iii) Maximum Level
 = Re-order level + Reorder Quantity – (Minimum Consumption × Minimum Re-Order Period)
 = 3,600 kgs. + 1,196 kgs – (100kgs. × 6 weeks) = 4,196 kgs.

(vi) Minimum Level
 = Re-order level – (Average Consumption × Average Reorder Period)
 = 3,600 kgs. - $\{(100 + 450)/2 \times (6 + 8)/2\}$ kgs. = 1,675 kgs.

(v) Average Stock Level = (Maximum Level + Minimum Level)/2
 = (4,196 kgs. + 1,675 kgs.)/2 = 2,936 kgs. (Approx)

Q. 18. (b) A company manufactures a product from a raw material, which is purchased at ₹ 87 per kg. The company incurs a handling cost of ₹ 350 plus freight of ₹ 400 per order. The incremental carrying cost of inventory of raw material is Re.0.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 9 per kg. per annum. The annual production of the product is 1,80,000 units and 2 units are obtained from 1 kg of raw material.

Required :

- (i) Calculate the EOQ of raw materials.
 (ii) Advise, how frequently should orders for procurement be placed
 (iii) If the company proposes to rationalize placement of orders on Quarterly basis, what percentage of discount in the price of raw materials should be negotiated?

Answer 18. (b)

A = 1,80,000 units / 2 units × 1 kg. = 90,000 kgs.

(i) O = ₹ 350 + ₹ 400 = ₹ 750

C = (Re. 0.50 × 12) + 9 = ₹ 15

EOQ = $\sqrt{2 \times 90,000 \times 750 / 15}$ = 3,000 kgs.

- (ii) No of orders p.a. = 90,000 / 3,000 = 30 orders
 Time between 2 orders = 360 days / 30 orders = 12 days

- (iii) No. of orders to be placed p.a. = 4 orders
 If orders are placed on Quarterly basis
 Order size Proposed = 60,000 kgs. / 4 Orders = 15,000 kg.

Statement showing determination of minimum percentage discount to be negotiated

	Order 3,000 kg	Order 15,000 kg
Annual Ordering Cost (60,000kg/3,000kg × ₹ 750) (4 × ₹ 750)	₹ 15,000	₹ 3,000
Annual Carrying Cost (3,000kg/2 × ₹ 15) (15,000kg/2 × ₹ 15)	₹ 22,500	₹ 1,12,500
Total Annual Relevant Cost	₹ 37,500	₹ 1,15,500
Extra cost to be incurred Annual Requirement of raw material		₹ 78,000 90,000 kgs
Extra Cost p.a./Min.disc.p.u. to be negotiated Purchase Price per kg.		Re. 0.87 ₹ 87
Min % to be negotiated		1%

Q. 19. (b) At what price per unit would Part No. P 42 be entered in the Stores Ledger, if the following invoice was received from a supplier :

	₹
400 units Part No.P 42 @ ₹ 10.00	4,000
Less : 20% discount	800
	3,200
Add : Excise Duty @ 15%	480
	3,680
Add : Packing Charges (5 non-returnable)	80
	3,760

- Notes : (i) A 2 percent discount will be given for payment in 30 days
 (ii) Documents substantiating payment of excise duty is enclosed for claiming MODVAT Credit.

No. of workers on the payroll:	
At the beginning of the month	900
At the end of the month	1,100

During the month 10 workers left, 40 persons were discharged and 150 workers were recruited. Of these, 25 workers are recruited in the vacancies of those leaving, while the rest were engaged for an expansion scheme.

Answer 20.

Average number of workers on rolls = $(900 + 1,100)/2 = 1,000$

(i) Separation Method :

$$\begin{aligned} \text{Labour Turnover} &= (\text{No. of separations in a year} / \text{Average number of workers on rolls}) \times 100 \\ &= ((10 + 40)/1000) \times 100 = 5\% \end{aligned}$$

(ii) Replacement Method :

$$\begin{aligned} \text{Labour Turnover} &= (\text{No. of replacement in a year} / \text{Average number of workers on rolls}) \times 100 \\ &= (25/1,000) \times 100 = 2.5\% \end{aligned}$$

(iii) Flux Method :

$$\begin{aligned} \text{Labour Turnover} &= [\frac{1}{2} (\text{No. of Separation} + \text{No. of Replacements}) / \text{Average No. of workers on rolls}] \times 100 \\ &= [\frac{1}{2} (50+25)/1,000] \times 100 = 3.75\% \end{aligned}$$

Note : 125 workers engaged for expansion scheme need not be taken into account for calculation of Labour Turnover.

Q. 21. A worker, whose day- work wages is ₹ 5.00 an hour, received production bonus under the Rowan Scheme. He carried out the following work in a 48 hours week :

Job 1	1,500 items at 4 hours per 1,000
Job 2	1,800 items at 3 hours per 1,000
Job 3	9,000 items at 6 hours per 1,000
Job 4	1,500 items for which no "Standard time" was fixed and it

Was arranged that the worker would be paid a bonus of 25 per cent.

Actual time on the job was 4 hours.

Job 5 2,000 items at 8 hours per 1,000, each item was estimated to be half-finished.

Job N.2 was carried out on a machine running at 90 per cent efficiency and an extra allowance of $1/9^{\text{th}}$ of actual time was given to compensate the worker.

4 hours were lost due to power cut. Calculate the earnings of the worker, clearly stating your assumptions for the treatment given by you for the hours lost due to power-cut.

Answer 21.

Job. No.	Hours
1 1,500 items at 4 hours per 1,000	6
2 1,800 items at 3 hours per 1,000 = 5.4 Add : Extra allowance $1/9 = 0.60$	6
3 9,000 items at 6 hours per 1,000	54
4 1,500 items at 4 hours + 25%	5
5 2,000 items half finished i.e., equivalent to 1,000 items	8
Time allowed	79
Less : Hours worked (48 – 4) =	44
Time saved	35

Rowan Scheme :

$$\begin{aligned}
 E &= HW \times RH + (TS/TA \times HW \times RH) \\
 &= 44 \times 5.00 + (35/79 \times 44 \times 5.00) \\
 &= 220 + 97.47 && ₹ 317.47 \\
 \text{Add : Wages for 4 hours at ₹ 5.00} &&& ₹ 20.00 \\
 \text{Earnings for the workers} &&& \underline{₹ 337.47}
 \end{aligned}$$

Treatment :

For 4 hours lost due to power cut, the worker will get wages at ₹ 5.00 an hour 4 hours should not be taken into account for arriving Time Saved. $4 \times 5.00 = ₹ 20.00$ should be debited to Factory Overhead A/c.

Q. 22. You are provided with the following Information :

Fixed Expenses ₹ 6,000, Break Even Point ₹ 10,000, Old Selling Price is ₹ 100

You are required to calculate :

- P/V Ratio**
- Profit when sales are ₹ 20,000**
- Sales to earn profit of ₹ 9,000**
- New Break Even Point if selling price is reduced by 20%**
- New Break Even Point if variable cost is increased by 50%**

Answer 22.

- $P/V \text{ Ratio} = (\text{Fixed Cost}/\text{Break Even Sales}) \times 100 = (\text{₹ } 6,000/\text{₹ } 10,000) \times 100 = 60\%$
- $\text{Profit} = \text{Contribution} - \text{Fixed Cost} = (60\% \text{ of } ₹ 20,000) - ₹ 6,000 = ₹ 6,000$
- $\text{Desired Sales} = (\text{Fixed Cost} + \text{Desired Profit})/P/V \text{ Ratio} = (\text{₹ } 6,000 + \text{₹ } 9,000)/60\% = ₹ 25,000$
- $\text{New } P/V \text{ Ratio} = ((\text{New Selling Price} - \text{Variable Cost})/\text{New selling Price}) \times 100$
 $= ((₹ 80 - ₹ 40)/₹ 80) \times 100 = 50\%$
 $\text{New Break Even Point} = \text{Fixed cost} / \text{New } P/V \text{ Ratio} = ₹ 6,000/50\% = ₹ 12,000$
- $\text{New } P/V \text{ Ratio} = \text{Selling Price} - \text{New Variable Cost}/\text{Selling Price} \times 100$
 $= ₹ 100 - ((₹ 40 + ₹ 40 \times 50\%)/₹ 100) \times 100 = 40\%$
 $\text{New Break Even Point} = \text{Fixed cost} / \text{New } P/V \text{ Ratio} = ₹ 6,000/40\% = ₹ 15,000$

Q. 23. A Factory engaged in Manufacturing Plastic Cans is working at 40% capacity and produces 15,000 cans per month. The present cost Break-up for one can is :

Materials ₹ 25, Labour ₹ 5, Overhead ₹ 15 (60% fixed)

Selling price is ₹ 50 per cans. If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the price of materials.

Prepare a statement showing the profit at 50% and 90% capacity and also determine the break-even point at each of these production levels.

Answer 23.

Statement of Present Contribution per Unit

Particulars		₹
A.	Selling Price	50.00
B.	Less : Variable Costs :	
	Materials	25.00
	Labour	5.00
	Overhead	6.00
		<u>36.00</u>
C.	Contribution per unit	<u>14.00</u>

Total Fixed Overhead = $(15 \times 60\%) \times 15,000$ units = ₹ 1,35,000

Flexible Budget

Particulars	Capacity Level		
	40%	50%	90%
A. Productions and Sales (unit)	15,000	18,750	33,750
	₹	₹	₹
B. Selling Price per Unit	50.00	48.50	47.50
C. Sales	7,50,000	9,09,375	16,03,125
D. Variable Costs :			
Materials	3,75,000	4,68,750	8,43,750
Labour	75,000	93,750	1,68,750
Variable Overheads	90,000	1,12,500	2,02,500
Total Variable Costs	<u>5,40,000</u>	<u>6,75,000</u>	<u>12,15,000</u>
E. Contribution (C-D)	2,10,000	2,34,375	3,88,125
F. Less : Fixed Overheads	1,35,000	1,35,000	1,35,000
G. Profit (E-F)	75,000	99,375	2,53,125
H. Contribution per unit (Total Contribution/Total units)	14.00	12.5	11.5
I. Break Even Point (in units) (Total fixed overhead/ Contribution per unit)	9,643	10,800	11,739

Q. 24. (a) In a Factory department there are three machines to which the following expenses have been allocated- A : ₹ 456; B: ₹ 507; C: ₹ 651

In Addition, there is an overhead crane to bring materials to the machines as necessary. The expenses allocated to this crane are ₹ 660.

During the period of this expenditure, the machines were used as follows –

Particulars	Machine A (in Hrs.)	Machine B (in Hrs)	Machine C (in Hrs)
With use of crane	240	260	360
Without use of crane	330	340	—
Total	570	600	360

Calculate a machine rate for each machine, distinguishing between the hours in which the crane is used and those in which it is not used.

Answer 24. (a)

Particulars	Machine A	Machine B	Machine C	Crane
Overheads (given)	₹ 456	₹ 507	₹ 651	₹ 660
Operating hours (given)	570	600	360	240+260+360=860
Rate per hour-normal, i.e.without use of crane	₹ 0.80	₹ 0.85	₹ 1.81	₹ 0.77
Rate per hour –with use of crane Normal + Re. 0.77	₹ 1.57	₹ 1.62	₹ 2.58	

Q. 24. (b) During the year ended 31st March,2012 the factory overhead costs of two production department of an organization are as under :

A - ₹ 64,500

B - ₹ 97,900

The basis of apportionment of overhead is as under :

Department A - ₹ 6 per piece for 10,000 pieces.

B - ₹ 10 per machine hour for 10,000 hours

Calculate department wise under or over-absorption of overheads.

Answer 24. (b)

Total amount of overhead absorbed

Department	Amount	Basis of absorption
A	₹ 60,000	₹ 6 per piece for 10,000 pieces
B	₹ 1,00,000	₹ 10 per machine hour for 10,000 hours

Department wise under or over-absorption of overheads

Department	Incurred ₹	Absorbed ₹	Under-absorption ₹	Over-absorption ₹
A	64,500	60,000	4,500	—
B	97,900	1,00,000	—	2,100
	<u>1,62,400</u>	<u>1,60,000</u>	4,500	<u>2,100</u>

Reconciliation :

	₹
Under-absorption of Overhead	4,500
Over-absorption of Overhead	<u>2,100</u>
Net Under - absorption of Overhead	2,400

The unabsorbed overhead amount will be written off to the Costing Profit & Loss Account, this will reduce the profit by ₹ 2,400.

Q. 25. (a) An engine manufacturing company has two production departments (i) Maintenance and (ii) Factory Office. Budgeted Cost and relevant cost drivers are—

Department	Snow Mobile Engine	Boat Engine	Maintenance	Factory Office
Cost in ₹	₹ 3,00,000	₹ 8,50,000	₹ 1,50,000	₹ 1,20,000

Bases are as under-

Department	Factory Office Department	Maintenance Department
Cost Driver	Number of Employees	Number of Work Orders
Mobile Engine Department	540 Employees	285 Orders
Boat Engine Department	135 Employees	95 Orders
Factory Office Department	—	20 Orders
Maintenance Department	75 Employees	—
Total	750 Employees	400 Orders

Required—

1. Determine the basis of Overhead allocation and Compute the allocation percentage and then use these percentage to allocate the Service Department Costs by using Direct Method.
2. Determine the basis of Overhead allocation and Compute the allocation percentage and then use these percentages to allocate the Service Department Costs by using Non Reciprocal Method / Step Method.

Answer 25. (a)

1. Apportionment of Service Department OH using Direct Method

Department	Snow Mobile Engine ₹	Boat Engine ₹	Total ₹
• Overhead Costs as Given	3,00,000	8,50,000	11,50,000
• Add : Factory Office Costs apportioned to Production Department in the ratio of no. of employees (540:135) or (4:1) i.e. (80%; 20%)	96,000	24,000	1,20,000
• Add : Maintenance department Costs apportioned to Production Departments in the ratio of no. of work orders (285:95) or (3:1) i.e. (75%; 25%)	1,12,500	37,500	1,50,000
Total Overhead	5,08,500	9,11,500	14,20,000

2. Apportionment of Service Department OH using Non Reciprocal Method/Step Method

Department	Factor Office	Maintenance ₹	Snow Mobile ₹	Boat Engine ₹	Total ₹
• Overhead Costs as given	1,20,000	1,50,000	3,00,000	8,50,000	14,20,000
• Factory Office Costs apportioned based on no. of employees (75:540:135) i.e. (10%; 72%; 18%)	(1,20,000)	12,000	86,400	21,600	1,20,000
• Maintenance Department Costs apportioned based on no. of work orders (285:95) i.e. (75%; 25%)	—	(1,62,000)	1,21,500	40,500	1,62,000
Total	Nil	Nil	5,07,900	9,12,100	14,20,000

Q. 25. (b) Q Ltd. which absorbs overhead at a pre-determined rate, provides you the following information :

- Overheads Actually incurred** ₹ 30,000
- Overheads absorbed** ₹ 20,000
- Goods sold** 600 units
- Stock of Finished Goods** 550 units
- Stock of Work-in-progress** 500 units (20% completed)
- Unabsorbed overheads were due to rising price levels.**
- How would under-absorbed overheads be treated in cost account?**

Answer 25. (b)

Under Absorbed Overhead = Actual Overhead – Absorbed Overhead = ₹ 30,000 – ₹ 20,000 = ₹ 10,000

Total Equivalent unit = 600 + 550 + (20% of 500 units) = 1,250 units

Supplementary Rate = $\frac{\text{Under Absorbed Overhead}}{\text{Total Equivalent unit}} = \frac{\text{₹ } 10,000}{1,250} = \text{₹ } 8 \text{ per unit}$

Charging by Supplementary Rate :

	₹
Cost of Sales (600 units × ₹ 8)	4,800
Stock of Finished Goods (550 units × ₹ 8)	4,400
Stock of Work-in-progress (100 units × ₹ 8)	880
	<u>10,000</u>

Journal entries

Date	Particulars	L.F.	Amount ₹	Amount ₹
	Cost of Sales A/c	Dr.	4,800	
	Finished Goods Ledger Control A/c	Dr.	4,400	
	Work-in-progress Ledger Control A/c	Dr.	800	
	To Overheads Control A/c			10,000

Q. 26. In Active Ltd. ,Machine hour rate is worked out at the beginning of the year on the basis of 13 weeks period, which is equivalent to 3 calendar months. The following estimates for operating a machine are provided to you.

1. Total available working hours per week: 48 hours
2. Maintenance Time included in above: 2 hours
3. Setting-up time included in above: 2 Hours
4. Operators Wages per month: Rs.7,000
5. Supervisor's Salary per month: ₹ 20,000 (common supervisor for 3 machines)
6. WDV of machine: ₹ 2,00,000 (depreciation at 10% p.a.)
7. Repairs and Maintenance per annum: ₹ 18,000
8. Consumable Stores per annum: ₹ 45,000
9. Rent & Rates for the quarter (apportioned) ₹ 6,000

Power is consumed at the rate of 10 units per hour at the rate of ₹ 5.00 per unit. Power is required for productive hours only. Setting-up time is part of productive time, but no power is required for setting-up jobs.

The Operator & Supervisor are permanent. Repairs & Maintenance and Consumable Stores are variable.

You are required to determine the machine hour rate.

Answer 26.

1. Computation of Productive Machine Hours

Possible operating Hours = $[48-2-2] \times 13$ weeks	572 Operating Hours
Add : Set Up Hours = 2×13 weeks	26 Set Up Hours
Hence Productive Hours	598 Productive Machine Hours

2. Statement of Overheads for the 13-week period

Particulars	Computation	₹
Operators' Wages	₹ 7,000 × 3 months	21,000
Supervisors' Salary	₹ 20,000 × 3 months × $\frac{1}{3}$	20,000
Depreciation	₹ 2,00,000 × 10% × $\frac{13}{52}$ weeks	5,000
Repairs and Maintenance	₹ 18,000 × $\frac{13}{52}$ weeks	4,500
Consumables	₹ 45,000 × $\frac{13}{52}$ week	11,250
Rent, Rates and Taxes	Given	6,000
Power	10 units × ₹ 5.00 per unit × 572 hours	28,600
Total Overhead		96,350

3. Machine Hour Rate = Total Overheads ÷ Machine Hours = ₹ 96,350 ÷ 598 = ₹ 161.12 per hr.

However the set-up time cannot be charged to the jobs, thus the Machine hour rate will be ₹ 96,350 ÷ 572 = ₹ 168.44 per hr. i.e based on Operating Hours.

Q. 27. From the following information, prepare a statement showing the cost, and the profit per unit and in total :

1. Cost of materials @ ₹ 15 per unit.
2. Labour cost @ ₹ 10 per unit
3. Factory overhead are absorbed @ 60 % of labour cost.
4. Administration overheads are absorbed @ 30% of labour cost.
5. Selling overheads are charged @ ₹ 2 per unit.
6. Opening stock of finished goods– 500 units @ ₹ 36.20
7. Closing Stock of finished goods – 250 units
8. Sales-11,000 units at profit of 20% on sales.

Answer 27.

Statement Showing Cost and Profit

Particulars	Per unit (₹)	Total (₹)
A. Direct Material Cost	15.00	1,65,000
B. Direct Labour Cost	10.00	1,10,000
C. Prime Cost [A + B]	25.00	2,75,000
D. Factory Overheads (60% of ₹ 1,10,000)	6.00	66,000
E. Factory Cost (C + D)	31.00	3,41,000
F. Administration Overhead (20% of ₹ 3,41,000)	6.20	68,200
G. Cost of Goods Produced	37.20	4,09,200
H. Add : Opening Stock of Finished Goods (500 × ₹ 36.20)		18,100
I. Less : Closing Stock of Finished Goods (250 × ₹ 37.20)		9,300
J. Cost of Goods Sold (H+I)	38.00	4,18,000
K. Add : Selling Overhead (11,000 × ₹ 2.00)	2.00	22,000
L. Cost of Sales (J+K)	40.00	4,40,000
M. Add : Profit	8.00	88,000
N. Sales	48.00	5,28,000

Q. 28. (a) The following information relates to Contract No. : 444

Particulars	Amount	Particulars	Amount
Direct Materials	40,500	Loose Tools	4,800
Direct Labour	31,000	Tractor Expenses :	
Stores Issued	21,000	Running Materials	4,600
Other Direct Charges	5,300	Wages of Drivers	6,000

The contract Price was ₹ 1,80,000 and the contract took 13 weeks in its completion. The value of loose tools and stores returned at the end of the period were ₹ 400 and ₹ 6,000 respectively. The Plant was also returned at a value of ₹ 32,000 after charging depreciation at 20%. The value of tractor was ₹ 40,000 and depreciation was to be charged to the contract at 15% p.a. Office OH is to be provided at 10% on Works Cost.

You are required to prepare the contract Account and the Contractee's Account assuming that the amount due from Contractee was duly received.

Also explain what would be the treatment if 10% retention money was to be released by the Contractee a year later.

Answer 28. (a)

1. Computation of Depreciation

	₹
• On Plant : (₹ 32,000 ÷ 80%) × 20% (Since WDV after charging 20% depreciation is ₹ 32,000)	8,000
• On Tractor : ₹ 40,000 × 15% × (13/52)	1,500
Total Depreciation	<u>9,500</u>

2. Contract No. 444 Account for the ended

Particulars	Amount ₹	Particulars	Amount ₹
To Direct Materials	40,500	By Contractee's Account	1,80,000
To Direct Labours	31,000	– Contract Price	
To Stores issued	21,000	By Loose Tools - Transfer/Return	400
To Direct Charges	5,300	By Stores Account- Transfer/Return	6,000
To Loose Tools-issued	4,800		
Materials 4,600 + Wages of Drivers 6,000	10,600		
To Depreciation (WN1)	9,500		
To Office Overheads (See Note Below)	11,630		
To P & L A/c - Profit - Bal. fig.	52,070		

Note : Works Cost = ₹ 1,16,300 (40,500 + 31,000 + 21,000 + 4,800 + 5,300 + 10,600 + 9,500 – 6,00 – 400)

Therefore Office Expenses : 10% of ₹ 1,16,300 = ₹ 11,630.

3. Contractee's Account

Particulars	Amount ₹	Particulars	Amount ₹
To Contract Account	1,80,000	By Bank	1,18,000

Q. 28.(b) Compute a Conservative estimate of profit on a contract (which has been 80% completed) from the following particulars. Illustrate four methods of computing the profit : Total expenditure to date ₹ 3,40,000; Estimated further expenditure to complete the contract ₹ 68,000 (including Contingencies); Contract Price ₹ 6,12,000; Work Certified ₹ 4,00,000; Work not Certified ₹ 34,000; Cash received ₹ 3,26,400.

Answer 28. (b)

- (i) Estimated Profit × (Work Certified/Contract Price)
= ₹ 2,04,000 × (₹ 4,00,000/₹ 6,12,000) = ₹ 1,33,333

- (ii) Estimated Profit × (Work Certified/Contract Price) × (Cash Received/Work Certified)
= ₹ 2,04,000 × ₹ (4,00,000/₹ 6,12,000) × (₹ 3,26,400/₹ 4,00,000) = ₹ 1,08,800
- (iii) Notional Profit × (Work Certified/Contract Price)
= ₹ 94,000 × (₹ 4,00,000/₹ 6,12,000) = ₹ 61,437.91
- (iv) $\frac{2}{3}$ × Notional Profit × (Cash Received/Work Certified)
= $\frac{2}{3}$ × ₹ 94,000 × (₹ 3,26,400/₹ 4,00,000) = ₹ 51,136

Working Notes :

1. Computation of estimated Profit	₹	₹
Contract Price		6,12,000
Less : Total expenditure to date	3,40,000	
Less : Estimated further expenditure to complete the contract (including contingencies)	68,000	4,08,000
Estimated Profit		<u>2,04,000</u>
2. Computation of Notional Profit		
Value of Work Certified		4,00,000
Less : Cost of Work Certified (Total Expenditure to Date – Work not Certified) (₹ 3,40,000 - 34,000)		<u>3,06,000</u>
Notional Profit		<u>94,000</u>

Q. 29. A Firm uses job costing and recovers overheads on direct labour. Three jobs were worked on during a period the details of which are as follows :

	Job 1 ₹	Job 2 ₹	Job 3 ₹
Opening work in progress	6,000	NIL	36,000
Material in period	17,000	28,000	NIL
Labour for period	12,000	23,000	5,000

The overhead for the period were exactly as budgeted ₹ 1,00,000 Job 1 and Job 2 are the only incomplete jobs.

You are required to compute the value of closing work in progress.

Answer 29.

Total Labour Cost = ₹ (12,000 + 23,000 + 5,000) = ₹ 40,000

Overhead absorption rate = ₹ (1,00,000/40,000) × 100% = 250% of direct labour cost

Costing work in progress valuation

	Job 1 ₹	Job 2 ₹	Total ₹
Costs given in question	35,000	51,000	86,000
Overhead absorbed	30,000	57,500	<u>87,500</u>
			<u>1,73,500</u>

Q. 30. Effect of 10% retention: If 10% of the Contract value had been retained by the Contractee, Profit transferred to P & L Account will be calculated as = Notional Profit \times (Cash Received \div Work Certified) = ₹ 52,070 \times 90% = ₹ 46,863. The balance of ₹ 5,209 will be carried forward as Reserve Profit, for recognition in the financial year in which the Retention Money is released. Also, the amount due from the Contractee i.e. 10% of ₹ 1,80,000 = ₹ 18,000 will be shown as "Due from Contractee" on the Asset Side of the Balance Sheet of the Contractor.

A factory, which uses a job costing system, provides the following cost data :

Direct Materials: ₹ 7,50,000; Direct Wages : ₹ 5,00,000; Profit ₹ 6,00,000; Selling

Overhead: ₹ 4,25,000: Administrative Overhead: ₹ 3,75,000; Factory Overhead: ₹ 2,50,000

Required :

- (a) Prepare a Cost Sheet indicating the various components of cost and profit.
- (b) For the next year, the factory has received an order for a number of jobs. It is estimated that Direct Materials would be ₹ 10,00,000 and Direct Labour would cost ₹ 5 lakhs. What would be the price for this jobs if the factory intends to earn the same rate of profit on sales, assuming that the Selling and Distribution Overhead has gone up by 15%? Fixed Overhead will be absorbed on the basis of Direct Wages and Administration Overhead and Selling & Distribution Overhead will be absorbed on the basis of Works Cost.

Answer 30. (a)

Job Cost Sheet

Particulars	Last Year ₹	Basis	Next Year ₹
Direct Materials	7,50,000	Actuals	10,00,000
Direct Wages	5,00,000	Actuals	5,00,000
Prime Cost	12,50,000	Actuals	15,00,000
Add : Factory Overhead Or, Factory on Cost	2,50,000	2,50,000 \div 5,00,000 = 50% on Wages	2,50,000
Factory Cost	15,00,000	3,75,000 \div 15,00,000 = 25% on Factory Cost	
Add : Administration Overhead Or, Administration on Cost	3,75,000		
Cost of Production	18,75,000		
Add : Selling & Distribution Overhead or Selling and Distribution on Cost	5,25,000	5,25,000 \div 15,00,000 = 35% + 15% on Factory Cost	
Cost of Sale/ Total Cost	24,00,000		
Add : Profit	6,00,000	6,00,000 \div 24,00,000 = 25% on Cost of Sales or Total Cost	
Sales	<u>30,00,000</u>		<u>38,28,125</u>

FOUNDATON EXAMINATION

(REVISED SYLLABUS - 2008)

Paper - 3 : ECONOMICS AND BUSINESS FUNDAMENTALS

Section - I

[Economics]

Q. 1. (a) Answers the following :

(i) Economics is —

- (A) Normative science
- (B) Positive science
- (C) Human science
- (D) Political science

(ii) Inductive Method proceeds from

- (A) Particular to General
- (B) General to particular
- (C) Imagination to reality
- (D) None of the above

(iii) Constituents of money supply are

- (A) Rupee notes and coins with the public
- (B) Credit cards
- (C) Traveller's cheques etc.
- (D) All the above

(iv) The author of 'General Theory of Employment and Money' was

- (A) Adam Smith
- (B) Paul Samuelson
- (C) J. M. Keynes
- (D) Robbins

(v) The law 'supply creates its own demand' was put forth by

- (A) Marshall
- (B) Pigou
- (C) Robbins
- (D) J. B. Say

- (vi) Deductive method is also known as
- (A) Hypothetical Method
 - (B) Abstract Method
 - (C) Periori Method
 - (D) All of the above.
- (vii) An individual demand curve sloped downward to the right because
- (A) Income effect of fall in price
 - (B) Substitution effect of decrease in price
 - (C) Diminishing marginal utility
 - (D) All of the above
- (viii) Normative science deals with
- (A) What ought to be
 - (B) What is
 - (C) Individual Consumption
 - (D) All of the above
- (ix) Marginal cost is calculated as
- (A) "TC/" output
 - (B) TC output
 - (C) AC/output
 - (D) None of the above.
- (x) Exception to the law of supply is :
- (A) Agricultural product
 - (B) Scarce goods
 - (C) Labour market
 - (D) All of the above
- (xi) Homogeneous product is the characteristics of :
- (A) Perfect competition
 - (B) Monopoly market
 - (C) Monopolistic competition
 - (D) Oligopoly

Q. 1. (b) Fill up the blanks :

- (i) Per capital income figure would be inflated because of _____ .
- (ii) Theory of comparative cost was developed by _____ .
- (iii) Fisher's equation is $MV =$ _____ .
- (iv) The two primary functions of a commercial bank are the _____ function and _____ .
- (v) GNP is the _____ of all final goods and services produced by domestic sectors in the country in a year.

- (vi) A central bank has monopoly over _____ .
- (vii) Law of variable proportions applies in the _____ .
- (viii) Net National Product = Gross National Product Minus _____ .
- (ix) Per Capita Income = National Income/ _____ .
- (x) Balance of payment is _____ than Balance of Trade.
- (xi) Cash Balance Approach is based on the _____ of money.

Q. 1. (c) State which of the following statements is true and which is false.

- (i) Giffen goods are otherwise known as superior goods.
- (ii) Average Fixed cost can never be zero.
- (iii) Theory of absolute trade was propounded by J. M. Keynes.
- (iv) Income tax is an indirect tax.
- (v) Industrial Development Bank of India is an investment bank.
- (vi) A country is said to be under populated when optimum population is more than the actual population.
- (vii) Quasi rent is earned from land only.
- (viii) Average cost is equal to AFC + AVC.
- (ix) There is continuous rise in price level and the value of money decreases during inflation.
- (x) Central Bank creates credit
- (xi) Unit Trust of India is an Investment Bank.

Q. 1. (d) Define the following terms in not more than thatn two lines :

- (i) Consumer's surplus
- (ii) Shut down point
- (iii) Regressive tax
- (iv) Fiscal Policy
- (v) Human Capital
- (vi) Proportional Tax
- (vii) Bank Rate
- (viii) Marginal Cost
- (ix) Cash Reserve Ratio

Answer 1. (a)

- (i) (B) — Positive science
- (ii) (A) — Particular to General
- (iii) (D) — All of the above
- (iv) (D) — J. M. Keynes
- (v) (D) — J. B. Say
- (vi) (A) — Hypothetical Method

- (vii) (D) — All of the above
- (viii) (A) — What ought to be
- (ix) (D) — None of the above.
- (x) (D) — All the above
- (xi) (A) — Perfect competition

Answer 1. (b)

- (i) Inflation
- (ii) Ricardo
- (iii) PT
- (iv) Deposit, Loan
- (v) Market Value
- (vi) Issue of notes
- (vii) Short-run
- (viii) Depreciation
- (ix) Size of population
- (x) Wider
- (xi) Store of value

Answer 1. (c)

- (i) False
- (ii) True
- (iii) False
- (iv) False
- (v) True
- (vi) True
- (vii) False
- (viii) True
- (ix) True
- (x) False
- (xi) True

Answer 1. (d)

- (i) **Consumer's surplus** : Excess of a price which a person is willing to pay over that which what he actually pays is called consumer's surplus.
- (ii) **Shut down point** : A stage when the $AR = MR = AVC = MC$ at this point the firm would be covering only the average variable cost and no part of average fixed cost.

- (iii) **Regressive tax** : When the rate of taxation decreases with the increase in income or asset value it is called regressive tax.
- (iv) **Fiscal Policy** : That part of economic policy which deals with public revenue, public expenditure, public borrowing and financial administration to attain socio-economic objectives.,
- (v) **Human Capital** : Human capital implies man as a means of production just as physical capital brings income to the owner. Investment in human capital earns money repeatedly.
- (vi) **Proportional Tax** : A tax is said to be proportional when it is charged at a flat rate of all. For example, tax is imposed at 5% rate on all income groups.
- (vii) **Bank Rate** : A Central Bank lends money or rediscounts the bills of commercial banks. The rate of interest charged by the Central Bank is called bank rate.
- (viii) **Marginal Cost** : It is defined as the increment of total cost that comes from producing an increment of one unit of output. $MC = \frac{\Delta TC}{\Delta Q}$
- (ix) **Cash Reserve Ratio** : Commercial banks are legally bound to keep a portion of their deposits in the form of cash reserve with the Central Banks. This is known as CRR.

Q. 2. State the Law of Demand. Explain the exceptions to the law of demand.

Answer 2.

Law of Demand : The law of demand expresses the functional relationship between the price of commodity and its quantity demanded. It states that the demand for a commodity tends to vary inversely with its price— ie, Other things remaining constant, a fall in price of a commodity will lead to a rise in demand of that commodity and a rise in price will lead to fall in demand.

ASSUMPTION :

- (1) Income of the people remaining unchanged.
- (2) Taste, preference and habits of consumers unchanged.
- (3) Prices of related goods i.e., substitute and complementary goods remaining unchanged.
- (4) There is no expectation of future change in price of the commodity.
- (5) The commodity in question is not consumed for its prestige value.

Exceptions to the law of demand :

- (i) **Conspicuous Goods** : These are certain goods which are purchased to project the status and prestige of the consumer. For e.g. expensive cars, diamond jewellery, etc. such goods will be purchased at a higher price and less at a lower price.
- (ii) **Giffen Goods** : These are special category of inferior goods whose demand increases even if with a rise in price. For eg. :- coarse grain, clothes, etc.
- (iii) **Share's speculative Market** : It is found that people buy shares of those company whose price is rising on the anticipation that the price will rise further. On the other hand, they buy less shares in case the prices are falling as they expect a further fall in price of such shares. Here the law of demand fails to apply.

- (iv) **Bandwagon effect** : Here the consumer demand of a commodity is affected by the taste and preference of the social class to which he belongs to. If playing golf is fashionable among corporate executive, then as the price of golf accessories rises. The business man may increase the demand for such goods to project his position in the society.
- (v) **Veblen Effect** : Sometimes the consumer judge the quality of a product by its price. People may have the expression that a higher price means better quality and lower price means poor quality. So the demand goes up with the rise in price for eg. : Branded consumer goods.

Q. 3. Define Elasticity of Demand? Discuss its various determinants.

Answer 3. (c)

It is defined as the degree of responsiveness of quantity demanded of a commodity due to change in its price other factor remaining constant. Price elasticity of Demand is usually measured by the following formula :

Price elasticity of demand = % Change in Quantity Demand / % Change in Price

$$\begin{aligned} ed &= (dq/q) \times 100 / (dp/p) \times 100 \\ &= dq/dp \times p/q \end{aligned}$$

Where dq = change in qty. demanded

dp = change in price,

p = Original price,

q = Original quantity

Determinants of Elasticity of demand :

- (i) **Nature of necessity of a commodity:** The demand for necessary commodity like rice, wheat, salt, etc is highly inelastic as their demand dose not rise or fall much with a change in price. On the other demand for luxuries charges considerably with a change in price and than demand is relatively elastic.
- (ii) **Availability of Substitutes:** The Demand for commodities having a large no. of close substi-tute is more elastic than the commodities having less or no substitutes. If a commodity has a large No. of substitutes its elasticity is high because when there is a rise in its prices, consumers easily switch over to other substitutes.
- (iii) **Variety of uses:** The product which have a variety of uses like steel, rubber etc. have a elastic demands and if it has only limited uses; then it has inelastic demand. For e.g. If the unit price of electricity falls then electricity consumption will increase, more than propor-tionately as it can be put to use like washing, cooking, as the price will go up, people will use etc. it for important purposes only.
- (iv) **Possibility of postponed of consumption:** The commodities whose consumption can easily be postponed has more elastic demand and the commodities whose consumption cannot be easily postponed has less elastic demand for eg, for expensive jewellery, perfume it is possible to postpone consumption in case the price is high and so such goods are elastic on the others hand, the necessities of life cannot be postponed and so they are inelastic in demand.

- (v) **Durable commodities:** Durable goods like furnitures etc, which will last for a longer time have valuably inelastic demand. This is because in such case, a fall in price will not lead to a large increase in demand and a rise in price again will not load to a huge fall in demand. But in case of perishable goods, the demand is elastic is nature.

Q. 4. Write a short note on Fixed Cost & Variable Cost.

Answer 4.

In the short-run, a firm employs two types of factors : fixed factors and variable factors. Costs are also of two types : fixed costs and variable costs.

- (i) **Fixed Costs** – Fixed costs (also known as supplementary costs or overhead costs) are the costs that do not vary with the output. These are the expenses incurred on the fixed factors of production.

Examples : Rent; interest; insurance premium; salaries of permanent employees, etc.

- (ii) **Variable Costs** – Variable costs (or prime costs) are the costs that vary directly with the output. These are the expenses incurred on the variable factors of production.

Examples : Expenses on raw materials, power and fuel; wages of daily labourers, etc.

Distinctions between Fixed Costs and Variable Costs

Fixed Costs	Variable Costs
1. Fixed costs do not vary with quantity of output.	1. Variable costs vary with the quantity of output.
2. They are related with the fixed factors.	2. They are related with the variable factors.
3. They do not become zero. They remain same even when production is stopped.	3. They can become zero when production is stopped.
4. A firm can continue production costs are even at the loss of fixed costs.	4. Production is carried on when the variable met.

Q. 5. Distinguish between Return to a Variable Factor and Return to Scale.

Answer 5. (c)

The main differences between returns to a variable factor and returns to scale are as indicated below :

Returns to a Variable Factor	Returns to Scale
1. Operates in the short run or it is related to short-run production-function.	1. Operated in the long-run or it is related to long-run production-function.
2. Only the quantities of a variable factor are varied.	2. All factor-inputs are varied in the same proportion.
3. There is change in the factor proportion. Suppose on 1 acre land 1 labour is employed, then the land labour ratio is 1 : 1. Now if we add one more unit of labour on the 1 acre land, then land-labour ratio would become 1 : 2.	3. There is no change in factor-ratio. For instance, in a firm is employing 1 unit of labour and 2 units of capital, then the labour-capital ratio is 1 : 2. Now if the firm increases is scale of operation and employed 2 units of labour and 4 units of capital, the labour-capital ratio still remains the same as 1 : 2.
4. No change in the scale of production. Because here all the factor-inputs are not changed.	4. There is change in the scale of production because here all the factor-inputs are varied in the same proportion.

Q. 6. Explain features of Monopoly.**Answer 6.****Features of Monopoly :**

Monopoly refers to the market situation where there is one seller and there is no close substitute to the commodities sold by the seller. The seller has full control over the supply of that commodity. Since there is only one seller, so a monopoly firm and an industry are the same.

Feature :

- (i) **Single seller and large number of buyers :** Under monopoly there is one seller and therefore a firm faces no competition from other firms. Though there are large numbers of buyers, no single buyer can influence the monopoly price by his action.
- (ii) **No close substitute :** Under monopoly there is no close substitute for the product sold by the monopolist. According to Prof. Boulding – a pure monopolist is therefore a firm producing a product which has no substitute among the products of any other firms.
- (iii) **Restriction on the entry of new firms :** Under monopoly new firms cannot enter the industry.
- (iv) **Price maker :** A monopoly firm has full control over the supply of its products and hence it has full control over its price also. A monopoly firm can influence the market price by varying its supply, for eg., It can make the price of its product by supplying less of it.
- (v) **Possibility of Price Discrimination :** Price discrimination is defined as that market situation where a single seller sell the same commodity at two different prices in two different markets at the same time, depending upon the elasticity of demand on the two goods in their respective market. Under such circumstances a monopolist can charge incur supernormal loss then firms would leave the industry, thus reducing the supply. As a result, price will again rise and the loss will wiped out.

Q. 7. What is meant by Capital Formation? Discuss the steps in Capital Formation.**Answer 7.**

Capital formation means the process whereby a nation creates capital assets that generate a continuous flow of income in future. The creation of such capital assets involves large scale investments and such investable resources come from surplus. Thus the essence of capital formation is creation of surplus or savings. Surplus generation is possible only when the nation does not use the entire production for current consumption but keeps a part of it for future production thus capital formation needs current sacrifice for future prosperity that is to-day's pain for tomorrow's gain.

In a word Capital Formation is the process of creation of savings and its productive investment.

In a wider context the formation of capital thus not merely means the growth of savings and investment but a qualitative change in man's attitudes and motives that may help development in the long run. Prof. W.W. Rostow opined, "capital formation is not merely a matter of maximizing profit. It is a matter of a society's effective attitude towards science, applied science, risk taking as well as the adaptability of the working force". Thus capital formation has a quantitative as well as a qualitative aspect. The former is the growth of investment resources while the latter involves a qualitative change in human resources.

Steps in Capital Formation :

Capital formation is a long drawn process. It passes through three important stages.

The first step in Capital formation is Creation of Surplus. Simply speaking, creation of surplus means increasing the ratio of saving to income. Out of a given income a country should save more if it wants to generate surplus. Savings can be increased in two ways.

1. If the level of personal income increases some increase in savings is quite natural.

2. Saving can also increase if people abstain from current consumption to a larger extent.

While the ability to save depends upon the size of a man's income, his family liabilities, his standard of living etc., it also depends upon his willingness to save. The willingness to save is influenced by some personal qualities that motivate a man to save and these motives may vary from person to person.

Not only the household sector but also the corporate sector and the public sector can contribute to the creation of savings. A Budgetary surplus is an important source of surplus generation in the Government sector. The private corporate sector too can contribute to surplus generation if they operate with efficiency. Thus the most important condition for Capital Formation is Creation of Surplus.

The second step is mobilization of the surplus created. It implies the surplus resources should be activated and they should not remain idle. Mobilisation of savings depends upon the financial network of an economy. Banks and other financial institutions play an important role in the mobilization process. These institutions collect the surplus from the surplus units and lend them to the deficit units like businessmen, industrialists, traders etc. who are in need of fund.

Thus they play an intermediary role connecting savers with the users of capital. The Financial systems can mobilize capital actively if they are safe and sound. The interest rate they offer may induce people to save more and to deposit it with the financial institutions. Thus the financial system of a country plays an important role in capital formation.

The last step in capital formation is effective investment of the surplus. Funds offered by financial institutions are taken by those who invest them with the object of earning income, from investment of such funds in trade, commerce and industry. If the borrowed fund is used for unproductive and speculative purposes, it may bring windfall profit but without helping the creation of capital assets for future income. Such investment is not desirable. What is essential is that money must be invested for productive purposes – purposes from which the investor can get a continuous earning over a period of time.

Q. 8. Distinguish between GNP and GDP.

Answer 8.

Gross National Product (GNP) - The GNP of a country in a year is defined as the market value of all final goods and services produced by domestic factors in the country in that year.

Gross Domestic Product (GDP) - GDP can be defined as the sum total of values of all goods and services produced within the geographical boundary of the country without adding the factor income received from abroad.

Distinction between Gross National Product and Gross Domestic Product –

Gross National Product is different from Gross Domestic Product in following respects :

- (a) Gross National Product refers to the total market value of all the final goods and services produced in a country during a given year, plus net factor income from abroad.
But Gross Domestic Product refers to the total market value of all the goods and services produced in the given year within the domestic territory of the country.
- (b) Gross National Product includes all income earned by the country in abroad. But Gross Domestic Product does not include the income earned by the country from abroad.
- (c) Gross Domestic Product does not include the income earned by the country from foreign investments.
- (d) G.D.P. includes only those goods and services which can be produced within domestic territory of the country.
- (e) G.N.P. is a wider concept than the G.D.P.
But G.N.P. is more useful than G.D.P.

Q.9. What do you understand by the term 'national income'? Discuss different methods of measuring it.**Answer 9.**

National Income is nothing but the income of a nation or a country. In real terms a national income is the flow of goods and services produced in an economy in a particular period — a year. A National Sample survey has, therefore, defined national income as — money measures of the net aggregates of all commodities and services accruing to the inhabitants of a community during a specified period.

There are three alternative ways of estimating National Income of a country. Broadly it may be viewed from income side, output side and expenditure side. Let us discuss these methods :

- (a) **Product method** - In simple terms this method implies that by adding the values of output produced and services rendered by different sectors one may find out the national income.

The output method is unscientific. In this method only those goods and services are counted which are paid for, that is marketed. But there are many goods and services that do not have market price and are not paid for. Services of a housewife or a teacher-father; food crop, fruits and vegetable grown in family farm would not be counted as part of the GNP. Similar services or goods would become a part of GNP if they are paid for. Thus GNP at market price invariably leads to an underestimate of gross and services.

Moreover, there lies possibility of double or even triple counting in this method. Counting wheat, flour and bread's value separately is methodologically incorrect because bread's value contains flour's value which, in turn, contains wheat's value. However, this problem can be overcome if only value of final goods are considered excluding primary and intermediate goods. The problem can be overcome in another way known as the value added method whereby only the value added by each firm in the production process is included in the output figure. Thus the value added output of all sectors makes up GNP at factor cost.

- (b) **Income method** - In this method all income from employment and ownership of assets before taxation received from productive activities to be counted. It is the factor income method. The summation of incomes earned by the factors of production for their contribution to production. To these be added the undistributed profits of the private sector and trading surplus of the public sector corporations. While all those groups of income generated in production, some other are to be excluded. These are known as Transfer Earnings. Examples of such earnings are pensioner benefits, an employment doles, sickness benefits, interest on national debt etc. These are excluded, as they do not arise from productive activities.

- (c) **Expenditure Method** - By measuring total domestic expenditure we can measure the income of a nation. Broadly, total domestic expenditure comprises two elements. First, consumption expenditure of the household sector on goods and services. It also includes the consumption outlays of business sector and public authorities.

Another part of national expenditure is investment expenditure by private sector and public authorities. Expenditure is said to be investment when it is used for making a fixed capital like building, machinery etc. It also means an increase in the stock of inputs and finished products.

In measuring total domestic expenditure we have to take some precautions (a) only new goods be considered. Any spending on old goods is a transfer of asset from one hand to another. There is no new asset coming through production (b) Only the final stage of purchase be included because measuring expenditure for intermediate stage may lead to duplication of spending amounts. (c) Residents of country may spend for foreign goods (import) any may also earn by selling goods abroad (exports). Hence it is necessary to exclude spending on imports and to include value of exports.

Q. 10. Discuss Deductive and Inductive methods of Economic Analysis.

Answer 10.

In Economics the issues are analysed either by inductive method or by deductive method. The deductive method tries to draw conclusions from certain fundamental assumptions or truths.

The logic proceeds from general to the particular. For example, we can deduce from the basic truth that a man will buy more at lower prices. The Law of Demand and the Law of diminishing Marginal Utility have been derived from deductive reasoning.

The inductive method, on the other hand, deduce conclusions on the basis of collection and analysis of facts and figures. The Logic proceeds from particular to general. It leads to exact and precise conclusions for policy making.

The Deductive method was used by earlier economists. It is a simple method, obviates the need of experimentation and collection of statistical data. But deductive conclusions are based upon assumptions that may turn out to be untrue or partially true. Hence it is unsuitable for policy making as it is dangerous to claim universal validity for economic generalizations.

Q. 11. Define Central Bank. Distinguish between Central Bank and Commercial Bank.

Answer 11.

Central Bank may be defined as an institution charged with the responsibility of managing the expansion and contraction of the volume of money supply for general Economic Welfare. The Central Bank is the apex institution in the banking and financial structure of the country.

The Central Bank differs from the commercial banks in several respects mentioned as under :-

- (a) The Central Bank acts as the supreme monetary authority of the country with wide powers control credit and currency of the country. But a commercial bank has no such powers.
- (b) The Central Bank does not exist to make profits for its owners. But commercial banks are organized for profits for their owners.
- (c) The Central Bank is the ultimate source of money supply. But a commercial bank is not so.
- (d) The Central Bank acts as the banker to the government, but other banks do not act as a rule in this capacity. They are bankers to private industries and institutions.
- (e) A Commercial bank undertakes risky business activities and many fail. But the Central Bank never fails.
- (f) The Central Bank does neither accept deposits nor lend to the public, but this is the most important functions of commercial banks.
- (g) The Central Bank is subordinate to the state and as such most of the Central Banks in the world are now state owned and state managed. But commercial bank in most of the countries are privately owned and privately managed; there is however a growing trend towards the nationalization of even commercial banks in many countries as in India.
- (h) The Central Bank issues paper notes in fact it enjoys the monopoly power in this matter. But other banks do not enjoy this power. They create credit.
- (i) The basis of credit money is cash deposit while what of cash money is gold and foreign reserve.

Q. 12. What is EXIM Bank? What are its functions?

Answer 12.

The Export Import bank of India commenced operations on March 1, 1982. It is a non-bank financial intermediary confined its area of operations to foreign trade of India. It is a fully statutory company

owned by the Government of India with an authorized capital of ₹ 200 crores and paid-up capital of ₹ 50 crores. It is empowered to borrow from RBI and also from foreign economies. It is a lead bank in the finance and promotion of exports and also an apex body for co-ordinating the working of similar organization engaged in promoting our export and import trade.

Functions and Activities :

The EXIM Bank's business is exclusively devoted to India's international activity. The aggregate loans and outstanding reached ₹ 16.16 billion during the first decade of its operation. In annual terms, the business is said to have grown at a rate of 30 per cents.

The Bank has developed "a three dimensional strategy" for export promotion. First, the Bank offers fund for product development, long-term export credit, investment capital.

Second gives export advisory services. Research on exports and market opportunities is a third component in the strategy.

Export bids have increased annually by 44 per cent and export contracts financed exceed ₹ 60 billion. Penetration into new markets has been possible because of a variety of lending program of the Bank, it rendered services in product export, project export and services export.

When the Bank commenced operation in early 1982 its catalytic role was mainly confined to granting of post shipment term export credit. Now its horizons have expanded. Now it lends product development finance, pre shipment finance, marketing finance, finance for joint ventures, investment capital for export production in addition to term export credit. The Bank is thus involved in more than export finance. In other program include –

- (a) Export Bills Re-discounting
- (b) Refinance of Suppliers credit
- (c) Bulk Import finance
- (d) Foreign currency Pre shipment credit
- (e) Product equipment finance program
- (f) Business Advisory and technical Assistance (BATA).

Q. 13. What are the objectives and functions of IMF?

Answer 13.

The objective for which the IMF was set up and act are as follows : -

- (a) To foster international monetary cooperation through joint action of its members.
- (b) To promote foreign trade by avoiding restrictive currency practices.
- (c) To secure stability of foreign exchange rate.
- (d) To recur multilateral convertibility i.e., a borrower nation can borrow the currency of any other member nation.

The Principal functions of the IMF are :

- (a) It provides short term credit.
- (b) It functions as a leading institution in foreign exchange.
- (c) It grants loans for current transactions and not capital transaction.
- (d) It helps for the orderly adjustment of exchange rates.
- (e) It acts as a store house of foreign exchange rates which is likely to improve the balance of payment position of member countries.

Q. 14. Explain the major canons of taxation.**Answer 14.**

Tax is a delicate instrument in the hands of the government. Just as a drug deadly when taken in large doses may have a reviving effect on the body to which it is administered with caution, so also taxation. How can tax be properly administered? Economists have suggested certain principles which the government can follow for ideal tax administration.

Adam Smith long ago propounded four such principles, which he called 'canons' as guiding stars of tax authorities.

- (a) **Canon of Ability** – Smith was of the view that subjects of a state ought to contribute “in proportion to their respective abilities i.e., in proportion to the revenues they respectively enjoy.” A proportional tax, as Smith advocated, implies equality of sacrifice.
- (b) **Canon of Certainty** – This canon lays down that taxes “be certain and not arbitrary.” Prior intimation as regards the amount and time of payment was thought necessary for reducing trouble and difficulties of tax payers.
- (c) **Canon of Convenience** – According to Smith taxes be collected according to the convenience of the payers. It should be levied “at the time or in the manner in which it is most likely to be convenient.”
- (d) **Canon of Economy** – Smith suggested that tax system be so framed “as both to take out and to keep out of the pockets of the people as little as possible over and above what it brings into the public treasure”. This implies least cost collection. Even with taking as little as possible from tax payers, tax revenue can be large if small amount is used up for their collection.

Q. 15. Discuss the salient features of International Trade.**Answer 15.**

1. The world market is heterogeneous on account of differences in climate, language, level of national income etc.
2. The mobility of factors of production is higher within the country than that between countries. International mobility of labour and capital is strictly restricted by governments. When resources are comparatively immobile, there is no automatic influence equalizing price and cost.
3. It involves the use of different types of currencies. Hence arises the question of foreign rate of exchange.
4. Foreign trade may be free or not. It is free when a country can buy and sell any good or service from world market without any obstruction. In most countries much free flow in and flow out is restricted by the government, looking after the broader national interest.
5. International trade has its impact on a country's gross national product and national income while domestic trade leads to transfer of goods from one region to another and no change in the size of GDP.

Q. 16. Write short notes on the following :

- (i) Deficit Financing
- (ii) Factors affecting supply

Answer 16.

- (i) **Deficit Financing :**

When government spending exceeds its earnings, the budget is said to be deficit and to bridge the gap, if government borrows money from the Central Bank or runs down its accumulated reserves,

it leads to a net addition to money supply. It is called deficit financing. It is used as an instrument to remedy depression and unemployment. Deficit financing denotes more spending by the government through created money.

Lord Keynes advocated deficit financing for lifting up of an economy from business depression and unemployment. According to him demand deficiency was the root cause of these problems. Hence the prescription to raise private expenditure comprising consumption and investment. The total expenditure of private sector cannot increase on its own in a depressionary economy. It needs external push. This is what the government should do through a policy of budgetary deficit financed by new money. Creation of new money and its injection into the economy can raise C+I+G curve upward to a level where unused and unemployed resources may be gainfully employed. Once the resources are fully employed more spending by the government will lead to inflationary rise in price.

(ii) **Factors affecting supply :**

Supply is defined as a quantity of a commodity offered by the producers to be supplied at a particular price and at a certain time.

The factors affecting the supply of a commodity are:

- (a) The price of the commodity in the market. When price rises, there will be more profit and supply increases. The reverse will happen when price falls.
- (b) Goals of the firm, such as profit maximization, sales maximization and employment maximization.
- (c) The supply of a commodity is influenced by the prices of raw materials, labour and other inputs.
- (d) State of technology used for production of a commodity. Improved and advanced technology reduces the cost of production and increases the supply.
- (e) The government policy with reference to production of commodities, imposition of taxes, such as excise duty, sales tax, subsidy policy etc. influence the supply of a commodity.
- (f) Expectation about future prices of the commodity.
- (g) Prices of other commodities, e.g., the supply of one commodity falls as the prices of other goods rise.
- (h) Number of firms in the market. Decrease in the number of firms reduces the supply.
- (i) In case of natural disorders like flood, drought, etc. reduce the supply of a commodity specially agricultural produces.

Q. 17. Write notes on the following :

(i) **Special drawing rights (SDR)**

(ii) **Explicit costs**

Answer 17.

(i) **Special Drawing Rights (SDR) :**

About two decades ago a new international money was created by the IMF for two reasons. First to overcome the shortage of gold in the world economy leading to fall in international reserves. Second, to avoid the movement of gold across national boundaries. This new international currency is known as Special Drawing Rights (SDR) held with the IMF. The origin of SDR thus lies in the shortage of international liquidity all over the world in the wake of acute shortage of American Dollar in the 60s and early 70s which was then the main reserve currency.

The SDR was first introduced in 1969. Under this scheme the IMF grants its member government special drawing rights from Special Drawing Account (SDA). They are like coupons which can be exchanged for currencies required by its holder for making international payments. They are also, besides gold and key currencies, a component of international reserve of an economy.

Each member of the fund was assigned an SDR quota that was granted in terms of a fixed value of gold. Hence they have been aptly described as "Paper Gold". The member countries are required to provide their currency in exchange for SDR when called upon. The use of SDR would mean a reduction in the country's foreign reserve and a corresponding increase in the SDR holding of the country receiving it.

The mechanism of the SDR system is an economy in need of foreign exchange has to apply to the Fund for the use of SDR. The Fund would designate another country having a sound foreign exchange resources to meet the need of the former. So the debtor country's SDR decreases and that of the creditor increases. The former have to pay interest at 1.5% per annum to the latter country. A designated (creditor) country can not pay more than the amount equal to twice the amount of SDRs allotted to the country. The scheme is flexible in that each country can use its quota to have an equivalent amount of convertible foreign exchange to overcome balance of payment difficulties.

(ii) **Explicit costs :**

Actual payments made by a firm for purchasing or hiring resources (or factor-services) from the factor-owners or other firms are called explicit costs. In other words, explicit costs are actual money expenses directly incurred for purchasing the resources. These are the costs which a cost accountant includes under the head expenses of the firm. Hence explicit costs also. Accounting costs include all costs incurred by the firm in acquiring various inputs from outside suppliers. Thus the examples of explicit costs are: payments for raw materials and power; wages to the hired workers; rent for the factory-building; interest on borrowed money; expenses on transport and publicity, etc.

Q. 18. Discuss the functions of Central Bank.

Answer 18.

Central Bank plays a leading role in organizing, running, supervising, regulating and developing the banking and financial structure of the country.

1. Monopoly of Note Issue :

The Central Bank enjoys the exclusive power of note issue. In India the RBI issues all notes except Re 1 notes and coins. Re 1 notes are issued by the Government of India under the guidance of RBI. The currency notes issued by the Central Bank are declared unlimited legal tender throughout the country. The Central Bank has to keep reserve of Gold, Silver and foreign securities for issuing notes.

2. Banker, agent, advisor to the Government :

The Banking A/c of the government both central and state are maintained by the Central Bank as the commercial bank does for its customers. As a banker and to the government it helps the government in short term loans and advances for temporary requirements and floats public loans for the government.

As an advisor to the government the Central Bank advices on monetary and Economic matters. It also advices on the ground as to how to maintain the internal and external value of money.

3. Banker's Bank :

All commercial banks keep part of their cash balances as deposits with the Central Bank of the country. This is either because of convention or legal compulsion. The commercial banks regularly draw currency during the busy season and paying in surplus during the slack season. Part of these balances are meant for clearing purposes i.e.; all commercial banks keep deposit account with the Central Bank. The deposit balances of the Central Bank is considered as cash reserves for general purpose.

Under the Banking Regulations Act of 1949, the Central Bank of India have been empowered with the right to supervise and control the activities of various scheduled commercial banks. These powers are related to licensing, branch expansion, liquidity of assets and methods of working of the Bank.

4. Clearing House Facility :

By virtue of its unique position in dealing with domestic and foreign funds the Central Bank has a special position for conducting

- (a) clearing house Operation;
- (b) Inter bank Transfer of funds;
- (c) Settlement of accounts.

Clearing house facility means providing an opportunity to member commercial banks to settle their claims on each other mutually. E.g. : Indian Bank has to pay to SBI a sum of 2 lakh and SBI has to pay to Indian bank ₹ 1,50,000. This can be settled with a check of ₹ 50,000 by Indian Bank on the RBI in favour of SBI. As a result Indian Banks accounts will be debited and SBI's account will be credited.

5. Custodian of Foreign Exchange Reserves :

Under this system the RBI controls both receipts and payments of foreign exchange. A country have in its foreign trade favourable or unfavourable balance. Favourable balance helps to bring foreign exchange to the country while unfavourable balance means paying foreign exchange out. As custodian of Foreign Exchange Central Bank keeps a constant watch on the same so that the value of the home currency does not rise or fall adversely in relation to foreign currency.

During times of emergency the Central Bank may impose restrictions to control on buying or selling of foreign currencies in the market.

6. Credit Control :

In order to ensure price stability and Economic growth of a country, the Central Bank undertakes the responsibility of controlling credit. The Central Bank ensures price stability and avoids inflationary and deflationary tendencies by several monetary methods such as regulation of Bank rate, open market operation, change in variable reserve ratio, etc.

Q. 19. What are the functions of money?**Answer 19.****Functions of money :**

Money is a matter of four functions, viz.,

- (a) **Medium of exchange** : Money everywhere acts as a common medium of exchange. In an exchange economy, money has an intermediary role. The origin of money lies in the inconveniences of the barter system. The invention of money has made the exchange- system smooth and convenient.

- (b) **Measure of value** : Money measures exchange value of goods and services. Things are said to be cheap or expensive on the basis of amount of money for their possession. This makes exchange mutually profitable.
- (c) **Standard of deferred payment** : Money as a standard of deferred payment implies the role of money in borrowing and lending. Money taken as loan is usually repaid after a time gap. This delayed payment is done through money.
- (d) **Store of value** : Money gives a man command over goods and services because of its purchasing power. This purchasing power of money can be stored by keeping a part for future use. Not being perishable, value of money can be preserved for a long time.

Money plays a dynamic role in a modern economy. It lubricates the wheels of trade and commerce. Money is the lifeblood of industry. Money activates idle resources and puts them into productive channels. It helps in increasing output, employment, income and converting savings into investment.

Q. 20. Discuss the theory of demographic transition with its different stages.

Answer 20.

Almost all demographers (who study demography or population theories) and social scientists agree that population growth in every country passes through many stages. Each stage has its own peculiarity. This theory indicates that particular types of demographic phases are associated with particular stages of industrialization. On the basis of the economic history of many countries of the world, this theory wants to establish that movement of a country from a traditional agricultural system to a highly industrialized urban economy, also signifies its travel from a stage of high fertility (and mortality) to a state of low fertility (and mortality).

According to Prof. O.P. Walker, there are five stages of such demographic transition :

1st Stage : At this stage, both the death rate and the birth rate remain very high, but the former exceeds the latter. As a result, population does not increase to a great extent. This is called a high stationary stage.

2nd Stage : At this stage, the birth rate does not come down but the death rate starts falling due to improvements in health facilities. As a result, population increases rapidly. This is called an early expanding stage.

3rd Stage : Both birth and death rates decrease at this stage. Though the birth rate exceeds the death rate, the distance between them becomes less. This happens when the country attains a certain level of agricultural development and steps towards urbanization. This is called the late expanding stage. Here the population size grows slowly.

4th Stage : At this stage, the death rate reaches its lowest and at the same time birth rate also comes to a low level. Growth in population becomes stagnant. But, unlike the first stage, it is called low stationary stage.

5th Stage : At this stage, the death rate becomes more than the birth rate, and it may be regarded as a declining stage.

While reviewing these stages, Prof. Thompson and Notestein opined that the first and fifth stages were unusual. According to them, only the three intermediate stages are relevant. They named these three intermediate stages (viz., the second, the third and the fourth stages) as the pre-transition stage, transition stage and post-transition stage respectively. The explanation of Karl Sax about the demographic transition also shows four stages of such transition also shows four stages were similar to the explanation given by Walker about the first four stages of transition in his own theory. Now, we can give a diagrammatic representation of these theories of demographic.

Section - II
[Business Fundamentals]

Q. 21. (a) Answer the following :

- (i) OTCEI is —
 - (A) An export organization
 - (B) Funding agency for industries
 - (C) A public facility go get schedules drugs
 - (D) Assisting small and medium firms to get access to share market nationwide.

- (ii) Characteristics of the sole proprietorship are :
 - (A) Capital contribution
 - (B) Unlimited liabilities
 - (C) Limited area of operation
 - (D) All the above

- (iii) Proxy has the following connotations :
 - (A) One
 - (B) Two
 - (C) Three
 - (D) Four

- (iv) Semantic barrier to communication is referred as the —
 - (A) Receiver misinterpreting the symbols used by the sender
 - (B) Sender misusing the symbols
 - (C) Receiver clarifying the symbols with sender
 - (D) Receiver not being able to decode the symbols used by the sender

- (v) Mention which of the following are not counted in a private limited company to make the maximum strength of members to 50 :
 - (A) Present employees and shareholders
 - (B) Past employees and present shareholders
 - (C) None of the above
 - (D) A and B both

Answer 21. (a)

- (i) (D) — Assisting small and medium firms to get access to share market nationwide.
- (ii) (D) — All the above
- (iii) (B) — Two
- (iv) (A) — Receiver misinterpreting the symbols used by the sender
- (v) (C) — None of the above

Q. 21. (b) Fill in the blanks :

- (i) Perpetual existence is a feature of _____ organization.
- (ii) Government policies are an important part of _____ environment of a company.
- (iii) A written communication provides _____ record for future reference.
- (iv) Memorandum of Association is one of the basic _____ of the company.
- (v) Without requisite _____ a meeting cannot be held.

Answer 21. (b)

- (i) Joint Stock Company type.
- (ii) Political
- (iii) Permanent
- (iv) Document
- (v) Quorum

Q. 21. (c) State which of the following statements is "True" and which is "False" . :

- (i) Misstatements in prospectus leads to cancellation of listing.
- (ii) Where B Ltd. and C Ltd. are subsidiaries of A Ltd., B Ltd. holds 30% shares in D Ltd. and C Ltd. holds 25% shares in D Ltd. Thus, D Ltd. is a subsidiary of A Ltd.
- (iii) A sale warrant holder is not treated as the member of that company.
- (iv) A sale is not made at the counter or by a salesman. It is made in the mind of seller.
- (v) Private company limits its members to fifty.

Answer 21. (c)

- (i) False
- (ii) True
- (iii) True
- (iv) False
- (v) True

Q. 21. (d) Define the following terms in not more than two lines :

- (i) Contract note.
- (ii) A multinational company.
- (iii) A company limited by guarantee.
- (iv) True test of partnership.

Answer 21. (d)

- (i) **Contract note** : It is the evidence about the transaction between buyer and his broker. The court will not accept any petition without the valid contract note.
- (ii) **A multinational company** : A company whose management, ownership and control are spread even more than one country.
- (iii) **A company limited by guarantee** : In such a company the extent of the liability of members is specified in the Memorandum of Association.

- (iv) **True test of partnership** : The true test of partnership is not the sharing of profit between them but it mutual agency. In other words a partner is an agent of other partners.

Q. 22. Discuss the various objectives of a business.

Answer 22.

The various objectives of business could be classified as follows :

- (1) Economic objectives
- (2) Social objectives
- (3) Human objectives
- (4) National objectives
- (5) Organic objectives

The Economic objectives are :

- (a) Earning of adequate profit
- (b) Production of tangible form of wealth
- (c) Creation of market or creation of customers
- (d) Innovation
- (e) Best use of available scarce resources.

The Social objectives are :

- (a) Providing quality goods and services
- (b) Charging reasonable prices
- (c) Generation of employment
- (d) Avoiding antisocial practices and profiteering
- (e) Creating and maintaining better environment.

The Human objectives are :

- (a) Giving a fair deal to the employees
- (b) Ensuring job satisfaction
- (c) Treating employees as partners to prosperity
- (d) Development of human resources

The National objectives are :

- (a) Producing goods and providing services as per national priorities
- (b) Development of small enterprises
- (c) Guaranteeing social justice
- (d) Export promotion

The Organic objectives are :

- (a) Survival
- (b) Growth, expansion and diversification
- (c) Creating goodwill, prestige and recognition.

Q. 23. What is stock exchange? Discuss its functions.

Answer 23.

The Securities Contracts Regulation Act, 1956 defines stock exchanges as 'an association, organization or body of individuals whether incorporated or not, established for the purpose of assisting, regulating and controlling business in buying, selling, and dealing in securities'. A close review of the well known definition brings out the following features of the stock market —

1. Stock market is an organized market where securities of government and semigovernment bodies and corporate enterprises are bought and sold.
2. Stock market deals in second hand or existing securities.
3. Individuals alone can buy and sell securities. The stock market does not provide this facility to corporations and partnership firms.
4. In the Stock market only those securities which are listed in the stock market are transacted. Unlisted securities are not permitted to be dealt in the market.
5. Stock market may be a registered or unregistered body. It is not always necessary for a stock exchange to incorporate it under the Companies Act.
6. Transactions in the stock market must adhere to the rules and byelaws framed by the stock exchange to regulate its day-to-day operations.

A stock exchange performs the following economic functions and services :

1. Provides ready and continuous market
2. Facilitates regular valuation of securities
3. Encourages capital formation
4. Provides proper direction to invest capital
5. Ensures wide ownership of securities
6. Facilitates distribution of new
7. Ensures safety of funds
8. Regulates company management and performance
9. Disseminates information
10. Facilitates speculation

Q. 24. Write a short note on Characteristics of a Prospectus.

Answer 24.

The important characteristics of a prospectus.

- (i) It is a document described or issued as a prospectus.
- (ii) It includes any notice, circular, advertisement, etc., inviting deposits from the public.
- (iii) It is an invitation to the public to subscribe to the shares or debentures of the company.
- (iv) It is a document through which the company secures the capital required for carrying on its business.

Q. 25. Explain the features of a public company.

Answer 25.

Features of a public company :

- (i) It requires a minimum of seven persons to form a public company. There is no restriction on the maximum number of members.

- (ii) It can offer shares to the general public in order to raise huge financial resources.
- (iii) Shares of a public company are freely transferable like movable property.
- (iv) Shareholders have no control over the management of the company.
- (v) A public company can choose any name, but it must add the word 'Limited' at the end of its name.
- (vi) It cannot commence its operations until it obtains a 'Certificate to Commence Business' in addition to the 'Incorporation Certificate' from the Registrar of Companies.

Q. 26. Explain the role of four animals in stock exchange.

Answer 26.

There are different types of speculators dealing in a stock exchange. There are named after some animals, as they behave like wild animals. Their classification depends upon the nature of their activities in the stock exchange and in general, they are of four types, viz. bulls, bears, lame ducks and stags.

Bull : A bull is speculator who expects a rise in the price of shares of a company. He is an optimist. He aims at making profit out of an expected rise in the price of a particular share. For this purpose he purchases the security for future delivery. Generally, he has no intention of taking delivery on the fixed date or settlement day. He may sell before the settlement day He may receive or pay the difference between the purchase price and sale price either on or before the settlement day.

A bear is a speculator who expects a fall in the price of a security. He is a pessimist and he forecasts a fall in price. He aims at making profit out of an expected fall in the price of a particular share. For this purpose he sells the security for future delivery. He may or may not possess the security. Generally, he has no intention of giving delivery on fixed date or the settlement day. He may purchase before the settlement day or settle the transaction on the settlement day.

Lame Duck : In case the bear is unable to strike the bargain immediately, he is said to "be struggling like a lame duck". This may happen on account of the fact that the security which has been agreed to be sold may not be available in the market and in that case the commitment cannot be fulfilled. If the other party agrees to postpone the deal, there would be no trouble but if he does not agree to postpone such a situation would arise.

Stag : Sometimes the shares to be issued by new company may be unofficially quoted at a premium. This happens when the prospectus of the new company. Are expected to be excellent. Some persons may apply for more shares than actually needed. Their object is to sell the shares at a high one as soon as they are allotted by the new company and thus make quick profit. So stag is a person who applies for shares of a new company with a view to selling the shares allotted to him at a profit.

Stags may suffer loss. This happens when the public applies for less number of shares than offered for. Then the stags will be allotted at the number of shares applied for and the shares may be quoted at a discount in the market. Under such circumstances stags will incur a loss, if they sell the allotted shares. The operations of stag create artificial scarcity of shares of the new company would rise. Suppose he purchases 1,000 shares of 'X' company for future delivery at the present market price of ₹ 150 and suppose the price rises to ₹ 160 on or before the settlement day, he will sell at that price. Thus he makes a profit of ₹ 10,000 out of the rise in the price of the security. It should be noted that if his expectation goes wrong. He will incur a loss.

Q. 27. What is a special resolution? For what purposes are such resolution necessary?

Answer 27.

A resolution shall be a special resolution when the votes cast in favour of the resolution by members present in person or, where proxies are allowed, by proxy, are not less than three times the number of

votes, if any, cast against the resolution and the has been duly specified in the notice calling the meeting [Sec 189(2)]. In other words, this is a resolution passed by a majority of at least 75 per cent of votes of members present in person or by proxy and a mention of the fact that the resolution shall be passed as a special resolution must have already been made in the notice of the meeting and the notice should have been duly given at least 21 days before the date of the meeting.

The articles of the company may specify purposes for which a special resolution is required.

The Companies Act has also specified certain matters, for which a special resolution must be passed, for example –

- (i) to alter the memorandum of the company (Sec. 17),
- (ii) to alter the articles of the company (Sec. 31),
- (iii) to issue further shares with preemptive rights (Sec. 81), for creation of Reserve Capital (Sec. 99),
- (iv) to reduce the share capital (Sec. 100),
- (v) to pay interest out of capital to members (Sec. 208),
- (vi) authorizing a director to hold an office or place of profit (Sec. 314),
- (vii) voluntary winding up of a company (Sec. 484), 'A copy of special resolution must be filed with the Registrar within 30 days of the date of its passing.

Q. 28. What is communication? Explain encoding, decoding and feedback as the elements in the process of communication.

Answer 28.

Communication is a process by which send information and feelings to recipients through one or more channels. It is an change of ideas, facts, opinions, information and understanding between two or more persons. It may also be regarded as the process of meaningfully transferring information from one person to another.

Encoding : This refers to preparing the subject-matter of communication in a suit able language. The purpose of encoding is to translate the thought of the sender into a language or code that can be easily understandable to the receiver of the message.

Decoding : This refers to the conversion of the message by receiver into meaning terms so as to make communication understandable. The effectiveness of communication depends on how much the receiver's decoding matches with the sender's message.

Feedback : This refers to the actual response of the receiver to the message communicated to him. It is a reversal of the communication process, in which the receiver expresses his reactions to the sender of the message.

Q. 29. What are the salient features of a good business letter.

Answer 29.

Characteristics of a good business letter :

Business people have to communicate with their customers, suppliers, debtors, creditors, public authorities and the public at large for the purpose of exchanging their views and for sending and receiving information. Written communication is called correspondence. Commercial correspondence means correspondence by business people on matters of commerce.

Following are the characteristics of a good business letter :

- (1) **Clarity** : The language shall be clear so that the ideas are properly expressed and the reader can understand them in the correct sense.
- (2) **Conciseness** : A letter shall not be unnecessarily long. It must be concise and precise.
- (3) **Completeness** : A business letter shall be complete in every sense. The points must be arranged systematically and logically and then a complete and clear picture emerges.
- (4) **Unambiguous** : A business letter must be free from ambiguity.
- (5) **Courtesy** : A business letter must be courteous. This means that the letter should be polite in its form.
- (6) **Well-planned** : Effectiveness of a letter depends on its good planning.

Q. 30. What is written communication? Mention its merits and demerits.**Answer 30.**

Written communication means transmission of information through written words. It may consist of messages in the form of letters, circulars, notes, notices, telegrams, bulletins, reports, memoranda, etc. Written communication provides a permanent record for future reference. It enables information to be conveyed far and wide. It should be clear, concise, complete and correct in order to make it effective.

Advantages of written communication :

The advantages of written communication are as follows :

- (i) It may be transmitted to numerous persons simultaneously.
- (ii) It provides a permanent record for future reference.
- (iii) It is more effective than oral communication.
- (iv) It is an ideal way of transmitting lengthy messages.
- (v) It is a formal communication and it carries more weight.
- (vi) It can be quoted as legal evidence in the case of any dispute.

Disadvantages of written communication :

The demerits of written communication are as follows :

- (i) It is an expensive and time-consuming method of communication.
- (ii) It is very formal and lacks a personal touch of sophistication.
- (iii) Written communication finds it difficult to maintain secrecy.
- (iv) It may be unsuited if unknown words and unfamiliar phrases are used.

FOUNDATON EXAMINATION

(REVISED SYLLABUS - 2008)

Paper - 4 : BUSINESS MATHEMATICS & STATISTICS FUNDAMENTALS

Section - I

[Arithmetic]

Q. 1. (a) If $\frac{x}{b+c} = \frac{y}{c+a} = \frac{z}{a+b}$ then show that

$$(b-c)(x-a) + (c-a)(y-b) + (a-b)(z-c) = 0$$

(b) Three numbers are in continued proportion of which the middle one is 16 and the sum of the other two is 130. Find the numbers.

Answer 1. (a)

Let $\frac{x}{b+c} = \frac{y}{c+a} = \frac{z}{a+b} = k$ (constant). say

Then $x = k(b+c)$, $y = k(c+a)$, $z = k(a+b)$

So, $(b-c)(x-a) + (c-a)(y-b) + (a-b)(z-c)$

$$= [x(b-c) + y(c-a) + z(a-b)] - [a(b-c) + b(c-a) + c(a-b)]$$

$$= [k(b+c)(b-c) + k(c+a)(c-a) + k(a+b)(a-b)] - [ab - ac + bc - ab + ac - bc]$$

$$= [k(b^2 - c^2) + k(c^2 - a^2) + k(a^2 - b^2)] - 0$$

$$= [k(b^2 - c^2 + c^2 - a^2 + a^2 - b^2)] - 0$$

$$= k \times 0 - 0 = 0 - 0 = 0 \text{ Proved}$$

Answer 1. (b)

Let the first and the third number be x and y respectively. Then $x, 16, y$ are in continued proportion.

$$\therefore \frac{x}{16} = \frac{16}{y}, \text{ or, } xy = 256. \quad \dots (i)$$

Also $x + y = 130$.

$$\therefore (x-y)^2 = (x+y)^2 - 4xy = (130)^2 - 4 \times 256,$$

$$\text{or, } (x-y)^2 = 16900 - 1024 = 15876; \therefore x-y = \pm 126. \quad \dots (ii)$$

Solving (i) and (ii), we get $x = 128, y = 2$, or $x = 2, y = 128$.

Hence the three numbers are 128, 16, 2 or 2, 16, 128.

- Q. 2. (a)** The average marks in "Elements of Mathematics" of Preliminary students of 3 centres in India is 50. The number of candidates in 3 centres are respectively 100, 120, 150. If the averages of the first two centres are 70 and 40, find the average marks of the third centre.
- (b)** A class has 3 divisions. Average marks of the students of the class, first division, second division and third division are 47, 44, 50 and 45 respectively in Mathematics. If first two division have 30 and 40 students, find the number of students in third division when all the students of the class have Mathematics as a subject.
- (c)** Mean monthly income of 10 workers in factory A is ₹ 4,000 and that of workers in factory B is ₹ 3,700. If the mean income of all workers in A and B is 3,800 per month, find the number of workers in B.

Answer 2. (a)

Let the average marks of the third centre be \bar{x}_3 .

Then using the formula : $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2 + n_3\bar{x}_3}{n_1 + n_2 + n_3}$, we get

$$50 = \frac{100 \times 70 + 120 \times 40 + 150 \times \bar{x}_3}{100 + 120 + 150}, \text{ or, } 50 = \frac{11,800 + 150\bar{x}_3}{370},$$

$$\text{or, } 11,800 + 150\bar{x}_3 = 18,500, \text{ or, } 150\bar{x}_3 = 18,500 - 11,800 = 6,700$$

$$\therefore \bar{x}_3 = \frac{6,700}{150} = 44.67$$

Hence the required average marks of the third centre = 44.67.

Answer 2. (b)

Let the no. of students be x in the third division.

Students have total marks in Mathematics in 1st division = $30 \times 44 = 1320$

Students have total marks in Mathematics in 2nd division = $40 \times 50 = 2000$

Students have total marks in Mathematics in 3rd division = $x \times 45 = 45x$

Total marks in Mathematics in the whole class = $3320 + 45x$

Total number of students in the class = $30 + 40 + x = 70 + x$

Then average marks of the students in the class =

$$\text{Thus } \frac{3320 + 45x}{70 + x} = 47$$

$$\text{So } 3320 + 45x = 3290 + 47x$$

$$\text{or, } 30 = 2x$$

$$\text{or, } x = 15$$

Answer 2. (c)

Let n_2 be the no. of workers in B. Then $\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$.

Here $n_1 = 10$, $\bar{x}_1 = 4000$, $\bar{x}_2 = 3,700$ and $\bar{x} = 3,800$, $n_2 = ?$

$$\therefore 3800 = \frac{10 \times 4000 + n_2 \times 3700}{10 + n_2}, \text{ or, } 38000 + 3800n_2 = 40000 + 3700n_2,$$

$$\text{or } 100n_2 = 2000, \text{ or, } n_2 = 20.$$

Hence the required no. of workers in B = 20.

Q. 3. (a) A vessel contains a mixture of Wine and Water. Had there been a litre more of Wine and a litre less of Water, the ratio of Wine to Water would have been 7 : 8; but had there been a litre more of Water and a litre less of Wine, the ratio would have been 2 : 3. How many litres does the mixture consist of?

(b) The proportion of liquid I and II in four samples are 2:1, 3:2, 5:3 and 7:5. A mixture is prepared by taking equal quantities of the samples. Find the ratio of liquid I to liquid II in the final mixture.

Answer 3. (a)

Let the vessel contain x litres of milk and y litres of water. Then the vessel contains $(x + y)$ litres of mixture.

By the given conditions,

$$\frac{x+1}{y-1} = \frac{7}{8} \tag{i}$$

and $\frac{x-1}{y+1} = \frac{2}{3}$. (ii)

\therefore From (i),

$$8x + 8 = 7y - 7,$$

or, $8x - 7y = -15$. (iii)

From (ii),

$$3x - 3 = 2y + 2,$$

or, $3x - 2y = 5$. (iv)

Solving (iii) and (iv), we get $x = 13$ and $y = 17$.

Hence the vessel contains $13 + 17$, i.e., 30 litres of mixture.

Answer 3. (b)

$$\frac{\text{Liquid I}}{\text{Liquid II}} = \left[\frac{2}{3}x + \frac{3}{5}x + \frac{5}{8}x + \frac{7}{12}x \right] \bigg/ \left[\frac{1}{3}x + \frac{2}{5}x + \frac{3}{8}x + \frac{5}{12}x \right]$$

$$= \frac{80+72+75+70}{40+48+45+50} = \frac{297}{183} = \frac{99}{61}$$

\therefore Ratio of Liquid I and Liquid II in final mixture is 99:61.

Q. 4. (a) At what rate per cent will ₹ 264.35 amount to ₹ 317.22 in 4 years?

(b) A sum deposited at a bank fetches ₹ 13,440 after 5 years at the rate of 12% simple interest. Find the principal amount.

(c) If I ask you for a loan and agree to repay you ₹ 300 after nine months from today, how much should you loan me if you are willing to make the loan at the rate of 6% p.a.?

Answer 4. (a)

We have

$$A = \left(1 + \frac{nr}{100}\right)P = P + \frac{Pnr}{100},$$

$$\text{or, } 317.22 = 264.35 + 264.35 \times 4 \times \frac{r}{100} \quad [\because P = 264.35, A = 317.22, n = 4]$$

$$\text{or, } 317.22 - 264.35 = 264.35 \times 4 \times \frac{r}{100}, \quad \text{or, } 52.87 = 264.35 \times 4 \times \frac{r}{100},$$

$$\text{or, } r = \frac{52.87 \times 100}{264.35 \times 4} = 5.$$

Hence the required rate = 5%

Answer 4. (b)

Let the principal amount be ₹ 100. Then

Simple interest on ₹ 100 for 5 years at 12% p.a. = $12 \times 5 = ₹ 60$.

Amount at the end of 5 years = $100 + 60 = ₹ 160$.

Amount	Principal
160	100
13,440	x

$$\therefore x = 100 \times \frac{13,440}{160} = ₹ 8,400$$

Answer 4. (c)

If ₹ 100 be the amount of loan, then interest = $6 \times \frac{9}{12} = ₹ \frac{9}{2}$ and amount with interest = $100 + \frac{9}{2} = ₹ \frac{209}{2}$.

If repayable amount be ₹ $\frac{209}{2}$, then amount of loan is ₹ 100.

If repayable amount be ₹ 300, then amount of loan is ₹ $100 \times \frac{2}{209} \times 300 = ₹ 287.08$.

Q. 5. (a) A bill was drawn on 14 June 1989 at 8 months after date and was discounted on 24 September 1984 at 5% p.a. If the banker's gain on the basis of simple interest is ₹ 3, for what sum the bill was drawn?

(b) If the difference between true discount and banker's discount on a sum due in 3 months 4% per annum is ₹ 20, find the amount of bill.

Answer 5. (a)

Date of drawing	14.6.84
Period	8 months
Nominal due date	14.2.85
Days of grace	3 days
Legally due date	17.2.85

∴ Unexpired period = 24.9.84 to 17.2.85 = 6 + 31 + 30 + 31 + 31 + 17 = 146 days.

Given B. G. = ₹ 3, or, B.D. – T.D. = ₹ 3

... (i)

If P. V. = ₹ 100, then T.D. = $5 \times \frac{146}{365} = ₹ 2$, B. V. = P. V. + T. D. = 100 + 2 = ₹ 102.

∴ B. D. = Interest on B. V. = $\frac{5}{100} \times 102 \times \frac{146}{365} = \frac{204}{100} = ₹ 2.04$.

∴ B. G. = B. D. – T. D. = ₹ 2.04 – ₹ 2 = ₹ .04 = ₹ $\frac{1}{25}$.

If B. G. = ₹ $\frac{1}{25}$, then B. V. = ₹ 102.

∴ If B. G. = ₹ 3, then B. V. = $\frac{102}{1/25} \times 3 = ₹ 7,650$.

Hence the required **Bill Value** is ₹ **7,650**.

Answer 5. (b)

A = Amount due at the end of n years = P (1 + ni) where

P = Present value, i = rate of interest, $n = \frac{3}{12} = \frac{1}{4}$ year

BD = Ani = P (1 + ni) ni, TD = Pni

$BD - TD = P(ni)^2 = 20 \Rightarrow P = \frac{20}{\left(\frac{1}{4} \times \frac{4}{100}\right)^2} = 20 \times 100^2 = 200000$ (in ₹)

$A = P (1 + ni) = 200000 \left(1 + \frac{1}{4} \times \frac{4}{100}\right) = 200000 \times 1.01 = 202000$

Amount of Bill : ₹ 202000.

Section - II

[Algebra]

Q. 6. Choose the correct option showing necessary reasons/calculations.

(a) If $x^a = y^b = z^c$ and $xyz = 1$ then the value of $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ is

(i) 1, (ii) 3, (iii) 0, (iv) $\frac{1}{5}$

(b) ${}^n C_r + {}^n C_{r-1}$ is equal to

(i) ${}^{n-1} C_r$, (ii) ${}^{n+1} C_r$, (iii) ${}^n C_{r+1}$, (iv) none of these.

(c) If $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y}$ then the value of xyz is

(i) 1, (ii) 0, (iii) -1, (iv) none of these.

Answer 6. (a)

$$\text{Let } x^a = y^b = z^c = k$$

$$\therefore x = k^{\frac{1}{a}}, y = k^{\frac{1}{b}}, z = k^{\frac{1}{c}}$$

$$xyz = 1 \Rightarrow k^{\frac{1}{a} + \frac{1}{b} + \frac{1}{c}} = 1 = k^0 \Rightarrow \frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$$

Answer 6. (b)

(ii)

$$\begin{aligned} {}^n C_r + {}^n C_{r-1} &= \frac{|n|}{|r| |n-r|} + \frac{|n|}{|r-1| |n-r+1|} \\ &= \frac{|n|}{|r| |n-r|} + \left[\frac{n-r+1+r}{r(n-r+1)} \right] \\ &= \frac{(n+1)|n|}{|r| |n-r+1|} = \frac{|n+1|}{|r| |n-r+1|} = {}^{n+1} C_r. \end{aligned}$$

Answer 6. (c)

(iv)

$$\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y} = K \text{ (say)}$$

$$\text{Then } \log x = K(y-z)$$

$$\log y = K(z-x)$$

$$\log z = K(x-y)$$

$$\text{Adding } \log x + \log y + \log z = K (y - z + z - x + x - y) = K \times 0 = 0$$

$$\text{or, } \log xyz = \log 1$$

$$\text{or, } xyz = 1.$$

Q. 7. (a) If w be an imaginary cube root of unity find out the value of $(1-w)(1-w^2)(1-w^4)(1-w^8)$.

(b) Simple interest and compound interest in 2 years for same principal are Rs. 200 and Rs. 210 at the same rate of interest per annum. Find the principal amount.

(c) The volume of a gas varies directly as the absolute temperature and inversely as pressure. When the pressure is 15 units and the temperature is 260 units the volume is 200 units. What will be the volume when the pressure is 18 units and the temperature is 195 units?

Answer 7. (a)

$$(1-w)(1-w^2)(1-w^4)(1-w^8)$$

$$= (1-w)(1-w^2)(1-w)(1-w^2)$$

$$= (1-w)^2(1-w^2)^2$$

$$= (1+w^2-2w)(1+w^4-2w^2) = (-3w)(-3w^2) = 9w^3 = 9$$

Answer 7. (b)

Let x = Principal amount and $r\%$ = rate of interest per annum

$$\text{The simple interest} = \text{Rs. } 200 = x \times \frac{r}{100} \times 2 = \frac{rx}{50} \Rightarrow rx = 10000$$

$$\text{The compound interest} = \text{Rs. } 210 = x \left(1 + \frac{r}{100} \right)^2 - x$$

$$= x \left(\frac{2r}{100} + \frac{r^2}{10000} \right) = \frac{rx}{50} + \frac{r^2x}{10000}$$

$$\Rightarrow 210 = 200 + \frac{r^2x}{10000} \Rightarrow 10 = \frac{10000r}{10000} \Rightarrow r = 10$$

$$\text{So, } x = \frac{200 \times 50}{r} = \frac{10000}{10} = 1000 \text{ Rs.}$$

Answer 7. (c)

Volume = V , Pressure = P , Absolute Temp = T

$$\therefore V \propto T \text{ \& } V \propto \frac{1}{P} \Rightarrow V \propto \frac{T}{P} \Rightarrow V = K \frac{T}{P} \quad K = \text{constant}$$

Then $P = 15$, $T = 260$ then $V = 200$

$$200 = K \frac{260}{15} \Rightarrow K = \frac{150}{13}$$

$$\text{When } P = 15, T = 260 \text{ then } V = \frac{150}{13} \times \frac{195}{18} = 125 \text{ units}$$

(b) A student is to answer 8 out of 10 questions on an examination :

- (i) How many choice has he?**
- (ii) How many if he must answer the first three questions?**
- (iii) How many if he must answer at least four of the first five questions?**

Answer 9. (a)

$$n(S) = 20, n(M) = 25, n(S-M) = 10$$

$$n(S-M) = n(S) - n(S \cap M) \Rightarrow 10 = 20 - n(S \cap M) \Rightarrow n(S \cap M) = 10$$

$$\text{Then } n(M-S) = n(M) - n(S \cap M) = 25 - 10 = 15.$$

Answer 9. (b)

- (i) The 8 questions out of 10 questions may be answered in ${}^{10}C_8$

$$\text{Now } {}^{10}C_8 = \frac{10!}{8!2!} = \frac{10 \times 9 \times (8)!}{8!2!} = 5 \times 9 = 45 \text{ ways}$$

- (ii) The first 3 questions are to be answered. So there are remaining 5 (= 8 - 3) questions to be answered out of remaining 7 (= 10 - 3) questions which may be selected in 7C_5 ways.

$$\text{Now, } {}^7C_5 = 7.6 = 42 \text{ ways.}$$

- (iii) Here we have the following possible cases :

- (a) 4 questions from first 5 questions (say, group A), then remaining 4 questions from the balance of 5 questions (say, group B).

- (b) Again 5 questions from group A, and 3 questions from group B.

$$\text{For (a), number of choice is } {}^5C_4 \times {}^5C_4 = 5 \times 5 = 25$$

$$\text{For (b), number of ways is } {}^5C_5 \times {}^5C_3 = 1 \times 10 = 10.$$

$$\text{Hence, Required no. of ways} = 25 + 10 = 35.$$

Q. 10. (a) If $x \propto y$, prove that $px + qy \propto ax + by$, where p, q, a, b are fixed constants.

(b) If $x + y \propto x - y$, show that $ax + by \propto px + qy$, a, b, p, q being all constants.

(c) Find x, if $x^{x\sqrt{x}} = (x\sqrt{x})^x$.

Answer 10. (a)

Since $x \propto y$, we have $x = ky$, where k is a constant.

$$\text{Now } \frac{px + qy}{ax + by} = \frac{p \cdot ky + qy}{a \cdot ky + by} = \frac{y(pk + q)}{y(ak + b)} = \frac{pk + q}{ak + b} = \text{constant} = k' \text{ (say),}$$

or, $px + qy = k' (ax + by)$, where k' is a constant.

Hence $px + qy \propto ax + by$.

Answer 10. (b)

If $x + y \propto x - y$; $\therefore x + y = m(x - y)$, where m is a constant,

$$\text{or, } x + y = mx - my,$$

$$\text{or, } y + my = mx - x,$$

$$\text{or, } y(1 + m) = (m - 1)x,$$

$$\text{or, } y = \frac{m-1}{m+1}x = kx, \text{ where } k \text{ is a constant. Now see 10(a).}$$

Answer 10. (c)

$$x^{x\sqrt{x}} = (x\sqrt{x})^x,$$

$$\text{or, } x^{x \cdot x^{1/2}} = (x \cdot x^{1/2})^x,$$

$$\text{or, } x^{x^{3/2}} = (x^{3/2})^x,$$

$$\text{or, } x^{x^{3/2}} = x^{3x/2};$$

$$\therefore x^{3/2} = \frac{3x}{2},$$

$$\text{or, } x^3 = \frac{9}{4}x^2,$$

$$\text{or, } x = \frac{9}{4} \quad [\because x \neq 0]$$

Section - III**[Mensuration]**

Q. 11. (a) The length, breadth and height of a box are 12m, 4 m and 3 m respectively. The length of the largest rod that can be placed in the box is

- (i) 15m (ii) 13m (iii) 12m (iv) none of these

(b) If the hypotenuse of a right angled isosceles triangle is 4 cm then the area of the triangle is

- (i) 12 sq. cm (ii) 8 sq. cm (iii) 4 sq. cm (iv) none of these

Answer 11. (a)

$$\text{(ii) Length of the largest rod} = \sqrt{12^2 + 4^2 + 3^2} = 13\text{m}$$

Answer 11. (b)

(iii) Let the length of equal sides be d Cm.

$$\therefore \text{Length of hypotenuse} = \sqrt{d^2 + d^2} = d\sqrt{2} \text{ cm}$$

$$\text{Now } d\sqrt{2} = 4 \Rightarrow d = 2\sqrt{2} \text{ cm}$$

$$\text{Area of the triangle} = \frac{1}{2}d^2 = \frac{1}{2}(2\sqrt{2})^2 = 4 \text{ sq. cm.}$$

Q. 12. (a) The height of the right circular cone is 42 cm and its slant height is 45.5 cm. Find the cost of painting of its total surface at the rate of ₹ 1 per sq cm. (Take $\pi = 22/7$).

(b) A right pyramid with height 8 cm stands on a base which is a triangle with sides of lengths 3 cm, 4 cm and 5 cm. Find the volume of the pyramid.

Answer 12. (a)

$$\text{Here } r = \sqrt{l^2 - h^2} = \sqrt{2070.25 - 1764} = \sqrt{306.25} = 17.5 \text{ cm}$$

$$\text{Total surface area} = \pi r l + \pi r^2 = \frac{22}{7} \times 17.5(45.5 + 17.5) = 3465 \text{ sq. cm.}$$

So total cost comes to ₹ 3465

Answer 12. (b)

$$\text{Semi perimeter of base} = s = \frac{3+4+5}{2} = 6 \text{ cm}$$

$$\text{Area of base} = \sqrt{6(6-3)(6-4)(6-5)} = \sqrt{6 \times 3 \times 2 \times 1} = 6 \text{ sq. cm}$$

$$\begin{aligned} \text{Volume of the pyramid} &= \frac{1}{3} \times \text{Area of base} \times \text{height} \\ &= \frac{1}{3} \times 6 \times 8 = 16 \text{ cu. cm} \end{aligned}$$

Q. 13. (a) The perimeter of a rectangle, having area 18 sq. cm and its length being twice its breadth, is
(i) 9 cm (ii) 18 cm, (iii) 24 cm, (iv) none of these

(b) Find the quantity of water in litre flowing out of a pipe of cross-section area 5 cm² in 1 minute if the speed of the water in the pipe is 30 cm/sec.

(c) The volumes of two spheres are in the ratio 8:27 and the difference of their radii is 3 cm. Find the radii of both the spheres.

Answer 13. (a)

$$\begin{aligned} \text{(ii) Given } l &= 2b \text{ and } lb = 18 \Rightarrow 2b^2 = 18 \Rightarrow b = 3 \text{ cm} \\ \text{So } l &= 6 \text{ cm. Perimeter} = 2(1+b) = 18 \text{ cm.} \end{aligned}$$

Answer 13. (b)

$$\text{Volume of water flowing in 1 sec} = 5 \times 30 = 150 \text{ c.c.}$$

$$\text{Volume of water flowing in 1 min} = 150 \times 60 = 9000 \text{ c.c.} = 9 \text{ litre}$$

Answer 13. (c)

$$\frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{8}{27} \Rightarrow \frac{r_1}{r_2} = \frac{2}{3} \Rightarrow r_1 = 2k, r_2 = 3k$$

$$\text{Now } 3k - 2k = 3 \Rightarrow k = 3$$

So, the radii (r_1) of 1st sphere = 6 cm and
the radii (r_2) of 2nd sphere = 9 cm.

Q. 14. (a) The circumference of the base of a cylinder is 44 cms. and its height is 20 cms. Find the volume of the cylinder.

(b) A solid cylindrical rod of length 80 cms. radius, 15 cms. is melted and made into a cube. Find the side of the cube.

Answer 14. (a)

$$2\pi r = 44 \quad \text{or, } 2 \times \frac{22}{7} \times r = 44 \quad \text{or, } r = 7 \text{ cm.}$$

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times 49 \times 20 = 3080 \text{ cu. cm.}$$

Answer 14. (b)

Volume of cube = a^3 cu. cm. [Where a is the side of cube]

$$\text{Volume of cylindrical rod} = \pi r^2 h = \frac{22}{7} \times 15^2 \times 80 = a^3, \text{ by question.}$$

$$\text{Or, } a^3 = 56571.428 \quad \text{or, } a = \sqrt[3]{56571.428} \text{ cm.}$$

Q. 15. (a) The circumference of the base of a cylinder is 44 cm and its height is 20 cm. Find the volume of the cylinder.

(b) The curved surface of a cylinder is 1000 sq cm and the diameter of the base is 20 cm. Find the volume of the cylinder and its height to the nearest millimeter.

Answer 15. (a)

If r cm be the radius of the base of the cylinder, then

$$2\pi r = 44, \quad \text{or, } r = \frac{44}{2\pi} = \frac{44}{2 \times \frac{22}{7}} = \frac{44}{2} \times \frac{7}{22} = 7.$$

$$\text{Volume of the cylinder} = \pi r^2 \cdot h = \frac{22}{7} \times 7^2 \times 20 = 3080 \text{ cu cms.}$$

Answer 15. (b)

If r cm be the radius of the base of the cylinder, then $r = \frac{20}{2} = 10$; curved surface = $2\pi rh$.

$$\therefore 2\pi rh = 1000, \text{ or, } \pi h = 50, \text{ where } h = \text{height.}$$

$$\therefore \text{Volume of the cylinder} = \pi r^2 h = \pi \cdot 10^2 \cdot h = 100 \times 50 = 5000 \text{ cu cm.}$$

$$\text{Height of the cylinder} = h = \frac{50}{\pi} = 50 \times \frac{7}{22} = \frac{175}{11} = 15.909 = 15.9 \text{ cm.}$$

Q. 16. (a) The diameter of the base of a conical water tank is 28 m and its height is 18 m. How much water does the tank hold?

(b) A conical tent is required to accommodate 5 people, each person must have 16 sq ft of space on the ground and 100 cu ft of air to breathe. Give the vertical height, slant height and width of the tent.

Answer 16. (a)

Radius of the circular base of the tank = $\frac{28}{2} = 14$ m and its height = 18 m.

$$\begin{aligned} \text{Volume of the water tank} &= \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi \cdot (14)^2 \cdot 18 = \frac{22}{7} \times 196 \times 60 \\ &= 3696 \text{ cu m.} = 3696 \times 1000 \text{ decimetres} \\ &= 3696000 \text{ litres} = 3696 \text{ kilolitres.} \end{aligned}$$

Answer 16. (b)

Space required to accommodate 5 people = $16 \times 5 = 80$ sq ft; $\therefore \pi r^2 = 80$, where r is the radius of the base.

$$\begin{aligned} \text{Again volume of the conical tent} &= \frac{1}{3} \pi r^2 h, \text{ where } h = \text{height of the tent} \\ &= \frac{1}{3} \times 80 \times h. \end{aligned}$$

$$\therefore \frac{1}{3} \times 80 \times h = 100 \times 5, \text{ or, } h = \frac{3 \times 500}{80} = 18.75 \text{ ft.}$$

From $\pi r^2 = 80$, we have

$$\frac{22}{7} r^2 = 80, \text{ or, } r^2 = \frac{560}{22} = 25.45; \quad \therefore r = 5.04 \text{ ft.}$$

$$\therefore \text{Width} = 2r = 2 \times 5.04 = 10.08 \text{ ft.}$$

$$l = \text{slant height} = \sqrt{h^2 + r^2} = \sqrt{(18.75)^2 + 25.45} = \sqrt{377.01} = 19.42 \text{ ft.}$$

Section - IV

[Co-ordinate Geometry]

Q. 17. (a) If the point $(x, 0)$ is equidistant from the points $(-1, 3)$ and $(6, 4)$ then value of x is

- (i) 1 (ii) 3 (iii) 4 (iv) none of these

(b) In what ratio is the joint of the points $(4, -1)$ and $(5, 3)$ divided by the line $x + 3y - 8 = 0$?

Answer 17. (a)

(ii) Distance between $(x, 0)$ and $(-1, 3)$ = Distance between $(x, 0)$ and $(6, 4)$

$$\therefore \sqrt{(x+1)^2 + (0-3)^2} = \sqrt{(x-6)^2 + (0-4)^2}$$

$$\Rightarrow x^2 + 2x + 10 = x^2 - 12x + 52 \Rightarrow 14x = 42 \Rightarrow x = 3$$

Answer 17. (b)

Let the line $x + 3y - 8 = 0$ divide the join of $A(4, -1)$ and $B(5, 3)$ at the point C in the ratio $m : n$. Then the

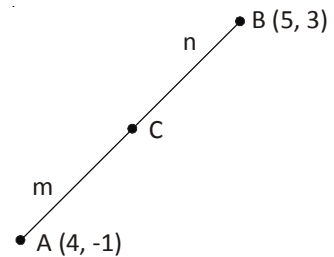
co-ordinates of C are $C\left(\frac{5m+4n}{m+n}, \frac{3m-n}{m+n}\right)$.

Since C lies on the line $x + 3y - 8 = 0$;

$$\therefore \frac{5m+4n}{m+n} + 3 \cdot \frac{3m-n}{m+n} - 8 = 0, \text{ or, } \frac{5m+4n+9m-3n-8m-8n}{m+n} = 0,$$

$$\text{or, } 6m - 7n = 0, \text{ or, } 6m = 7n, \text{ or, } \frac{m}{n} = \frac{7}{6}, \text{ i.e., } m : n = 7 : 6.$$

Hence the required ratio is $7 : 6$.



Q. 18. (a) Prove that the two circles $x^2 + y^2 + 2x - 6y + 5 = 0$ and $x^2 + y^2 + 10x - 2y + 21 = 0$ touch each other externally.

(b) Show that the point $(3, 7)$ lies inside the circle $x^2 + y^2 - 6x - 8y - 11 = 0$.

Answer 18. (a)

$$x^2 + y^2 + 2x - 6y + 5 = 0.$$

$$\Rightarrow [x+1]^2 + (y-3)^2 = 5 \quad \therefore \text{Centre is } (-1, 3), \text{ Radius} = r_1 = \sqrt{5}$$

$$x^2 + y^2 + 10x - 2y + 21 = 0$$

$$\Rightarrow (x+5)^2 + (y-1)^2 = 5. \quad \therefore \text{Centre is } (-5, 1), \text{ Radius} = r_2 = \sqrt{5}$$

Distance between the two centres

$$= \sqrt{(-1+5)^2 + (3-1)^2} = 2\sqrt{5}$$

$$\text{Again } r_1 + r_2 = \sqrt{5} + \sqrt{5} = 2\sqrt{5}$$

\therefore The circles touch each other externally.

Answer 18. (b)

Here $2g = -6$, $2f = -8$ and $c = -11$. $\therefore g = -3$, $f = -4$.

\therefore The centre C of the circle is the point $(-g, -f) = (3, 4)$, and the radius of the circle

$$= \sqrt{g^2 + f^2 - c} = \sqrt{9 + 16 + 11} = 6.$$

The distance of the point P (3, 7) from the centre

$$C(3, 4) = \sqrt{(3-3)^2 + (7-4)^2} = 3,$$

which is less than 6.

Hence the point (3, 7) lies inside the circle.

Q. 19. (a) Find the co-ordinates of the vertex and the focus and the equation of the directrix of the parabola $3y^2 = 16x$. Find also the length of the latus rectum.

(b) The major and minor axes of an ellipse are the x and y axes respectively. Its eccentricity is $1/\sqrt{2}$ and the length of the latus rectum is 3 units. Find the equation of the ellipse.

Answer 19. (a)

We have

$$3y^2 = 16x, \text{ or, } y^2 = \frac{16}{3}x$$

which is of the form $y^2 = 4ax$.

Here

$$4a = \frac{16}{3}, \text{ or, } a = \frac{4}{3}.$$

\therefore The co-ordinates of the vertex are (0, 0) and the co-ordinates of the focus are (a, 0), i.e., $(4/3, 0)$.

The equation of the directrix is

$$x + a = 0, \text{ or, } x + \frac{4}{3} = 0, \text{ or, } 3x + 4 = 0.$$

The length of the latus rectum $4a = 16/3$ units.

Answer 19. (b)

Equation of the ellipse is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

Here, $\frac{2b^2}{a} = 3$ (i)

$e^2 = \frac{1}{2} \Rightarrow 1 - \frac{b^2}{a^2} = \frac{1}{2} \Rightarrow \frac{b^2}{a^2} = \frac{1}{2}$ (ii)

From (i) and (ii), $\frac{b^2}{a^2} = \frac{3}{2a} = \frac{1}{2} \Rightarrow a = 3$

and $b^2 = \frac{9}{2}$

Equation of the ellipse $\frac{x^2}{9} + \frac{y^2}{9/2} = 1 \Rightarrow x^2 + 2y^2 = 9$

Q. 20. (a) Find the co-ordinates of the foci, the eccentricity and the equations of the directrices of the hyperbola $16x^2 - 9y^2 = 144$.

(b) Show that the line $x - 3y = 13$ touches the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$. What are the co-ordinates of the point of contact?

Answer 20. (a)

We have

$$16x^2 - 9y^2 = 144, \text{ or, } \frac{16x^2}{144} - \frac{9y^2}{144} = 1, \text{ or, } \frac{x^2}{9} - \frac{y^2}{16} = 1.$$

Here $a^2 = 9$ and $b^2 = 16$. $\therefore a = 3$, taking positive sign.

Now

$$e^2 = \frac{a^2 + b^2}{a^2} = \frac{9 + 16}{9} = \frac{25}{9}; \therefore e = \frac{5}{3} \quad [\because e > 1.]$$

\therefore The co-ordinates of the foci are

$$(\pm ae, 0) = (\pm 3 \cdot \frac{5}{3}, 0) = (\pm 5, 0).$$

The eccentricity is $e = \frac{5}{3}$.

The equations of the directrices are

$$ex \pm a = 0, \text{ or, } \frac{5}{3}x \pm 3 = 0 \text{ or, } 5x \pm 9 = 0.$$

Answer 20. (b)

$$x - 3y = 13 \tag{i}$$

$$\text{and } \frac{x^2}{25} + \frac{y^2}{16} = 1.$$

From (1),

$$x = 13 + 3y.$$

\therefore From (2),

$$\frac{(13+3y)^2}{25} + \frac{y^2}{16} = 1, \text{ or, } \frac{169+9y^2+78y}{25} = \frac{y^2}{16} = 1, \text{ or, } \frac{2704+144y^2+1248y+25y^2}{400} = 1,$$

$$\text{or, } 169y^2 + 1248y + 2304 = 0, \text{ or, } (13y + 48)^2 = 0$$

which gives two real and equal values of y , i.e., $y = -\frac{48}{13}, -\frac{48}{13}$.

Since the roots are equal, the line (i) intersects the ellipse (ii) in two coincident points. Hence the line (i) touches the ellipse (ii).

Substituting $y = -\frac{48}{13}$ in $x = 13 + 3y$, we get

$$x = 13 + 3 \times \frac{-48}{13} = \frac{169 - 144}{13} = \frac{25}{13}.$$

\therefore The point of contact is $\left(\frac{25}{13}, -\frac{48}{13}\right)$.

Section - V

[Calculus]

Q. 21. (a) If $y = \log \left(x + \sqrt{x^2 + a^2} \right)$ then prove that $(a^2 + x^2) y_2 + xy_1 = 0$.

(b) If $y = Ae^{mx} + Be^{-mx}$ show that $y_2 - m^2y = 0$.

(c) Find the area of the region bounded by curves $y^2 = x$ and $y = x$.

Answer 21. (a)

$$y = \log \left(x + \sqrt{x^2 + a^2} \right)$$

$$y_1 = \frac{1 + \frac{1}{2}(x^2 + a^2)^{-\frac{1}{2}} \cdot 2x}{x + \sqrt{x^2 + a^2}} = \frac{1 + \frac{x}{\sqrt{x^2 + a^2}}}{x + \sqrt{x^2 + a^2}} = \frac{1}{\sqrt{x^2 + a^2}}$$

$$y_2 = -\frac{1}{2}(x^2 + a^2)^{-\frac{3}{2}} \cdot 2x = -\frac{x}{(x^2 + a^2)\sqrt{x^2 + a^2}}$$

$$\therefore (x^2 + a^2)y_2 + xy_1 = 0$$

Answer 21. (b)

$$y = Ae^{mx} + Be^{-mx}$$

$$y_1 = Ame^{mx} - Bme^{-mx}$$

$$= m(Ae^{mx} - Be^{-mx})$$

$$y_2 = m(Ame^{mx} + Bme^{-mx})$$

$$= m^2(Ae^{mx} + Be^{-mx}) = m^2y$$

$$\therefore y_2 - m^2y = 0$$

Answer 21. (c)

$y^2 = x$ and $y = x$ cut at (0, 0) and (1, 1)

$$\text{Required area} = \int_0^1 \sqrt{x} \, dx - \int_0^1 x \, dx$$

$$\left[\frac{x^{2/3}}{3/2} \right]_0^1 - \left[\frac{x^2}{2} \right]_0^1 = \frac{2}{3}(1-0) - \frac{1}{2}(1-0) = \frac{1}{6} \text{ sq. unit}$$

Q. 22. (a) If $x^a y^b = (x+y)^{a+b}$ show that $\frac{dy}{dx} = \frac{y}{x}$ where a and b are independent of x and y .

(b) If $y = \left(x + \sqrt{1+x^2}\right)^m$ show that $(1+x^2)y_2 + xy_1 = m^2y$.

(c) The value of $\int_0^1 \frac{dx}{x+\sqrt{x}}$ is

(i) $\log_e 2$, (ii) $2 \log_e 2$, (iii) $-\log_e 2$, (iv) none of these

Answer 22. (a)

$$a \log x + b \log y = (a+b) \log (x+y)$$

Differentiating w.r. to x .

$$\frac{a}{x} + \frac{b}{y} \cdot \frac{dy}{dx} = \frac{a+b}{x+y} \left(1 + \frac{dy}{dx}\right)$$

$$\text{or, } \left(\frac{b}{y} - \frac{a+b}{x+y}\right) \frac{dy}{dx} = \frac{a+b}{x+y} - \frac{a}{x}$$

$$\text{or, } \frac{b(x+y) - (a+b)y}{y(x+y)} \cdot \frac{dy}{dx} = \frac{x(a+b) - a(x+y)}{x(x+y)}$$

$$\text{or, } \frac{dy}{dx} = \frac{bx - ay}{x(x+y)} \times \frac{y(x+y)}{(bx - ay)} = \frac{y}{x}$$

Answer 22. (b)

$$y = \left(x + \sqrt{1+x^2}\right)^m \Rightarrow y_1 m \left(x + \sqrt{1+x^2}\right)^{m-1} \left\{1 + \frac{1 \times 2x}{2\sqrt{1+x^2}}\right\}$$

$$\Rightarrow y_1 = m \left(x + \sqrt{1+x^2}\right)^{m-1} \left(\frac{x + \sqrt{1+x^2}}{\sqrt{1+x^2}}\right)$$

$$\Rightarrow y_1 = \frac{my}{\sqrt{1+x^2}} \Rightarrow y_1^2 (1+x^2) = m^2 y^2$$

$$\therefore 2y_1 y_2 (1+x^2) + 2xy_1^2 = 2m^2 yy_1$$

$$\Rightarrow y_2 (1+x^2) + xy_1 = m^2 y$$

$$(1+x^2) y_2 + xy_1 = m^2 y \text{ Proved.}$$

Answer 22. (c)

$$(ii) I = \int_0^1 \frac{dx}{x + \sqrt{x}} = \int_0^1 \frac{dx}{\sqrt{x} + (\sqrt{x} + 1)} = \int_1^2 \frac{2dy}{y} \text{ where } \sqrt{x} + 1 = y \text{ i.e. } \frac{dx}{2\sqrt{x}} = dy$$

$$\text{So } I = [2 \log_e y]_1^2 = 2 \log_e 2$$

Q. 23. (a) If $y = \log(x + \sqrt{x^2 + a^2})$ $y_2 + xy_1 = 0$.

(b) If sum of two values is 8 find the maximum value of their product.

(c) Find the area of the region bounded by curves $y^2 = x$ and $y = x$.

Answer 23. (a)

$$y = \log(x + \sqrt{x^2 + a^2})$$

$$y_1 = \frac{1 + \frac{1}{2}(x^2 + a^2)^{-\frac{1}{2}} \cdot 2x}{x + \sqrt{x^2 + a^2}} = \frac{1 + \frac{x}{\sqrt{x^2 + a^2}}}{x + \sqrt{x^2 + a^2}} = \frac{1}{\sqrt{x^2 + a^2}}$$

$$y_2 = -\frac{1}{2}(x^2 + a^2)^{-\frac{3}{2}} \cdot 2x = -\frac{x}{(x^2 + a^2)\sqrt{x^2 + a^2}}$$

$$\therefore (x^2 + a^2)y_2 + xy_1 = 0$$

Answer 23. (b)

Let two values be x and y

Then $x + y = 8$. Let $A = xy = x(8 - x) = 8x - x^2$

$$\frac{dA}{dx} = 8 - 2x. \frac{dA}{dx} = 0 \text{ give } x = 4$$

$$\frac{d^2A}{dx^2} = -2 < 0. \text{ So } A \text{ is maximum at } x = 4$$

$$x = 4, \text{ then } y = 8 - 4 = 4$$

$$\therefore xy = 4 \cdot 4 = 4^2 = 16.$$

$$\text{So, maximum } A = 84 - 4^2 = 16.$$

Answer 23. (c)

$y^2 = x$ and $y = x$ cut at (0, 0) and (1, 1)

$$\text{Required area} = \int_0^1 \sqrt{x} dx - \int_0^1 x dx$$

$$\left[\frac{x^{3/2}}{3/2} \right]_0^1 - \left[\frac{x^2}{2} \right]_0^1 = \frac{2}{3}(1-0) - \frac{1}{2}(1-0) = \frac{1}{6} \text{ sq. unit}$$

Q. 24. (a) The total cost (C) for output x is as follows :

$$C = \frac{3}{5}x + \frac{15}{4}$$

Find (i) Cost when output is 5 units (ii) Average cost of output of 10 units (iii) Marginal cost (C)

(b) The cost function (C) for commodity (q) is given by $C = q^3 - 4q^2 + 6q$. Find the AVC and also find the value of q for which AVC is minimum.

Answer 24. (a)

$$\text{For 5 units} = \frac{3}{5} \cdot 5 + \frac{15}{4} = 3 + 3.75 = 6.75 \text{ units.}$$

$$AC = \frac{C}{x} = \frac{\frac{3}{5}x + \frac{15}{4}}{x} = \frac{3}{5} + \frac{15}{4x}$$

$$\therefore AC \text{ for 10 units} = \frac{3}{5} + \frac{15}{40} = 0.6 + 0.375 = 0.975; \quad MC = \frac{d(C)}{dx} = \frac{3}{5} = 0.6.$$

Answer 24. (b)

$$AVC = \frac{C}{q} = q^2 - 4q + 6, \text{ (in cost function (C), fixed cost is absent)}$$

$$MC = \frac{d}{dq}(q^3 - 4q^2 + 6q) = 3q^2 - 8q + 6. \text{ For AVC minimum, slope of AC is zero i.e.,}$$

$$\frac{d}{dq}(q^2 - 4q + 6) = 0 \text{ or, } 2q - 4 = 0 \text{ or, } q = 2 \text{ units.}$$

Section - VI [Statistics]

Q. 25. (a) Draw a Pie Chart to represent the following data relating to the production cost of manufacture :
 Cost of Materiala—₹ 38,400, Cost of Labour—₹ 30,720; Direct Expenses of Manufacture—
 ₹ 11,520; Factory Overhead expenses—₹ 15,360

(b) Draw a histogram and a frequency polygon for the following data :

Weight (nearest to the pound) :	102-113	113-124	124-135	135-146	146-157	157-168	168-179	Total
No. of men :	1	1	4	14	12	5	3	40

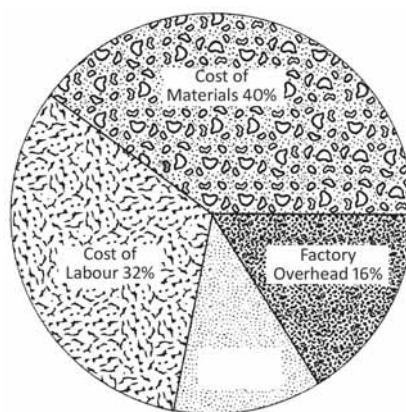
Answer 25. (a)

We first express each item as a percentage of the total cost, viz., Rs. 96,000.

	Percentage	Central angles
1. Cost of Materials	$\frac{38,400}{96,000} \times 100\% = 40\%$	$3^\circ.6 \times 40 = 144^\circ$
2. Cost of Labour	$\frac{30,720}{96,000} \times 100\% = 32\%$	$3^\circ.6 \times 32 = 115^\circ.2$
3. Direct Expenses	$\frac{11,520}{96,000} \times 100\% = 12\%$	$3^\circ.6 \times 12 = 43^\circ.2$
4. Factory Overhead	$\frac{15,360}{96,000} \times 100\% = 16\%$	$3^\circ.6 \times 16 = 57^\circ.6$
Total	= 100%	= 360°

A circle of convenient radius is now drawn and the above angles are marked out at the centre of the circle. 4 radii will then divide the whole circle into four required sectors.

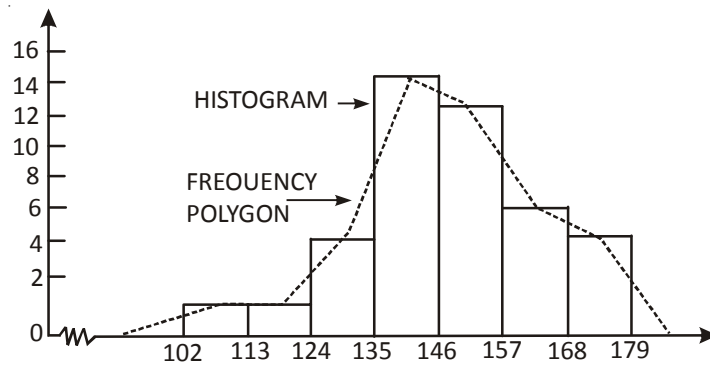
The different sectors are generally differently shaded. fig. gives the Pie Chart required.



The calculations of angles at the centre can be avoided if the circumference of the circle be divided into 100 equal parts.

Answer 25. (b)

Wt. (lb)	102-113	113-124	124-135	135-146	146-157	157-168	168-179
No. of men (f)	1	1	4	14	12	5	3



Q. 26. (a) The mean annual salary of all employees of a company is Rs. 28,500. The mean salaries of male and female employees are Rs. 30,000 and Rs. 25,000, respectively. Find the percentage of males and females employed by the company.

(b) Median marks of 50 candidates in mathematics in a test are 26. Frequencies in the ranges 10 - 20 and 30 - 40 are missing the following table :

Marks obtained :	0-10	10-20	20-30	30-40	40-50
No. of candidates :	5	—	20	—	7

Determine the missing frequencies.

Answer 26. (a)

Let n_1 be the number of males and n_2 the number of females

$$\text{Then } x = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$$

$$\Rightarrow 28,500 = \frac{n_1 \times 30,000 + n_2 \times 25,000}{n_1 + n_2}$$

$$\Rightarrow 3,500n_2 = 1500n_1$$

$$\Rightarrow \frac{n_1}{n_2} = \frac{70}{30} \Rightarrow n_1 : n_2 = 7 : 3$$

\therefore Percentage of males = $\frac{7}{10} \times 100 = 70$ and females = 30.

Answer 26. (b)

Let the missing frequencies be f_1 and f_2

$$\therefore 5 + f_1 + 20 + f_2 + 7 = 50 \Rightarrow f_1 + f_2 = 18$$

Class (Marks)	No. of Candidates	Cumulative frequencies
0 - 10	5	5
10 - 20	f_1	$5 + f_1$
20 - 30	20	$25 + f_1$ * median class
30 - 40	f_2	$25 + f_1 + f_2$
40 - 50	7	$32 + f_1 + f_2$

$$\text{Median} = 26 = 20 + \frac{25 - (5 + f_1)}{20} \times 10,$$

$$\Rightarrow 6 \times 20 = 200 - 10f_1 \Rightarrow f_1 = 8$$

$$f_1 + f_2 = 18 \Rightarrow f_2 = 18 - 8 = 10$$

∴ The missing frequencies are 8 and 10.

Q. 27. (a) Find the mean deviation about arithmetic mean of the first 10 natural numbers.

(b) From the following age distribution of 230 workers, calculate Karl Pearson's coefficient of skewness and quartile deviation :

Wages in ₹ p.m.	500 — 600	600 — 700	700 — 800	800 — 900	900 — 1000
No. of workers	30	53	82	40	25

Answer 27. (a)

$$\text{Sum of first 10 natural numbers} = \frac{n(n+1)}{2} = \frac{10 \times 11}{2} = 55$$

$$\text{A.M. of first 10 natural numbers} = \frac{55}{10} = 5.5$$

First 10 natural numbers (x)	$x - \bar{x}$ $= x - 5.5$	$ x - 5.5 $	Mean deviation $= \frac{25}{10} = 2.5$
1	-4.5	4.5	
2	-3.5	3.5	
3	-2.5	2.5	
4	-1.5	1.5	
5	-0.5	0.5	
6	0.5	0.5	
7	1.5	1.5	
8	2.5	2.5	
9	3.5	3.5	
10	4.5	<u>4.5</u>	
		25	

Answer 27. (b)

Wages ₹ p.m.	f	Mid. value of Class (X)	$x = X - 750$	$\frac{x}{100} = x'$	fx'^2	fx'
500 — 600	30	550	- 200	- 2	120	- 60
600 — 700	53	650	- 100	- 1	53	- 53
700 — 800	82	750	0	0	0	0
800 — 900	40	850	100	1	40	40
900 — 1000	25	950	200	2	100	50
	$\Sigma f = 230$				$\Sigma fx'^2$ = 313	$\Sigma fx'$ = - 23

$$\text{Mean} = A + \left(\frac{\Sigma fx'}{\Sigma f} \right) i = 750 - \frac{23}{230} \times 100 = 740$$

$$\begin{aligned} \text{S.D.} &= \left[\sqrt{\frac{\Sigma fx'^2}{\Sigma f} - \left(\frac{\Sigma fx'}{\Sigma f} \right)^2} \right] i \\ &= 100 \sqrt{\frac{313}{230} - \left(\frac{23}{230} \right)^2} = 116.2 \end{aligned}$$

$$\begin{aligned} \text{Mode} &= 700 + \left[\frac{82 - 53}{2 \times 82 - 53 - 40} \right] \times 100 \\ &= 700 + \frac{29}{71} \times 100 = 740.8 \end{aligned}$$

Karl Pearson's Coefficient of Skewness

$$\begin{aligned} &= \frac{\text{Mean} - \text{Mode}}{\text{SD}} \\ &= \frac{740 - 740.8}{116.2} = \frac{-0.8}{116.2} = -0.007 \end{aligned}$$

Q. 28. (a) Find the mean and standard deviation of the 2 values, $(a + b)$ and $(a - b)$.**(b)** Prove that for any two positive real quantities $AM \geq GM \geq HM$.**(c)** Calculate coefficient of variation for the following distribution of marks obtained by 60 students in a test :

Marks :	0 — 10	10 — 20	20 — 30	30 — 40	40 — 50
Students :	11	19	15	9	6

Answer 28. (a)

$$\text{Mean} = \frac{a+b+a-b}{2} = a.$$

$$\text{S.D.} = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n}} = \sqrt{\frac{(a+b-a)^2}{2} + \frac{(a-b-a)^2}{2}} = \sqrt{\frac{b^2}{2} + \frac{b^2}{2}} = b.$$

Answer 28. (b)

Let x_1 and x_2 be any two positive real quantities.

Now $(x_1 - x_2)^2 = (x_1 + x_2)^2 - 4x_1x_2$

$\Rightarrow (x_1 + x_2)^2 - 4x_1x_2 \geq 0$

$\Rightarrow \left(\frac{x_1 + x_2}{2}\right) \geq \sqrt{x_1x_2} \Rightarrow \frac{x_1 + x_2}{2} \geq \sqrt{x_1x_2} \Rightarrow \text{AM} \geq \text{GM} \quad \dots \text{(I)}$

Next $\frac{\frac{x_1 + x_2}{2}}{\frac{x_1x_2}{2}} \geq \frac{\sqrt{x_1x_2}}{x_1x_2} \Rightarrow \frac{\frac{1}{x_1} + \frac{1}{x_2}}{2} \geq \frac{1}{\sqrt{x_1x_2}}$

$\Rightarrow \frac{2}{\frac{1}{x_1} + \frac{1}{x_2}} \leq \sqrt{x_1x_2} \Rightarrow \text{HM} \leq \text{GM} \quad \dots \text{(II)}$

Combining (I) & (II)

$\text{AM} \geq \text{GM} \geq \text{HM}$

Answer 28. (c)

Class Interval	Mid Value x	No. of Students f	$x - 25 = d$	$d' = \frac{d}{10}$	fd'	fd'^2
0 – 10	5	11	-20	-2	-22	44
10 – 20	15	19	-10	-1	-19	19
20 – 30	25	15	0	0	0	0
30 – 40	35	9	10	1	9	9
40 – 50	45	6	20	2	12	24
	$\Sigma f = 60$				$\Sigma fd' = -20$	$fd'^2 = 96$

Mean = $A + \left(\frac{\Sigma fd'}{\Sigma f}\right) \times i = 25 - \frac{20}{60} \times 10 = 25 - \frac{20}{6} = \frac{130}{6} = 21.7$ approx.

S.D. = $10 \sqrt{\left[\frac{\Sigma fd'^2}{\Sigma f} - \left(\frac{\Sigma fd'}{\Sigma f}\right)^2\right]}$
 $= \sqrt{\frac{96}{60} - \left(\frac{-20}{60}\right)^2} = 10\sqrt{1.6 - 0.11} = 12.2$

C.V. = $\frac{\text{S.D.}}{\text{Mean}} \times 100 = \frac{12.2}{21.7} \times 100 = 56.25$

Q. 29. (a) Explain the concept is negatively skewed.

For a frequency distribution, the quartiles are ₹ 20 and ₹ 50, and the median is 30. Calculate bowley's coefficient of skewness.

(b) The means of two samples of sozes 50 and 100 respectively are 54.1 and 50.3. Obtain the mean of the sample of size 150 obtained by combining the two samples.

(c) Calculate the arithmetic mean and the median of the frequency distribution given below. Hence claculate the mode using the empirical relation between the three.

Class-limits	130-134	136-139	140-144	145-149	150-154	155-159	160-164
Frequency	5	15	28	24	17	10	1

Answer 29. (a)

Firs Quartile = 20 = Q_1

Second Quartile = Meadian = 30 = Q_2

Third Quartile = 50 = Q_3

Bowley's Coefficient of Skewness

$$= \frac{Q_3 + Q_1 - 2Q_2}{Q_3 - Q_1} = \frac{50 + 20 - 60}{50 - 20} = \frac{10}{30} = \frac{1}{3}$$

Answer 29. (b)

Here $n_1 = 50$, $n_2 = 100$, $\bar{x}_1 = 54.1$, $\bar{x}_2 = 50.3$.

$$\therefore \text{Mean } (\bar{x}) = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2} = \frac{50 \times 54.1 + 100 \times 50.3}{50 + 100} = \frac{2705 + 5030}{150} = \frac{7735}{150} = 51.57 \text{ (approx.)}$$

Answer 29. (c)

Calculation of A.M.

Class-intervals	Mid-values x	$d = \frac{x - A}{i} (i = 5)$	Frequency f	fd
130-134	132	-3	5	-15
135-139	137	-2	15	-30
140-144	142	-1	28	-28
145-149	147 = A	0	24	0
150-154	152	1	17	17
155-159	157	2	10	20
160-164	162	3	1	3
Total	100 = N	33 = Efd

$$\text{Arithmetic Mean} = A + \frac{\sum fd}{N} \times i = 147 + \frac{-33}{100} \times 5 = 147 - 1.65 = 145.35$$

CALCULATION OF CUMULATIVE FREQUENCY

Class-boundary	Cumulative Frequency (less than)
129.5	0
134.5	5
139.5	20
144.5	48
Median	x—50
149.5	72
154.5	89
159.5	99
164.5	100 = N

Here $\frac{N}{2} = \frac{100}{2} = 50$. Median (M) = the value corresponding to cumulative frequency 50.

∴ Median class is 145-149 and Median $= l_1 + \frac{\frac{N}{2} - C}{f} \times i$

Here $l_1 = 144.5$, $\frac{N}{2} = 50$, $C = 48$, $f = 24$, $i = 5$.

∴ Median $= 144.5 + \frac{50 - 48}{24} \times 5 = 144.5 + \frac{5}{12} = 144.5 + 0.42 = 144.92$

The empirical relation between Mean, Median and Mode is

Mean – Meode = 3 (Mean – Median), or, $145.35 - \text{Mode} = 3 (145.35 - 144.92) = 3 \times 0.43$,
or, $145.35 - 1.29 = \text{Mode}$, i.e. Mode = 144.06.

Q. 30. (a) (i) Find mean and standard deviation of following frequency distribution of ages :

Class of age (yrs) :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	Total
No. of persons :	2	4	9	3	2	20

(ii) Find the median and mode of the following grouped frequency distribution :

Salaries (in ₹) per hour :	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	Total
No. of persons :	10	20	30	25	15	100

(iii) For a group containing 90 observations the mean and standard deviation are 59 and 9 respectively. For 40 observations of them mean and standard deviation are 54 and 6 respectively. Find the mean and standard deviation of the remaining 50 observations.

(b) Short notes on :

- (i) Dispersion of Data;
- (ii) Ogive less than type.

Answer 30. (a)

(i)	Mid value (x) :	5	15	25	35	45	Total
	$u = (x - 25)/10$:	-2	-1	0	1	2	
	freq (f) :	2	4	9	3	2	20
	fu :	-4	-4	0	3	4	-1
	fu ² :	8	4	0	3	8	23

$$\text{mean} = 25 + 10 \times \frac{\sum fu}{\sum f} = 25 + \frac{10 \times (-1)}{20} = 25 - 0.5 = 24.5 \text{ yrs.}$$

$$\text{s.d} = \sqrt{\left[\frac{\sum fu^2}{\sum f} - \left(\frac{\sum fu}{\sum f} \right)^2 \right]} \times 10 = \sqrt{\left[\frac{23}{20} - \left(\frac{-1}{20} \right)^2 \right]} \times 10 = \sqrt{114.75} = 10.71 \text{ yrs.}$$

(ii)

Class (₹)	Frequency	Cumulative frequency (< type)
4.5 - 9.5	10	10
9.5 - 14.5	20	30
14.5 - 19.5	30	60
19.5 - 24.5	25	85
24.5 - 29.5	15	100

$\frac{100}{2} = 50$. So median class is 14.5 – 19.5 since value corresponding to 50 (C.F.) lies in that class.

$$\begin{aligned} \text{Median} &= 14.5 + \frac{\frac{100}{2} - 30}{60 - 30} \times 5 = 14.5 + \frac{20}{30} \times 5 = 14.5 + \frac{10}{3} \\ &= 14.5 + 3.33 = 17.83 \text{ ₹.} \end{aligned}$$

Modal class is 14.5 – 19.5 since maximum frequency 30 lies in that class

$$\begin{aligned} \text{Mode} &= 14.5 + \frac{30 - 20}{(30 - 20) + (30 - 25)} \times 5 = 14.5 + \frac{10}{10 + 5} \times 5 = 14.5 + \frac{10}{3} \\ &= 14.5 + 3.33 = 17.83 \text{ ₹.} \end{aligned}$$

$$(iii) \bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$$

$$\text{i.e., } 59 = \frac{40 \times 54 + 50\bar{x}_2}{90} \quad \text{i.e., } \bar{x}_2 = 63$$

$$(n_1 + n_2)\sigma^2 = n_1[\sigma_1^2 + (\bar{x} - \bar{x}_1)^2] + n_2[\sigma_2^2 + (\bar{x}_2 - \bar{x})^2]$$

$$\Rightarrow 90 \times 81 = 40[36 + (59 - 54)^2] + 50[\sigma_2^2 + (63 - 59)^2]$$

$$\Rightarrow \sigma_2^2 = 81 \quad \text{i.e., } \sigma_2 = 9 = \text{s.d of remaining 50 observations}$$

Answer 30. (b)

(i) Dispersion of Data :

The degree to which numerical data tend to spread about an average value is called the variation or dispersion of the data.

The word dispersion may also be used to indicate the spread of the data.

In the definition, we can find the basic property of dispersion i.e. "The value which indicates the extent to which all the values are dispersed about the central value in a particular distribution is called dispersion, or variation or scatter or deviation".

The measures of dispersion can be either absolute or relative. Absolute measures of dispersion are expressed in the same units in which the original data are expressed.

Relative or Coefficient of dispersion is the ratio or the percentage of a measure of absolute dispersion to an appropriate average.

Measure of Dispersion:

The following measure of dispersion are in common use:

1. Range
2. Inter Quartile Range
3. Quartile Deviation or semi-inter Quartile Range
4. Average Deviation or Mean Deviation
5. Standard Deviation or Root Mean Square Deviation
6. Lorenz Curve

Of the above six measures, the first three are positional measures.

Measures number 4 and 5 are algebraic measure and number 6 is a graphic method based on cumulative frequencies.

(ii) Ogive less than type :

Cumulative frequency corresponding to a given variate value of a distribution is defined to be the sum total of frequencies up to and including that variate value. This is known as cumulative frequency of less than type. In case of a grouped frequency distribution, cumulative frequency (less than) of a class corresponds to the upper class-boundary of that class and it is the sum total of frequencies of classes up to and including that class.

For grouped frequency distribution of a continuous variable, cumulative, cumulative frequency distribution of less than type can be represented graphically by means of a cumulative frequency polygon also known as ogive less than type. To draw a cumulative frequency polygon, boundary values of each class are located in the X axis. The cumulative frequency table provides the cumulative frequency (less than type) corresponding to upper class boundary of a class along Y axis. For each pair of values (U_i, CF_i) , a point is plotted in the graph paper. Joining all these points by straight lines, we get a cumulative frequency polygon of 'less than type'.

