MODERN SCIENCE - 7

CONTENTS

1. Food and Nutrition

(I) Answer the following questions :

1. How many kinds of teeth do most animals have ? What are the different functions of different kinds of teeth ?

Ans. Animals have four types of teeth incisors, caniner, premotars and molars.

i. **Incisors :-** Incisors are the chief biting teeth of animals. These have a sharp, straight cutting edge and have one root. There are 4 in each jaw i.e. 2 in each half of the jaw. The front incisors are longer and similar to those of the hind pair. In carnivores, the upper canines are well developed and are used to pierce skin.

ii. **Canines :-** Canines are more pointed teeth at either side of the incisors. There is one canine in each half of the jaw behind the incisors. These teeth are used to tear flesh and are found in carnivores.

iii. **Premolars :-** Premolars are meant to crush and grind the food. They have a broad lumpy top instead of a sharp biting edge. The small surface lumps are called cusps.

iv. **Molars :-** Molars are also used to grind food. They are shaped like premolars but have a larger surface.

2. What is nutrition and how many types of nutrition are there in living organisms ?

Ans. Nutrition is the process of how the body uses food to provide energy, to support growth and maintain body functions. There are two main types of nitrition : Autotrophic and heterotrophic nutrition. In autotrophic nutrition organisms use inorganic substances to synthesis food. All green plants and some bacteria feed autotrophically and are called autotrophs.

3. With the help of an experiment show that plants use carbon-di-oxide for the process of photosynthesis.

Ans. To show that carbon-di-oxide is necessary for photosynthesis take a destarched plant. Through a split cork insert one of its leaves in a wide mouthed bottle containing potassium hydroxide (KOH). Potassium hydroxide absorbs carbon-di-oxide. Keep the plant in the sunlight. After a few hours. Test any other leaf of this plant for starch.

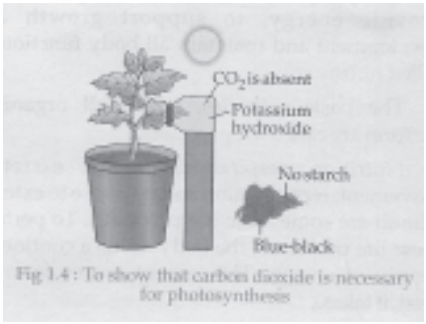


Fig 1.4 : To show that carbon dioxide is necessary for photosynthesis

You will notice, that the leaf which was exposed to the atmospheric air becomes blue-black and the one in the bottle containing potassium hydroxide does not become blue-black. It shows that carbon-di-oxide is necessary for photosynthesis.

4. Desribe any two carnivorous plants and their mode of nutrition differently.

Ans. **Carnivorous plants :-** There are some plants which feed on animals. So, they are called carnivorous plants. Examples of such plants are given below :

i. **Pitcher plant :-** These plants have jug-like traps for catching insects. In some cases the top of the trap have a flap, which prevents too much rain from entering in it. The flaps and the lid of the trap are usually brightly coloured to attract insects. The nectaries are present inside the pitcher. An insect before reaching them, has to cross a very slippery surface and downward pointing hair or spikes arter that. All these prevent the insect from getting a firm foothold and cause it fall into the liquid at the bottom of the pitcher.

ii. **Venus flytrap :-** This plant is also a good example of carnivorous plant. Each leaf of this plant is composed of two lobes hinged together in the middle. Each lobe has three trigger hair on its surface and the outer edges of the lobes are fringed with stiff spikes. If two hair are touched the trap is sprung.

Very small insects may escape between the interlocking spikes, but a large animal remains trapped. After a few hours the lobes push inwards, crushing the animal's body. The chemicals produced in the gland digest the crushed body. Small insects are common prey. but some times animals like frogs even may fall victim to a venus fytrap.

5. Describe in detail the heterotrophic nutrition in animals.

Ans. Animals cannot prepare their own food. They depend on plants or on other animals for food. Thus they consume solid organic matter as their food. All animals, some bacteria and some non-green plants feed on the food made by others. This type of nutrition is called heterotrophs nutrition and the organisms which get their food heterotrophically are called heterotropic.

Heterotrophic nutrition can be of the following :-

i. **Saprophytic :-** Heterotrophs that feed on the dead and decomposed bodies of living things are called saprophytes example mushroom.

ii. **Parastic :-** Heterotrophs living on other living organisms bodies and deriving food from them are called parasites. The organism which feeds them totally or partially is called host.

iii. **Symbiotic :-** In this type of heterotrophic nutrition two organisms

live together and provide benefit to each other.

iv. **Holozoic :-** Most of the animals have holozoic type of nutrition. They took food from plants and animals in solid form. But anythig passing from one animals to another is first made by the plants. So, plants are called producers where as animals are consumers of food.

6. According to the feeding habits of animals in how many categories they are being divided ?

Ans. On the basis of their feeding habit, animals are divided into following groups.

i. **Herbivores :-** Animals which eat plants and their parts are called herbivores or plant eating animals.

ii. **Carnivores :-** Animal which eat flesh of other animals are called carnivores or flesh eating animals.

iii. **Omnivores :-** Some animals eat both plants and animals such animals are called omnivores.

7. What is the mode of nutrition is amoeba ?

Ans. Nutrition in Amoeba :- Amoea is a unicellular micro-organism. It lives in slow moving streams and ponds. Using its false feet or pseudopodia it moves very slowly over the surface or at the bottom of the dead leave. Amoeba feeds on other animals living in water, which are smaller than it. When prey is found, amoeba puts out it pseudopodia around it. The pseudopodia completely surround the organism and join up around it.

8. Give a brief account of steps in the process of nutrition.

Ans. The main steps of holozoic nutrition are as follow :-

i. **Ingestion :-** Ingestion is the process by which food is captured and taken in. It various in different animal.

ii. **Digestion :-** Digestion is the process of breaking down complex food molecules into simpler moleculues and is brought about with the help of special enzymes.

iii. **Absorption :-** Absorption is the process in which the simpler substances resulting from the process of digestion are absorbed by the cells of the body.

iv. **Assimilation :-** The cells of the body make use of absorbed substances the formation of the constituent of protoplarm and in obtaining energy for them. This process is known as assimilation. On assimilation the amoeba grows in size.

v. **Egestion :-** This is the process by which undigested food is removed out from the body. In amoeba the residual materials are thrown out of the body through vacuoles.

9. Describe in brief the digestive system of human beings.

Ans. The organs which help in digestion collectively make a system called the digestive system.

The process of digestion starts in the mouth from the mouth, the food passes through a food canal called alimentary canal. This canal is a long, muscular and coiled tube which starts from the mouth and ends in the anus. It is about nine metres in length. Different organs of alimentay canal are as follows :

i. **Mouth :-** In human, food is ingested into the mouth. The front teeth bit the food into pleces and the back teeth chew this food.

ii. **Tongue :-** Tongue is a muscular organ present in the mouth. Its funclions are as given below :-

a. It helps in mixing the food with the saliva.

b. It helps in swallowing the food.

c. Due to the presence of taste buds its helps to taste food and distinguish four basic tastes i.e. sweet, bitter, salty and sour.

d. It also help in speaking.

2. **Oerophagus (gullet) :-** Oesophagus connects the mouth cavity with the stomach and is called the food pipe. No digestion of food takes place here. It only helps to push the food into the stomach.

3. **Stomach :-** Muscles of the oesophags push and squeeze the food down into the stomach. The muscles from the saliva act as a lubricant, so that the food slips down easily.

4. **Small Intestine :-** Small intestine is a long coiled tube. It is about 7 metre long and 2.5 cm. wide. It lies just beneath the stomach. Different parts next to stomach is called duodenum. The middle ragion is called the jejunum. Here it is mixed with panereatic juice secreted by the pancrease and the bile juice secreted by the liver. The digestion and absorption of food is done in the small intestine. The inner walls of the small intestive are covered with millions of tiny projections called villi. Cells of villi secrete enzymes which completes the digestion of food. The digested food is absorbed by the blood and the undigested food moves to the large intestine.

5. **Large intestine :-** No digestine function is carried out in the large intestive. It helps in absorbing water and in removing the undigested solid wastes product through the anus. The large intestine is about 1.5 m. long. It has three parts caecium, colon and rectum.

10. What is the mode of nutrition in ruminants ?

Ans. Ruminants is the name given to an animal that chews its Cud and has split hoofs. The ruminants have a four Chambered Stomach.The four

separate chambers or Cavities of the stomach are rumen, reticulum, onasum and obomasum. The ruminants eat the fodder or grass given to them very quickly. Then they release leisurely and chew the fodder. This act of chewing is known as chewing cud. The food these animals take enters the first cavity called the rumen or paunch which is the largest compartment. Thus, the food enters the second cavity called this reticulum. In these cavities the food is softened and formed into soft masses called cuds.When the animal rests the muscles of reticulum send the cud back to the mouth to be chewed and mixed with saliva. The animals chew the food in a roundish motion of the Jaw. Now the cud passes through the rumen and reticulum to the third cavity called the omasum and then to the fourth cavity called the obomasum. Here the food is mixed with the digestive juice from obomasum, the food passes into the intestine for the complete digestion. The digested food is absorbed inthe blood and passes to all parts of the body.

II. Write whether the following statements are ture or false :-

Ans. 1. T, 2. F, 3. F, 4. F, 5. F, 6. F, 7. T, 8. T, 9. T, 10. F.

III. Fill in the blanks with the help of suitable works :-

Ans. 1. All living organisms use *energy* to perform life processes.
2. Food is digested by special chemical called *enzymers*.
3. Saliva is secreted by the *salivary* glands in the mouth cavity.
4. Elimination of undigested food is called *egestion*.
5. *Doddes* is an example of total parasite.
6. Saprophytic plants lack *green pigment*.
7. Heterotrophs derive their food from *dead decaying matter*.
8. *Chlorophye* is the green pigment which gives green colour to plants.
9. The process of taking food is called *ingestion*.
10. Saliva contains an enzyme called *amylase*.

IV. Match the statements in column A with thhose in Column B :-

Ans.

1. Two different organisms live togeather and both are mutually beneficial.	:	Symbiosis
2. Living on other organisms and deriving food from them.	:	Parasitic
3. A Plants food factory.	:	Leaf
4. Needed by plants to make food.	:	Water, Sunlight
5. Tiny pores in leaves.	:	Stomata

V. Tick the correct option :-

Ans. 1. d, 2. b, 3. c, 4. b, 5. a, 6. b.

VI. Define the following terms :-

1. Nutrition **2. Ruminants** **3. Autotrophs**
4. Ejestion **5. Intracellular digestion** **6. Enzymes**

Ans. 1. Nutrition :- The process of how the body use food to provide energy, to support growth and development and maintain all body functions is called nutrition.

2. **Ruminants :-** Ruminants is the name given to an animal that chews its cud and has spilt hoofs.

3. **Autotrophs :-** Organisms which make their own food using inorganic substances are known autotrophs.

4. **Ejestion :-** This is the process by which undigested food is removed out from the body.

5. **Intracellular digestion :-** Digestion in lower animals is called intracellular digestion.

6. **Enzymes :-** Enzymes break down food particles into simpler molecules through chemical reaction and convert them into absorbable substances.

2. Animal Fibres For Making Clothes

I. Answer the following questions :-

1. Give a short account of the investion of needle and yarn, made by the prehistoric hunters :

Ans. About 25,000 years ago, by the end of the old stone age, people invented needle and started sewing skins together into clothing. They also learned to make yarn from fur or hair of some animals and thread like parts of some plants. They also learned to weave yarn into clothes.

2. Write a short note on the clothing materials used by men ?

Ans. There are two kinds of clothing materials :- natural clothing and artifical clothing materials. Natural clothing materials : Fur leather, cotton, silk, wool and flax are natural fibres. Most widely used clothing fibres are cotton, wool and silk.Silk and wool are animal fibres silk comes from cocoon spun by silk worm. Most of the wood we use is provided by sheep. Cotton is a fibre plant.Paper, plastic sheeting and rubber are man made materials. They are less expensive then natural fibres.

3. What are the different steps of processing of wool ? Explain.

Ans. Processing of wool involves the following steps :

i. **Shearing :-** Removing the fleece from a sheep body is called shearing the shearers remove the fleece in one piece so that the various parts can be identified for sorting and grading.

ii. **Shorting and grading :-** Putting the wool in different groups according to the quality i.e.its fineness strength, crimp and colour is called sorting and grading.

iii. **Making yarn :-** the wood contains yolk and dust as impurities to clean the impurities the wool is scurred with detergents. The grease of the yolk is processed into a substance called lanolin after drying, the wool is carded. In carding process the wool is passed through rollers that have thin wire teeth. The teeth change the fibres into a flat sheets called web. The web is changed into strands called slivers. Slivers are stretched into thinner strands called roving. Spinning machines twist them into yarn.

iv. **Making fabric :-** Wool manufacturers knit or weave the yarn into a variety of fabrices. The fabrics undergo a finishing process to give them the desired look and touch after the finishing process, the fabric is made into clothes.

4. What do you understand by sheap breeding ?

Ans. Improving the quality of a particular animal by crossing different various of that animal is called breeding. The domestic beeds of sheep are descended from two qualities of wild sheep by breeding the coarser hair that covered the wild sheep was replaced by a soft coat. There are mainly five groups of sheep, depending on their fleece. They are fine woolled sheep, medium woolled sheep, long woollen sheep, cross bud, woolled sheep and coarse woolled sheep. The wool obtained from the romney sheep, a long woolled sheep is usually used for making carpets, whereas a coarse woolled sheep called Navaji sheep produces wool which is used for blankets and rugs.

5. What are the properties and uses of wools ?

Ans. **Properties of wool :-** Wool is generally creamy white in colour. Some species of sheep produce natural colours such as brown, black and grey. The wool has a high tensile strenght and elasticity. It can be easily dyed. It is light weight and has the properties of heat insulation and water absorption on account of the crimps the wool is highly resitient

uses :-

1. Use of wool is to make sweaters gloves, socks mufflers and other clothing which help in keeping our body warm during winters. It is also used for carpets.
2. It is used to cover piano hammers. It is used to absorb noise in heavy machinery and sterea speakers.
3. Shoddy is made from the used wool.
4. It is used to cover cloth diapers.

6. Give a brief account of the history of silk ?

Ans. Silk was first discovered and then developed in early China, possibly about 3000 B.C. The credit of silk discovery goes to XI Ling Shi. After the discovery of silk cocoon and the invention of first silk reel, China successfully guarded the secret of producing silk fibre untill AD 300, when Japan and later India, penetrated the secrecy.

7. Explain the process of sericulture in detail ?

Ans. The practice of rearing silkworm is called sericulture. After killing the pupae, the workers boil the cocoons in boiled water. The boiling hot water not only kills the insects with in cocoon but also dissolves a gummy substances that holds the cocoon filament in place. Filaments from several cocoons are unknown at the same time, The method sericin glues several silk filaments into a reel. This thread is called raw silk.

8. What are the processes involved in processing of Silk ?

Ans. In processing of silk involves the following steps :-

1. **Reeling :-** After killing the pupae, the workers boil the cocoons in boiled water. The boiling hot water not only kills the insects with in the cocoon but also dissolves a gummy substance that holds the cocoon filament in place. Filaments from serveral cocoon are unwound at the same time. The melted sericin glves several silk filaments into a reel. This thread is called raw silk. Later silk is removed from the reel and twisted into small coiled bandles.
2. **Throwing :-** The raw silk is strengthered by a series of processes called throwing.
3. **Boiling off :-** After throwing workers boil the silk in a hot soap solution to remove the sericin. The process is called boiling off.The boiled off silk is usually milky white.
4. **Dyeing and weaving :-** Silk fabric can be dyed either before or after weaving. Silk fibres are woven on looms much like those used for cotton and wool.

II. Write whether the following statements are ture or false :-

Ans. 1. F, 2. T, 3. T, 4. T, 5. F, 6. T, 7. F, 8. F.

III. Fill in the blanks :-

Ans. 1. *Silver* is the splitting of woollen web into fine thin strands for spinning.
2. Science of raising silk worms to obtain silk cocoons is called *Sericulture*.
3. The fabrics made from the used wool are called *Shoddy*.
4. The scientific name of silk moth is *Bombyx Mori*.
5. The only substance found in raw silk is called *Sericin glues*.

6. Silk warm feed on *mulberry* leaves.
7. Tweed and *worsted* are type of woollen fabrics.
8. Wild silk called 'Muga' is produced in *Brahamputra* valley.

IV. Match the statements in coloumn A with those in column B :-

Ans.
1. A woollen fabric having a smooth surface. : Worsted
2. An international trade mark for new and pure wool : Wool Mark
3. The name of the sheep which produces finest quality of wool. : Merino
4. Science of rearing silk warms so as to obtain silk : Sericulture
5. A Variety of wild silk having a golden yellow colour : Muga

V. Define each of the following terms :-

1. Sericulture 2. Wool mark 3. Throwing
4. Worsted 5. Roving 6. Cocoon.

Ans.
1. **Sericulture :-** The practice of rearing silkworm is called sericulture.
2. **Wool Mark :-** The Wool Mark institued by IWS indicates that garmets bearing this sign was made from pure new wool, that has not been used. Previously in any process.
3. **Throwing :** The raw silk is strengthened by a series of processes called throwing.
4. **Worsted :-** The woollen fibres are combed which separates the long and shot fibres. The long fibres are then formed into smooth. Compact strands which are then spun to from smooth textwred and firm woollen yarn.
5. **Roving :-** Slivers are stretched into thinner strands called roving.
6. **Cocoon :-** When fully grown the silk worm stops eating. It spins a net or web to hold itself a twing or stem. It then from a silky cocoon.

VI. Tick the right options :-

Ans. 1. a, 2. a, 3. b, 4. a, 5. d, 6. a, 7. , 8. .

3. Heat Flow and Temperature

I. Answer the following questions :-

1. What is temperature and what is the working Principal of a thermometer ?

Ans. Tempreature is the degree of hotness of a body. A Themometer works on the principal that substances expand on heating and contract on cooling.

2. What are the various scales of temperature ? Explain.

Ans. There are three scales of temperature :

1. **Celsius scales :-** The celsius scale was fomerly known as the centigrade scale after the name of a swedish scientist Anden Celsius. The name

centigrade is derived from the fact that there are 100 degrees between the reference temperatures which are 0^0c to 100^0c. ^{0}c is the symbol for degree celsius. The 0^0c, corresponds to the temperature of pure melting ice and is called the lower standard point or lower fixed point. 100^0c corresponds to the temperature of pure boiling water and is called the upper standard point or upper fixed point.

2. **Kelvin scale :-** Kelvin scale devised by Sir Lord Kelvin Scale on the principle that the lowest temperature is 273 degree below 0 degree celsius. A unit on this kelvin scale is similar to that a celsius degree and is called a kelvin. Denoted by the letter K. If this temperature of an object on celsius scale is 20^0c than corresponding temperature on kelvin scale is (273 + 20) = 293 K.
3. **Clinical thermometer :-** The normal temperature of any healthy human being is 37^0c. The thermometer used to measure the temperature of a human body is called a clinical thermometer or a doctors thermometer.
4. **Fahrenheit scale :-** The Fahrenheit scale was derived by fahrenheit of Davzig on this scale the ice point is 32^0F and the steam point is 212^0F here are 180^0 in the fundaments interval ^{0}f is the symbol for degree Fahrenheit.

3. Write a note on Clinical thermometer ?

Ans. Clinical Thermometers is used to measure the temperature of a human body. A Clinical thermometer is marked from 35^0c to 43^0c.It is because the temperature of a human body does not come down to 35^0c nor it rise above 43^0C and if it does occurs.To measure the temperature of a human body this thermometer is first washed and then jerked till the mercury thread falls below 35^0c.It is then placed under the tongue of a patient for 1 minute. It is then taken out from the month to note the reading.

4. What are the various modes of transfer of heat ? Describe

Ans. Heat is transfered from one body to another by three different ways, namely, conduction, convection and radiation.

1. **Conduction :-** Heat through solids travels by means of conduction only. The process of transfer of heat energy in solids without the actual movement of particles from their position is called conduction. The two important conditions for heat to be conducted from one body to another are

i. Two bodies should be in contact.
ii. Their temperature should be different.

2. **Convention :-** The phenomenon due to which particles of a medium move to the source of heat energy and then move away from it after

absorbing heat energy is called convection. It is not possible in solides because molecules of solid are held strongly due to inter-molecular force.

3. **Radiation :-** Both conduction and Convection require a material medium as solid, liquid or gas for transferring heat from one place to another. There is a third phenomenon of heat transmission which does not require a material medium. This is called radiation. Radiation from a body depends upon

i. Its temerature

ii. Surface area

iii. The distance between the body and the source of radiation.

iv. The nature of the surface. A black body receives and absorbs more than the shinning ones.

5. Give an account of practical applications of bad conductor of heat.

Ans. Bad conductors of heat help in the prevention of transfers of heat from the system to the surrounding or vice versa. The commonly used insulators are asbestor, straw, wood, wool, cotton, sawdust etc.

1. Vessels are provided with wooden or ebonite handles so that heat from the vessel is not conducted to our hands.
2. Hot water storage tanks and pipes are lined with cloth, fiberglass or asbestos wool to prevent the heat loss due to conduction.
3. Thermocol is used as an insulating material to maintain the temprature of substance in ice-box.
4. Layers of insulating materials or granules are spread on the roof to prevent the loss of heat energy by conduction.

6. What are conventional currents ? How do these currents occur in liquids ? Show it with the help of an activity ?

Ans. The phenomenon due to which particles of a medium move to the source of heat energy and then move away from it after absorbing heat energy is called convection. This phenomenon takes place only in liquids and gases where particles are free to move about. Air is moved to all parts of a room by the process of conventional current.

To show the conventional current in a liquid. Fill 3/4th of a round bottomed flask with water. Drop a crystal of potassium permaganate ($KMnO_4$) in it. Now heat the flask over a flame slowly and observe the movement of the

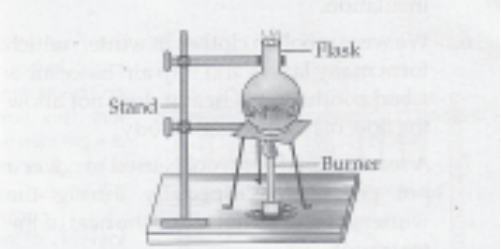


Fig 3.15 : To show the convection currents in liquid

coloured solution, water of the flask gets heated first at the bottom. The warm water being lighter than the surrounding water, rises up, the colder water moves down, gets heated and then rises again.

In the activity, the heat is transfered from the bottom to the top by actual movement of water itself.

7. What is radiation ? Describe any five practical applications of radiation.

Ans. The transfer of heat energy from a hot body to a cold body directly without heat in the space in between the two bodies is called radiation. Practical applications of radiation.

1. Big petro reservoirs are painted white or polished so that they are able to reflect heat radiation from the sun and thus, prevent a rise in their temperature.
2. Cooking utensils are usually highly polished. This polished surface radiates very little heat and the food cooked in it remains hot for a longer period.
3. Electric radiators are highly polished reflectors, so that a large amount of heat produced is reflected in the room.
4. A milk van is painted white, so that it absorbs a very little heat from the atmosphere and so the milk is kept fresh.
5. Hot water pipes and rediators of cars are painted black so that they radiate heat quickly and the temperature is kept within limit.

8. Give an account of thermos flask ? Make its labelled diagram

Ans. Sir James Dewar, a Scottish scientist invented the vacuum insulated thermos flask in 1872. The flask is used to keep hot things hot and cold things cold.

A thermos flask consists of a double walled glass vessel which reduces the loss of heat due to conduction and convection. The outer surface of the inner wall and the inner surface of the outer wall are silvered and polished. This type of surface prevents the loss of heat due to radiation. Its mouth is closed with a cork, which is a bad conductor of heat. The flask is kept on a rubber cork, heat is not allowed to enter the flask. Thus the flask keeps hot things hot and cold things cold for a long period.

II. Write wheather the following statements are ture or false :-

Ans. 1. T, 2. F, 3. T, 4. F, 5. F, 6. F, 7. T, 8. T, 9. T, 10. F.

III. Match the statements in Column A with those in Column B.:-

Ans. 1. A device used for keeping cold for hot and cold things cold for longer time. : Thermos Flask.

2. A Process of transmission of heat in which particles of a medium do not move towards the soure of heat : Conduction.
3. A Process of transmission of heat which does not require any medium : Radiation.
4. An international thermometric scale : Kelvin.
5. A device which measures the degree of hotness : Thermometer.
6. Transmission of heat energy with actual movement of the particles of a medium : Convection.

IV. Fill in the blanks :-

Ans. 1. The energy received from the sun is called *Solar* enery.
2. The rising air is called a *hot air*.
3. *Mercury* being a good conductor of heat is used as a thermometer liquid.
4. The hot water radiator is generally made of *glass vessel*.
5. The earlist thermometer was developed by *Anden Celsius* in 1952.
6. If the heat energy flows out of our body, we feel *cool*.
7. The commonly used unit of measuring temperature is *celsius*.
8. In order to measure very high temperature *pimetallic* thermometers are used.
9. Heat travels through *solid* by conduction only.
10. The radiant energy is a kind of *electromagnetic* energy similar to light energy.

V. Define the following terms :-

1. Radiation 2. Convectional currents 3. Heat energy
4. Clinical thermometer 5. Ventilation 6. Temperature.

Ans. 1. **Radiation :-** The transfer of heat energy from a hot body to a cold body directly, without heating the space in between the two bodies is called radiation.
2. **Convectional currents :-** Movement of heated air away from a hot object, along with the flow of cooler air towards the hot object is called convectional current.
3. **Heat energy :-** Heat causes the sensation of hot and cold.
4. **Clinical Thermometer :-** The thermometer used to measure the temperature of a human body is called a clinical thermometer.
5. **Ventilation :-** Convectional currents are setup in order to replace the hot and impure air in the room. The room is provided with ventilators near the ceiling. The warm and impure air rises up and exposes through the open windows and the room is kept fresh and cool.

6. **Temperature :-** Temperature is the degree of hotness or coldness of a body.

VI. Tick the right options :-

Ans. 1. b, 2. d, 3. c, 4. c, 5. d.

4. Acids, Bases and Salts

I. Answer the following questions :-

1. What are the categories in which daily useful items are being classified ? What are indicators ?

Ans. All daily useful items are being classified into acids bases (Alkalis) and salts on the basis of their properties. Acids are usually sour in taste, while bases are bitter in taste Neutral substances are those which are neither acid nor base.

Indicators :- The complex, naturally occurring sulstances which change their colour after coming in contact with othersubstances are called indicators.

2. What is an acid ? Classify the acids on the basis of sources, strtrength and concentrtion ?

Ans. A substance which dissolves in water to give hydrogenions as the only positively charged ions is called an acid.

Acids are classified differently according to their basic nature. They are classified as follows :-

1. ***On the basis of source :-***

(a) **Organic acid :-** Acids derived from plants or animal products from plants or animal products are called organic acids such as citric acid, oxalic acid.

(b) **Mineral acids :-** Acids which are prepared from non livings by chemical means are called minerals acids. Example :- Nitric acid (HNO_3), Sulphure Acid (H_2SO_4).

2. ***On the basis of concentration :-***

(a) **Concentrated acids :-** The acids which contain a very little mount of water are called concetrated acids.

(b) **Dilute acid :-** The acids which contain a large amount of water are called dilute acids.

3. ***On the basis of Strength :-***

(a) **Strong acids :-** Acid which disolved in water to give a large number of positivly charged hydrogen ions are called strong acids. HCl, H_2SO_4 HNO_3 are examples of strong acid.

(b) **Weak acids :-** Acids which disolve in water to give a small number of positively charged hydrogen ions are weak acids carbonic acid,

phosphoric acid oxalic acid, acetic acid and formic acid are examples of weak acid.

3. Write applications of hydrochoric, sulphuric and nitric acid ?

Ans. A. **Hydrochloric Acid (HCl) is used :-**

a. In manufacturing of liquids, used for cleaning wash basius floor tiles and metal surface.
b. for making glue.
c. for making glucose from starch.
d. in textile industry for bleaching purpose.
e. for de-scaling the steam boilers.
f. in cleaning kitchen sinks and other sanitory ware.
g. in the dyeing industry.

2. **Sulphuric acid (H_2SO_4) is used :-**

a. in the manufacturing of fertilizers.
b. in the manufacturing of dyes drugs, paints, plastics, detergents etc.
c. in the manufacturing of batteries of cars, buses, trucks, and inverters.
d. in petroleum refining.
e. in the manufacturing of synthetic fibres.

3. **Nitric Acid (HNO_3) is used :-**

a. in purification of metals like gold and silver.
b. in manufacturing of some dyes, perfumes, medicines and artificial silk.
c. in the manufacturing of fertilizers such as ammonium nitrate and calcium ammonium nitrate.

4. What are bases ? What are the properties of bases ? Write about the applications of sodium and calcium hydroxide bases ?

Ans. The substances whcih react with acids to form salts and water only are called bases. All oxides and hydroxides metal are bases. The name of all bases start with the name of metal and ends with the oxide or hydroxide properties of bases :-

1. All bases have a better taste.
2. They turn red litmus blue.
3. They have a soapy touch.
4. They turn phenolphthalein solution to pink colour.
5. They turn methyl orange solution in yellow colours.
6. Bases in their aqueous solution are good conductors of electricity.

5. What are neutral substances and what is the process of neutratization reaction with the help of an experiment ?

Ans. A substance is neutral if it is neither acidic nor basic and does not bring

any change in the colour of common indicater. To show neutralization reaction take two test tubes fill a little sodium hydroxide (NaOH) in one and a little hydrochloric acid (HCl) in the other test tube here former is base and the later is an acid. In a third test tube put a few drops of HCl with a dropper and add a drops of phenolphthalein solution to it. you will observe no change in the colour of the solution. Clean the dropper and add a few drops of NaOH solution to this test tube and keep on shaking the solution. you will observe that the solution in the test tube turns light pink. This solution has no effect on either red or blue to litmus paper. Thus it is clear that this solution has neither the properties of an acid nor of a base. So it is neither acidic nor basic it is a neutral solution.

6. In how many categories simple salts have been divided ? Explain in detail with suitable example.

Ans. Simple salts are classified into the following categories.

1. **Acidic Salts :-** salts that have a dual property of a salt as well as of an acid are called Acidic Salts. They are formed by pastial removal of H+ions from acid.

Example :-

i. Sodium hydrogen sulphate-$NaHSO_4$
ii. Sodium hydrogen carbonate-$NaHCO_3$
iii. Sodium hydrogen sulphide-NaHS

2. **Basic Salts :-** Salts which when dissolved in water, behave like bases are called basic salts. They are formed by incomplete neutralization of bases.

Example :-

i. Magnesium hydroxy chloride Mg (OH) Cl
ii. Calcium hydroxy chloride-Ca (OH) Cl

3. **Normal Salts :-** Salts which are formed by complete removal of H+ ions form an acid are called normal salts.

Example :-

i. Sodium Chloride-NaCl
ii. Sodium Sulphate-Na_2SO_4

II Write whether the following statements are true or false :-

Ans. 1. F, 2. T, 3. T, 4. F, 5. F.

III. Fill in the blanks with suitable words :-

Ans. 1. All soluble bases are called *alkalis*.
2. Sulphuric acid is used for preparing *drug* powder.
3. Sodium hydroxide is also known as *NaOH*.
4. Curd contains *Lactic* acid.

5. Salts formed by the incomplete neutralization of bases are called *basic* salts.

IV. Match the statements in column A with those in column B :-

Ans.

i.	The term acid is derived form the latin word	:	Acidus
ii.	The acid used as a table acid and for the preservation of food articles	:	Acetic acid
iii.	The acids which contain a large amount of water	:	Dilute acid
iv.	An organic acid found in lemon	:	Citric acid
v.	A substance which turns turmmeric solution borwnish-red	:	Basic

V. Write the chemical formulae of the following :-

Ans.

i.	Sodium Sulphate	:	Na_2SO_4
ii.	Sodium bicarbonate	:	$NaHCO_3$
iii.	Magnesium hydroxy chloride	:	Mg (OH) Cl
iv.	Copper sulphate	:	$CuSO_4$
v.	Calcium hydroxide	:	$Ca(OH)_2$
vi.	Nitric acid	:	HNO_3

VI. Define the following terms :-

Ans.

i. **Neutralization :-** The process of mixing an acid and a base to make a neutral solution is called neutralization.

ii. **Indicators :-** Substances such as litmus which change their colours when treated with acids or bases are called indicators.

iii. **Acidic substance :-** Salts that have dual property of salt as well as of an acid are called Acidic salts.

iv. **Weak acids :-** Acids which dissolvein water to give a small number of positively charged hydrogen ions, are called strong acids.

v. **Strong acids :-** Acids which dissolved in water to give a large number of positively charged hydrogen ions, are called strong acids.

vi. **Acid :-** A substance which dissolves in water to give hydrogen ions as the only positively charged ions is called an acid.

vii. **Concentrated acids :-** The acid which contain a very little amount of water are called concentrated acids.

viii. **Alkalis :-** Bases which are soluble in water are called alkalis.

5. How things change/react with one another

I. Answer the following questions :-

1. What is an an element and what are its characteristic ? How elements are classified into two groups ?

Ans. An element is a substance which is madeup of only one kind of atoms.

Characteristics of elements :-

1. An element is a pure substance.
2. It is made up of only one kind of atoms.
3. It cannot be broken down into simpler substances.
4. Element can crush in all the three states of matter.

Classification of elements :-

Elements can be classified onto two main groups :-

1. Metals 2. Non Metals

1. Metals are found in nature in free as well as combined state eg Gold, silver etc.
2. Non Metal are available in very small quantities yet that are the main constituments of air, water, sea, rock etc on the earth.

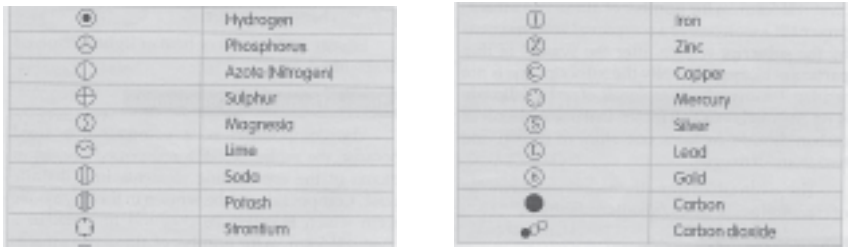
2. What do you mean by the symbol of an element and what is its significance ? Give at least two symbols used by Dallon.

Ans. The symbol of an element signifies the name of the element and atom of the element and the relative atomicmass.

Significances :- The symbol of an element signifies :

1. The name of the element.
2. An atom of the element.
3. The relative atomic mass.

Some symbols used by Dallon :-



3. What are the characterictics of a compound ? What do you understand by the chemical formulae of compounds ? Explain with the help of example.

Ans. Characteristic of compound :-

1. A Compound is a pure substance.
2. It is chemically formed by the union of two or more elements, in a definite ratio of mass.
3. It is homogeneous.
4. It has distict new properties as the original components lose their individual properties.
5. All samples of a compoud have an identical composition and have

the same properties throughout.

6. The formation of a compound involves change in energy.

The symbolic form of a compound is called its chemical formula. In Chemical formula the number of atoms of elements present in a molecule of a compound is represented by the subscript written after the symbol of that particular element. Usally the subscrible one is not written. For example one molecule of carbon-di-oxide is represented as Co_2. It means that molecule of carbon-di-oxide contains one atom of carbon and two atoms of oxygen.

4. What is a chemical reaction and a chemical equation ? Explain with examples ?

Ans. Chemical reaction :- A chemical reaction is a process which changes one or more substances into new ones with the release or absorption of energy for example :

$$2Mg + O_2 \longrightarrow 2\ MgO$$

Chemical equation :- A Chemical equation is a short form of a chemical reaction by using symbols. Substances which take part in a chemical reaction are called reactants. The substances which are formed as result of the chemical reactions are called products. Reactants are written on the right hand side. A sign of arrow ($\longrightarrow$) is put between the reactants and the products.

5. What are the important characteristics of chemical reactions ?

Ans. Characteristics of chemical reactions :-

1. **Evolution of gas :-** when active metal such as sodium and magnesium react with acids hydrogen gas is evolved.

$$2Na + 2HCl \longrightarrow 2Nacl + H_2$$

2. **Change of colour :-** Some chemical reactions are performed by the change of colour of the reactants.

$$N_2 + O_2 \longrightarrow 2No_2 \text{ (Browncolour)}$$

3. **Energy change :-** Chemical reactions are always accompanied by energy change like heat, light, sound and electricity changes.

$$C + O_2 \longrightarrow Co_2 + \text{Heat.}$$

4. **Formation of precipitats (ppt) :-** Precipitate is an insoluble substance formed during some chemical reactions.
5. **Change of state :-** In certain chemical reactions a change of state takes place.

$$2H_2O + O_2 \longrightarrow 2H_2 + O_2$$

6. What are the main types of chemical reactions ? Explain with examples ?

Ans. The main types of chemical reactions are as follows :-

1. **Chemical Combination or chemical :-** Composition reactions when

two or more elements or compounds react chemically to form only one new product. The reaction which takes place is said to be a chemical combination or chemical composition.

$$2Na + Cl_2 \longrightarrow 2Nacl$$

Sodium Chlorine Sodium Chloride

2. **Displacement reactions :-** When a more reactive element displaces a less reactive element from its aqueous salt solution the reaction which takes place is called chemical displacement.

$$Fe - Cuso_4 \longrightarrow FeSo_4 + Cu$$

3. **Decomposition reaction :-** Decomposition mean breaking down of a compound into two or more simpler compounds or elements. Such reactions in which a compound breaks up into two or more simpler compounds are called decomposition reactions.

$$2HgO \longrightarrow 2Hg + O_2$$

4. **Double decomposition or double displacement reactions :-** This type of reactions takes place when two compounds exchange atoms or group of atoms.

$$AgNo_3 + Nacl \longrightarrow Agcl + NaNo_3$$

5. **Neutrelization reaction :-** When an acid solution reacts with a base or metal carbonate so as to form a salt then the reaction is called neutrealization reaction. It is a type of double decomposition reaction.

$$2kOh + H_2So_4 \longrightarrow K_2So_4 + 2H_2O$$

7. What do you mean by the salinity and crystallization of sea water explain in detail ?

Ans. When the rivers discharge themselves in the sea. They bring along dissolveable salts, especially. the common salt when the heat of the sun evaporate sea water, the salts are left behind in the sea water. The water evaporated, changes into clouds and causes rain over the land mass. The rain water again dissolves salts from the land mass and brings them to sea . This cycle continues and hence, the concentration of salts goes on increasing in the seawater.

The process of separating a pure substance in the form of crystals from its hot saturated solution by cooling is called crystallization. This process is very commonly used to purify solid substances.

II. Write whether the following statements are ture or false :-

Ans. 1. F. 2. T. 3. T. 4. F. 5. T. 6. T. 7. T. 8. F.

III. Fill in the blanks :-

Ans. 1. The chemical formula of copper sylphate is $CuSo_4$.

2. The Latin name of potassium is K.
3. Ar is the symbol of *Argon*.
4. A Shorthand respresentation of an *element* is called symbol.
5. The substances produced as a result of a chemical reaction are called *production*.
6. The sea water is salty because of the presence of *salt* minerals.
7. The short form of precipitate is *PPT*.
8. Hydrogen and oxygen combine to form *water*.

IV. Differentiate between each of the following :-

1 Atoms and molecules.

Ans. Atom :- Atom is the smaller particle of an element which possesses the properties of that element.

Molecule:- The smallesr particle of a pure substances which always exits independently and can retain physical and chemical properties of that substance is called molecule.

2. Metals and Non Metals.

Ans.	**Metals**	**Non-Metals**
1.	They have generally high melting and boiling point.	They have low melting and boiling points.
2.	They have metallic lustre. They have a shiny appearance.	They have no lustre and can not be brighten by rubbing.
3.	They can be beaten into sheets.	They cannot be beaten into sheets.
4.	They are good conductors of heat and electricity.	They are bad conductors of heat and electricity.
5.	Some metals are ductile. ie they make a ringing sound when struck.	They are non-ductile and non-sonorous.

3. Exothermic and endothermic reaction.

Ans. Exothermic reaction :- Chemical reaction that involves the liberation of heat is called exothermic reaction.

Endothermic reaction :- Some chemical reactions take place with the ab sorption of heat.

4. Reactants and products.

Ans. Reactants :- Substances that take part in a chemical reaction are called reactants.

Products :- The substances which are formed as a result of the chemical reaction are called products.

5. Chemical formula and chemical reaction.

Ans. **Chemical formula :-** Compounds can be written in their symbolic form which is called its chemical formula.

Chemical reaction :- A change in which two or more substances react to form new substance is called chemical reaction.

V. Match the statements in Column A with those in Column B :-

Ans.

1.	The shorthand representation of an element	:	Symbol.
2.	The symbolic form of chemical compound	:	Chemical formula.
3.	The substance/substances which are produced as a result of a chemical reaction	:	Products.
4.	The gernab name of tungslun	:	Walfram.
5.	The reddish brown powdery substance formed on iron object due to moist air	:	Rust.

VI. Name the following :-

Ans.

1.	The smallest particle of an element	:	Atom
2.	Two elements found in the liquid state	:	Mescury, Bromine
3.	Two elements found is gaseous state	:	Oxygen, Hydrogen
4.	Two main groups of elements	:	Metal, Non Metal
5.	Four elements whose name begin with C	:	Carbon, Calcium, Cobalt, Chromium
6.	Two metals found in free state in nature	:	Gold, Silver
7.	A liquis non metal	:	Water
8.	Two solid non metal	:	Silicon, Phosphoras

VII. Tick correct answer of the following :-

Ans. 1. a. 2. b. 3. c. 4. d. 5. b.

6. Soil

I. Answer the following questions :-

1. What is meant by soil profile ? Give the characteristics of different horizons oberved in the soil profile ?

Ans. During soil formalion soil develops separate soil layers called horizons the sequence of horizons is called soil profile.

Soil in which three layers are developed is called mature soil. This soil takes many years and favourable conditions for soil to develop three layers. Soils that contain only two layers are called immature soil. The top layer of mature soil where most of the plants grow is called horizon A or top soil. It is often overlaid by a layer of humus. Humus makes the soil fertile because it is rich in organic materil that contains more minerals.

This layer of soil is soft, porous and holds enough water.Layers just below horizon A is called horizon B or sub-soil.It is lighter in colour than the upper layer most of the minerals in horizon A seep down in horizon B and make it rich in minerals. It contains metal salts especically iron oxide in large ratio. Farmers often mix horizon A and B while ploughing their fields.

2. How is soil formed ? Discribe in detail ?

Ans. Soil has been formed from parent rock material over millions of year. The process of breaking and wearing down of rocks and other materials on the earth's surface is called weathering which is a very slow and gradual process during which parental rock material breaks down into five particles rocks are broken down mainly by two types of weathering physical weathering and chemical weathering.

3. Describe various types of soil and the basis of their classification ?

Ans. According to the size of particles, the soil is of three types :

1. **Sandy soil :-** Soil having high percentage of soil particles about 70-80% are called sandy soil. Sandy soil is highly porous. A lot of air is present due to the percentage of large particles. These soils however do not hold much water and lack humus so these soils are not fit for plant growth Xerophytes plants like cacti that grow in the sandy soil serve as wind breakers and also help in binding the soil.
2. **Clayey soil :-** This type of soil mainly consists of clay particles when wet, clayey soil is very sticky and tilling becomes very difficult. Its water holding capacity is very high.Clay soil is rich in minerals. So it is not good for plant growth but this soil is good for some crops like paddy which requiresa lot of water.
3. **Loamy Soil :-** It consists of a good mixture of sand clay and humus. It has a goodwater holding capacity due to the presence of smaller particles. It contains enough air also due to the presece of some large particles. It contain humus also providing fertility to the soil. Soil is well suited for cultivation roots of plants get enough water, air and space to grow.

5. Give an account of the composition of soil ?

Ans. In different types of soil the composition of soil is different basically, all soils contain the following constituents :-

1. **Mineral Particles :-** These particles are gravel, sand and clay, gravel has very fine grains and sand grains are smaller than gravel. Clay is made up of fine grains and sand grains are smaller than gravel. Clay is made up of fine grains which stick together. Mineral particles of the soil determine the texture and type of soil.

2. **Salts :-** Salts such as nitrates phosphates, sulphates, carbonates etc. are of potassium, magnesium, sodium and iron.
3. **Living organisms :-** Tiny plants and animals like scorpions. Cantepedes, millipedes, earthworm etc. are found in soil. When these organisms die, they decayed Remains get mixed up with the soil.
4. **Air :-** Air is present in spaces between the soil particles. It is also needed for organisms living in the soil.
5. **Humus :-** It is completely decomposed product of plants and animals. The humus acts as a manure.
6. **Water :-** Water is present in the spaces found in between the soil particles. The water building capacity of a soil depends on its texture. Water is needed for good growth of plants.

6. What are the main agents of weathering and how are they involved in this process ?

Ans. Agents of weathering :- A number of agents help to break down the parent soil further. There agents are as follows :-

1. **Wind :-** Wind blowing across a rock surface helps to carry away minute rock particles and deposit them else where such winds have an abrasive effect on the rocks. They roll the rocks when they blow with great force and the rocks crack and break down into smaller and stones.
2. **Water :-** Water enters the cracks in the rocks and freezes, frozen water makes the rocks expand and deapen the cracks. Rocks crack and break into pieces and finally into finer particles and the process continues.
3. **Sun :-** The sun heats up the rock during the day causing by the night, the heated rocks cool very slowly and contract the repeated heating and cooling cause rocks expand. These rapid changes cause cracks and ultimately the rocks split into pieces.
4. **Plants and animals :-** Plants send their roots through the crevices of the rocks. They split the rocks mosses and lichens produce certain acids which are capable of dissolving the minerals in the rocks. These acids seep into the rocks and dissolve some of the minerals. Gradually the rocks break down into finer pieces.
5. **Micro organisms :-** Organic matter called humus is constantly being added to the parent soil by the action of many types of bacteria, fungi and other microscopic organisms. The micro organisms which live in the soil decompose dead plants and animals to form humus. Humus helps in binding the loose soil grains together and makes the soil more fertile.

7. What ate the effects of climate on the soil ? Write about the adaptations of animals to different climate ?

Ans. Climate effects both the chemical and biological activities of a soil in

cluding the rate of weathering higher temperature and humidity encourage chemical decomposition as well as disintegration. Decaying also requires warm and moist condition. During winters, such activities slow down or even stop so soil in cool dry climates lend to be shallower and less developed than those in warm, humid regions.

Adaptations of animals to different climates :

In cold climate :

a. Animals living in cold climate have thick fur or a layer of fat beneath their skin which helps them to keep their body warm.
b. They eat a lot during the summer and store energy in their bodies as fat.
c. During winter these animals just go to sleep or hibernate for months. Their body temperature becomes low and heart beat rate is also reduced.

In hot climate :

a. Animals living in hot and dry climate have thick shiny fur to reflect the sun rays.
b. Animals like camel, rattle snakes, ostriches etc.are adapted to live in hot and dry climate.
c. Some animals live in burrows to save themselves from fluctuations in temperature.

8. "Soil is a natural resource valuable to all living being" Give answer in support of this statement ?

Ans. Soil is considered a valuable resource because of the following reasons :

1. It is an excellent medium in which all plants grows.
2. Plants get minerals and water from the soil.
3. It is the natural habitat for various organisms like ants. Worms and micro-organisms.
4. It is used for the construction of buildings, roads, dams, bridges, industries etc.
5. Soil is the store house of a large number of minerals. These minerals are used in a number of industries.
6. Soil is used as a raw material for making bricks, motor, pottery and other materials.
7. Rain water seeps through the soil and accumnlates above the bed rock.

9. What is soil erosion ? What are the means of prevention of soil erosion ?

Ans. The removal of top soil is called soil erosion. This is brought about by rain, wind and water etc. There are various factors which allow water and

wind to cause soil erosion. Some of the factors are as follows :

a. Deforestation.
b. Over grazing.
c. Poor farming methods.
d. Forest fires.
e. human beings.

Means of prevention of soil erosion :- Soil erosion can be prevated by controlling the factors which are responsible for soil erosion.

1. Deforestation should be banned strictly.
2. To reduce the effect of strong winds in the fields, trees should be planted along the boundaries of the fields.
3. To maintain the soil in its natural condition, it is good to grow different crops. Crop rotation, helps to maintain the fertility of the soil.
4. Proper drainge and irrigation arrangements.
5. Trees like bamboos and eucalyptus should be planted. These trees work as soil binders by not allowing top soil to run down with the flow of water.
6. Agricultural land should not be left fallow for a long times to prevent soil erosion.
7. Conservation filling can be used.
8. On slopes of hills, cantourfarming or terrace farming should be practised to prevent direct loss of top soil due to water running down the slopes.

II. Write wheather the following statements are ture or false :-

Ans. 1. T. 2. T. 3. T. 4. F. 5. T. 6. T. 7. T. 8. F. 9. T. 10. T.

III. Fill in the blanks :-

Ans. 1. *Sand* are the largest soil particles.
2. Soil is formed by the *breaking and wearing* of rocks.
3. Humus is not present in horizon *B*.
4. *Clay* soil is suitable for growing paddy.
5. The water holding capacity of *sand* soil is very poor.
6. *Loamy soil* is good for cultivation .
7. Red colour of the soil is due to the presence of *iron oxide.*
8. Bed rock is found below the A horizon.
9. Humus content is the highest in *loamy* soil.
10. A horizon is also known as *top soil.*

IV. Match the statementsin column A with those of column B :-

Ans.

1.	Leaving stems and roots for the previous previous corps in the field	:	Conservation filling.
2.	Soil which contains salts of iron calcium and magnesium	:	Black soil.
3.	Completely decomposed product of plants	:	Humus.
4.	Horizon-B is also called	:	Black soil.
5.	The initial product of weathering	:	Parent soil.

V. Define the folklowing terms :-

Ans.

1. **Soil :-** Soil is the granular material that forms the top layer of much of the land on the earth.
2. **Weathering :-** The process of breaking and wearing down of rocks and other materials on the earth's surface is called weathering.
3. **Hibernation :-** During winter many animals just go to sleep. This process is called Hibernation.
4. **Soil erosion :-** The removal of top soil is called soil erosion.
5. **Soil texture :-** Soil texture depends upon the relative amount of the size of various particles present in the soil.
6. **Strip cropping :-** Growing of crops in rows or strips in the hills is strip cropping.

VI. Name the following : -

Ans.

1.	Any two natural agents causing soil erosion	:	Water, Wind
2.	Any tow animals which are wel-adapted for cold climate.	:	Polar bear, Penguins
3.	Any two animals found in hot climate.	:	Camel, Rattle snake
4.	Any two types of soils according to the	:	Red soil, Aluvial soil
5.	Any two constituents of soil	:	Mineral particles salts
6.	Any two salts present in the soil	:	Nitrates, phosphates
7.	Two types of weathering	:	Physical weathering Chemical weathering
8.	Any two agents which help in the process of weathering.	:	Wind, Water
9.	Any two organisms which help in increasing soil fertility.	:	Manure,
10.	Any two plants grown very well in black soil.	:	Cotton, Sugarcane

7. Respiration in plants and animals

I. Answer the following questions :

1. What is respiration and what are its different phases ?

Ans. Respiration is the process by which living organisms take oxygen to reduce energy and then removes the waste products like Carbon dioxide and water.

2. What are different types of respiration ? Explain.

Ans. On the basis of the presence of oxygen or its absence respiration is divided into two types :

a. Aerobic respiration

b. Anaerobic respiration

a. **Aerobic respiration :-** It occurs in the presence of oxygen.In this process the food in oxidised to produce energy. Carbon-di-oxide and water are produced as waste products. The chemical reaction is represented as

$$C_6H_{12}O_6 + 60_2 \longrightarrow 6Co_2 + 6\ H_2o + \text{energy.}$$

This process involves exchange of gases only.

3. How do plants respire and photosynthesis ?

Ans. Plants cell like animals cells keep on respiring but exchange of gases in plants takes place through stomala in leaves and lenticels in stems. In plants specific organs for respiration are missing. The exchange of gases occurs by the process of diffusion. Diffusion of gases occurs through three sources :-

1. Through stomata the minute pores on the surface of the leaves.
2. Through Tenticals openings present in old stems and
3. Through general surface of the rools. In aquatic plants gases diffuses through body surfaces.

Green plants make their food through photosynthesis. They make glucose by combining water and carbon-di-oxide. This needs energy which comes from the sunlight. The energy is trapped by chlorophyll. Glucose which is made contains some of this energy.

$$6Co_2 + 6H_2o \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2$$

When a plant needs energy, it releases it from the glucose in the same way that an animal does by respiration.

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6Co_2 + 6H_2O + \text{energy.}$$

4. With the help of a labelled diagram show that carbon-di-oxide is produced by green plants during photosynthesis ?

Ans. To show that carbon-di-oxide is produced during respiration keep some

germinating seeds in a flat bottomed flask and plug it with a rubber cork having two holes.In one hole, introduce a thistle funnel and in a second hole, insert the twice bent glass tube see that the stop cork is closed.

Place the free end of the glass tube inside a glass test tube containg water. Leave the apparatus for about an hour replace the test tube containing water with another test tube containing lime water. Open the stop cork. Put water from the thistle funnel into the flask, filling it almost completely.

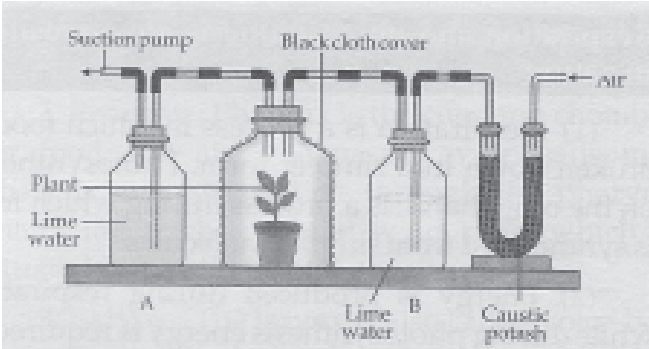


Fig 7.2 : Spiracles in an insect

You will observe that the lime water turns milky. This proves that germinating seeds produce carbon-di-oxide during respiration. This activity can also be performed by using a patted green plant and keeping it in an inverted bell jar.

5. How will you show that heat is given out during respiration ?

Ans. To show that heat is produced during respiration. Take some bean or pea seeds divide them equally into two parts take just half of them and soak them in water for a day. So they begin to germinate. Boil other half of seeds to kill them.

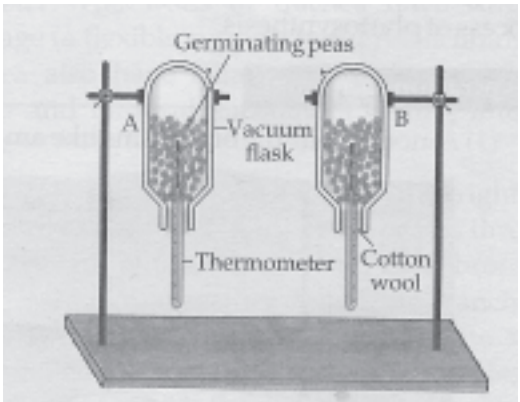


Fig 7.3 : To show that heat is given out during respiration

Take two vacuum flasks A + B put germinating seeds in flask A and killed one in flask B. Insert a thermometer in each flask and plug their mouths with cotton wool. Note the temperature of each flask. Invert each flasks upside down and leave them undisturbed for a few hours.

You see, that the thermometers of flask A has higher temperature where as there is no change in the temperature of the flask B.This indicates that

germinating seeds give out heat where as killed seeds do not.

6. What is the mechanism of respiration in fish and frogs ?

Ans. **Fish :-** Fish are aquatic animals. They have special organs called gills which are enclosed on each side of the head. Fish use these gills for exchange of gases to oxygen dissolved in water fish gulps water through the mouth and pumps it over the gills water passes into the gill chamber through gill slits. In each chamber water passes over the filaments. They absorb oxygen and replace it with carbon-di-oxide formed. The water is then passes out through the gills opening.

Frogs :- Frogs are amphibians they can live both on land and in water. When they are in tadpole stage, they breathe through gills, mature frogs breath mostly with lungs and also exchange gases with the environment through their skin. The most skin of frogs has blood vessels. The exchange of gases take place through the thin wall of the blood vessels.

7. Write in short about the respiratiory systems in human beings ?

Ans. In human beings the most importamt organs or respiration are lungs. A series of cavities and tubes suck the air into the lungs and make up the respiration syatem.The main organs of human respiratiory systems are :-

1. **Nose :-** Nose consists of two notrils externally. Air enters the body through these nostrils which are lined with membrances that are coated with a moist sticky mucus. Some membrances have moving cilia also.
2. **Pharynx :-** Pharynx is common chamber for food and air. The nasal leads into pharynx and air passing through the pharynx enters the trachea or the wind pipe, which is situated in the middle of the neck.
3. **Larynx :-** The larynx is also called voice box and is located in the traches. The larynx contains vocal cords that vibrate making sound as air passes over them.
4. **Trachea or windpipe :-** The larynx leads to trachea. The walls of trachea have rings of cartilage cells lining the trachea also have cilia which help to prevent germs and harmful substances getting into the lungs.
5. **Bronchi :-** The trachea divides into right and left tubes called branch after air passes through the trachea it enters the bronchi each bronchus enters a lung air is further pulled into branches of the bronchi.
6. **Lungs :-** the lungs are a pair of elastic organs present in the chest cavity. The sides of the chest are bounded by the ribs, which are joined to the backbone at the back and backbone at the front. The throrax is separated from the abdomen below by the diaphragm. They can contract and expand by the action of muscles of the diaphragm.

A bit larger right lungs is divided into three lobes, whereas the left lung is divided into two holes.

7. **Alveali :-** The bronchioles connect to tiny ducts that lead into air sacs called alveoli. Alveoli are usually surrounded by tiny blood vessels called capillaries. The gaseous exchange takes place in the alveoli of the lungs, Oxygen from the alveoli passes into the blood cells and is carried to different parts of the body. At the same time, carbon-di-oxide from the blood vessels passes into the alveoli and then travels upwards through the bronchi, trachea and the larynx is exhaled through the nose.

8. How do the ribs and diaphragm move during breathing ? Draw a labelled diagram and explain ?

Ans. During inspiration air is moved into lungs and the muscles of the dia phragm contract as a result the diaphragm springs back to attain its normal domeshaped appearance. The rib-cage also drops down into its normal position. This decreases the volume of the chest cavity with the result the air rushes out of the lungs.

II. Write whether the following statements are ture or false :-

Ans. 1. F. 2. T. 3. T. 4. T. 5. F. 6. F. 7. T. 8. T. 9. T. 10. F.

III. Fill in the blanks with suitable works :-

Ans. 1. The waste product of respiration is *carbon-di-oxide, water.*
2. Insects respire through *tranchea.*
3. Airsacs present in lungs are called *alveoli.*
4. *Fish* respire through gills.
5. Exchanges of gases in plants takes place through *stomata* and lenticels.
6. Lungs are present in the *Chest* cavity of the body.
7. Aerobic respiration occurs in presence of *Oxygen.*
8. In *Anaerobic* respiration food is not completely oxidised.
9. The nasal cavity leads into *pharynx.*
10. Alveoli are surrounded by tiny blood vessels called *capillaries.*

IV. Differentible between the following :-

1. Breathing and respiration.

Ans.

	Breathing	**Respiration**
i.	It is a physical process in which oxygen is taken in and carbon di-oxides given out.	It is a biochemical process in which glucose is oxidised to carbon-di-oxide and water
ii.	It does not librate energy.	It liberates energy.
iii.	It does not involve energy living cell of the body.	It involves every living cell of the body.

iv.	Enzymes are not used in this process.	Enzymes are used in this process.

2. Combustion and respiration.

Ans.	**Combustion**	**Respiration**
i.	It is a fast process which occurs in a single step.	It is a slow process which occurs in a series of steps.
ii.	It occurs at high temperature.	It occurs at body temperature (37^0C.)
iii.	Energy is produced in the form heat and light energy.	Energy is obtained in the form of chemical molecule.
iv.	It is carried out by heat.	It is carried out by enzymes.

3. Photosynthesie and Respiration.

Ans.	**Photosynthesis**	**Respiration**
i.	Food is synthesized from simpler molecules	In this food is broken down in to simpler form.
ii.	Energy is required in the form of Sunlight.	Energy is produced during respiration
iii.	Oxygen gas is produced.	Oxygen is used
iv.	Carbon-di oxide is used up in this	Carbon-di oxide is produced or given out

4. Aerobic and Anaerobic respiration.

Ans.	**Aerobic**	**Anoerobic**
i.	It occurs in the presence of oxygen	It occurs in the absence of oxygen
ii.	Glucose is completely oxidised to release Co_2water and energy.	Glucose is uncompletely oxidised to alchol, Co_2 and energy.
iii.	Sufficient amount of energy is released.	Small amount of energy is released.
iv.	No alcohol is formed	Alcohol is formed.

V. Define the following terms :-

1. Respiration **2. Breathing** **3. Combustion**
4. Cellular respiration **5. Tidal volume**

Ans. 1. **Respiration :-** Respiration is a process by which living organisms take in oxygen to release energy and they removes the waste products like carbon- di- oxide and water.

2. **Breathing :-** It is a physical process in which oxygen is taken in and carbon-di-oxide is given out.

3. **Combustion :-** It is a process in which energy is produced in the form of heat and light energy. It occurs at high temperature.

4. **Cellular respiration :-** It is a biochemical process in which glucose is

oxidised to carbon-di-oxide and water.

5. **Tidal Volume :-** It is the volume of air that moves in or goes out in one stroke and is about 500 ml. The Tidal volume is higher when a person is running or exercising whereas it is lower during rest or sleep.

VI. Match the Column A and Column B :-

Ans.

1.	Plants	:	Stomata
2.	Human beings	:	Lungs
3.	Frogs	:	Lungs and skin
4.	Fish	:	Gills
5.	Earth Worms	:	Skin
6.	Cockroches	:	Trachea

VII. Tick the correct option :-

Ans. 1. d. 2. c. 3. c. 4. c. 5. a.

VIII. Name the following :-

1. Any two plants which respire aerobically

Ans. Yeast , Bacteria

2. Two respiratory organs lined with cillia :

Ans. Nose , Trachea

3. Two types of respiration :

Ans. Aerobic respiration, Anoerobic respiration

4. Two phases of respiration :

Ans. External respiration , Internal Respiration

5. Two animals which breathe through their moist skin.

Ans. Earth worm and Leeches

8. Transporatation of Food and Water in Plants

I Answer the following questions :-

1. Explain the two transport systems in plants ?

Ans. Plants have two system for the transportation of food and water

1. **Xylem vessels :-** Upward movement of water and minerals occurs through xylem vessels. present in roots, stems and leaves. Xylem vessels of the root join with the xylem vessels of the stem and leaves. A Xylem vessels is composed of dead hollow cells with no end walls. The cells join end to end and form a continnous table. Main function of xylem vessels is to transport water and minerals from roots to leaves and to keep the plants upright.
2. **Pholem Vessels (Tubes) :-** Pholem tubes are also made of many cells

joined end to end. The end wall of a phloem is perforated. So it looks like a sieve. Thus phloem tubes are also called sceve tubes. The main function of phloem tubes is to transport food from leaves to the other parts of the plants.

2. How does water move in plants ? Explain with the help of a diagram.

Ans. The absorption of water by roots and its distribution to all cells, takes place by a process called osmosis. Osmosis is the diffusion of water from a region of thier higher concentration through a semipermeable membrance.

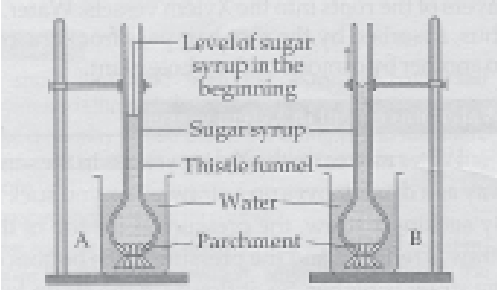


Fig. 8.3 : To demonstrate the process of osmosis by parchment

To show the osmosis process through a semi permeable membrance. Tie an animal bladder, cellophone or parchment to the wide mouth of a thistle funnel. Immeuse the wide month of the thistle funnel in a beaker filled with water. Mark the level of solution in the tube of the funnel. Leave the set up undisturbed for an hour and note the level of

sugar solution in the tube. The level of the solution increase after sometimes. The increase in the level of the thistle funnel is due to the entry of water molecules from the beaker into the thistle funnel. The concentration of water molecules in the funnel is less than in the beaker. Therefore water molecues from the beaker move inside the funnel.

3. How is food transported in the plants ?

Ans. The leaves of plants make food with the help of photosynthesis. As food is made with in leaves it dissolves in water Dissolved food enters the phloem tubes of the veins of the leaves. From here, food is carried in any direction with in the plants. This process is called translocation of food. Usually, food moves downward through the phloem tubes of the stem into the roots. There it enters the cortex. In the cortex, simple sugar is converted into strach and stored.

4. How is water absorbed by the plants ?

Ans. Root hair do the work of absorption of water. Root hair are in touch with soil water found in the space between the soil particles. The Semi permeable membrane in the root hair cell, allows only some substances

to pass through it. The cell sap of root hair is more concentrated is higher than the soil water.

Therefore the soil water passes into the root hair by osmosis and dilutes the cell sap. Water from root hair passes by osmosis across the cell layers of the roots into the xylem vessels. Water is thus, abosorbed by the root hair passes from one cell to another by osmosis to the whole plant.

5. What is osmosis and how does it take place in plants ?

Ans. Osmosis is the diffusion of water from a region of their higher concentration to a region of their lower concentration through a semi permeable membranes.

6. What is transpiration and what is its importance for plant life?

Ans. Transpiration is the process of loss of water vapours from the leaves in the plants. It occurs through stomata present in the leaves by the process of diffusion.

Importance of transpiration :

i. It results in the transport of water and minerals from the soil to the leaves. In the leaves water forms the raw materials for photosynthesis.

ii. It produces a cooling effect which helps in preventing hot sunlight from damaging the delicate cells.

Transpiration to the some extent controls the temprature of plants and it establishes a continous water stream from the roots to the aerial parts of plants, thus increasing the rapid transpiration of water.

II. Write whether the following statements are True or False :-

Ans. 1. T, 2. F, 3. T, 4. F, 5. F, 6. F.

III. Fill in the blanks with suitable words :

Ans. 1. Water is conducted upwords by *xylem vessels*.
2. The transportation of food within a plant is called *translocation of food*.
3. Tiny pores on the surface of the leaves are called *stomata*.
4. The loss of water takes place from the *leaves* parts of a plant.
5. A *xylem* vessel is composed of dead, hollow cells with no end walls.
6. The main stem of the tree is called *branch*.

IV. Match the statements of column A with those of coloumn B :

Ans.

Coloumn A	Coloumn B
1. The absorption of water from roots and its distribution to all cells	Transpiration
2. A group of Xylem vessels and phloem tubes	Vascular bundle
3. Pants with soft and green stems	Herbs
4. Carrying of food in any direction with in the plant	Translocation of food

5. Loss of water from the aerial parts of a plant Osmosis

V. Name the following :

Ans. i. Any two herbs : Mustard, Corn
ii. Any two shrubs : Lemon, Guava
iii. Any two trees : Mango, Apple
iv. Two transport system in plants : Xylem vessel, Pholoem vessels
v. Two functions of xylem vessels : (a) Carry water and minerals,
(b) Keep the plants upright

VI Define the following terms :-

Ans. (a) Vascular bundle :- A group of xylem vessels and phloem tubes is called a vascular bundle.

(b) Osmosis :- Osmosis is the diffusion of water from a region of their higher concentration through a semi permeable membrane.

(c) Transpiration :- Transpiration is the process of loss of water vapours from the leaves in plants. It occurs through stomata present in the leaves by the process of diffusion.

(d) Translocation of food :- Dissolved food enters the phloem tubes of the veins of the leaves. from here food is carried in any direction with in the plants.

(e) Stomata :- Tiny proes on the leaves.

9. Circulatory and Excretory System in Animals

I. Answer the following questions :-

1. What is blood and blood circulatory system ? State the composition and functions of blood.

Ans. Blood is a special kind of tissue which flows through blood vessels the arleries veins and capillaries.

The group of organs which helps in passing the blood throughout all body parts is called circulatory system.

Composition of blood :- Blood is a red coloured liquid flowing inside the blood vessels is consists of the following :-

a) **Plasma :-** Plasma is a straw coloured fluid part of the blood. It makes up 50-60% of the total volume of blood plasma consists of about 90% of water and the remaning 10% contains proteins salts hormones and waste products

b) **Red blood cell or Red blood corpuscles (RBCs) :-** Red blood cells also called erthrocytes are disc-shaped cells. These are found most

abundantly in the blood. They mainly consist of an iron-containing protein called haemoglobin, that gives them the red colour. The cells also contain enzymes and chemicals that allow them to function more efficiently.

c) **White blood cells or white blood Corpusels (WBCs) :-** The white blood cells play an important role in the body as they destroy the germs and help in fighting infections. They are also called Leucocytes. They do not contain haemoglobin and are irregular and colourless cell.

d) **Platelets :-** Platelets are also called Thrombocytes. They are colourless, irregular shaped fragments of cells. They help in blood clotting at the site of injury.

Function of the blood :-

i) It carries or transports food and oxygen to all body cell.

ii) It carries away waste products to kidneys (like kidneys, lungs intesline from where they are excreted from the body.

iii) It helps in blood clotting, there by preventing excessive blood loss.

iv) It protects the body against infection by destroying germs.

v) It regulates the body to temperature. It carries heat from one place to another and equalize the body temperature.

vi) It maintains water balance to constant level, distributing uniformly over the body.

2. Explain the structure of human heart the help of a labelled diagram.

Ans. Heart :- The heart is a hollow muscular and conical organ located in the rib-cage in between the lungs. It has four chambers : two upper and two lower. The upper chambers are called auricles or atria (left auricle and right auricle). The two lower chambers are called ventricles. (left ventricles and right ventricles). All the four chambers are connected to the arteries and veins. A tissus called Septum completely separates the right and left sides of the heart. The lower and upper chambers of the heart are separated by two values. The heart is composed of cardiac muscles. The thickness of the walls in different heart chambers reflects this function. The atria are thinly muscled because they pump the blood to short distance to the ventricles below them.

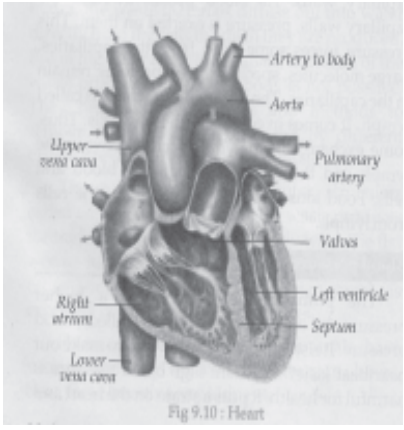


Fig 9.10 : Heart

3. How many types of blood vessels are there in the human body and what are their functions ?

Ans. There are three types of blood vessels :- arteries, veins and capillaries. The structure and function of each blood vessel is closely related.

a) **Arteries :-** Arteries are blood vessel in which blood is going away from the heart to all parts of the body. They are carrying pure blood Arteries lie down deep in the tissues except at the wrist, the lenght and along the side of the neck. The outer layer consists of elastic tissues, and the inner layer is made of thin, smooth cells. The middle layer of arteries is a muscular tisssue. Two main arteries are the aorta and the Pulmonary artery. The aorta is the largest blood vessel in the body. It is divided into smaller arteries called arterioles.

b) **Veins :-** Veins are blood vessels carrying impure blood loaded with waste products from all body parts back to the heart. Veins lie closer to the surface of the skin. The veins begin at the capillaries. At first they are very tiny and are called venules. Small veins join together to form larger ones. Blood in venis is called venous blood. The two major veins are Superior vena cava and Inferior vena cava. Veins have tiny one-away valves which open towards the heart. These valves stop the blood flowing backwards.

c) **Capillaries :-** The smallest thin-walled blood vessels are called capillaries. They connect veins and arteries. Oxygen, food and other substances pass from the blood through capillary walls into the tissues. Carbon-dioxide and other waste products from the tissues also pass through the capillary walls and enter the blood stream.

4. What is heartbeat and pulse ? Explain in detail.

Ans. The heart beats as the cardiac muscles in its wall contract and relax. When they contract, the heart becomes smaller squeezing blood out. The heart becomes larger, when they relax. A heartbeat is made up of a contraction followed by relaxation of the cardiac muscles. The human heart beats at a rate of 60-80 times per minute. Heartbeat is reflected through your body in the form of a pulse. The alternate expansion and contraction of the arteries is called the pulse.

5. What is excretion and what are the various excretory organs in human's body ?

Ans. Removal of waste products like carbon-dioxide, water, urea, uric acid from the body is known as excretion. Human body has various organs to get rid of waste products liver, lungs, Skin and kidney etc play an important role in excretion of different waste products from human body but kidneys are the main excretory organs of his body.

The kidneys together with their ducts (ureters), a urinary bladder and urethra constitute the excretory system.

6. Write about the human Excretory System with the help of a labelled diagram?

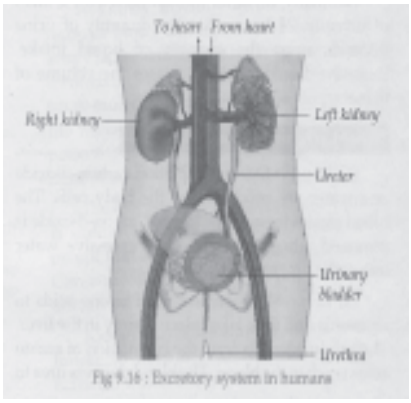


Fig 9.16 : Excretory system in humans

Ans. A pair of bean-shaped reddish brown excretory organs called kidneys are located just above the waist on either side of the backbone. They are about 10 cm long. Each kidney consits of a large number of coiled tubes called nephrons. Nephrons are microscopic structures which filter the nitrogenous waste material and excess of water from the blood and from the urine. The kidney is connected with rest of the organs of the excretory system. A narrow tube called ureter runs from the kidney to the urinary bladder. From the bladder leads a tube called the urethra. The kidneys produce urine which consists of urea, water and other wastes removed from the blood. The urine from all the nephrons in the kidneys flows into the ureters.

7. What do you mean by dialysis ? How does dialysis help to individuals whose kidneys do not function properly ?

Ans. Dialysis is a process of separating small molecules from larger molecules with the help of a semi-permeable membrane.

The principle of dialysis is used in an artificial kidney machine,also called dialysis machine. This machine is used in case of individuals whose kidneys do not perform the excretory function properly. As a result, waste accumulates in the body, which may even lead to death. A kidney receives blood through a tube connected to an artery in the arm. Inside the machine, blood flows through a cellulosic dialysis tubing which allows small molecules, including urea, to pass through the walls. The cleaned blood is returned to the patient through a tube connected to a vein in the same arm.

The dialysistubing is bathed in a liquid which is similar to blood plasma, except that it lacks the plasma waste substances. Consequently, wastes diffuse out of the blood and are carried away by the machine.

II. Write weather the following statement are true or false :-

Ans. 1. T. 2. T. 3. F. 4. T. 5. F. 6. T. 7. T. 8. F. 9. T. 10. F.

III. Fill in the blanks with the suitable words :-

Ans. i. *Arteries* carry blood from the heart towards the other organs of the body.

ii. Urine contains 95% of *water.*

iii. The earthworms excrete through tubular structures called *nephriclia*.
iv. The heart is composed of *cardic* muscles.
v. Artificial kidney machines arework on the principle of *dialysis*.
vi. The two main arteries are *aerta* and the pulmonary artery.
vii. A double-blood circulation must have a four *chamber* heart.
viii. The main function of *capillaries* blood cells is to transport oxygen and carbon-dioxide.
ix. *Platelets* help in blood clotting at the sight of injury.
x. White blood cells are also called *leucocytes*.

IV. Differentiate between each of the following :-

1. Single circulation and Double circulation of blood.

Ans. Single circulation :- A single circulation has heart with two chambers.
Double circulation :- Double circulation has four chambered heart.

2. An artery and a vein.

Ans.

	Arteries	vein
1.	They are located deep in the body away from the skin.	They are located close to the skin.
2.	They carry blood away from the heart to various organs and tissues.	They bring blood from various organs and tissues into or towards the heart.
3.	The wall is thick and strong.	The wall is thin and weak.
4.	Valves are absent.	Valves are present.

3. Red blood cells and white blood cells.

Ans.

	Red blood cell	White blood cell
1.	Consist of an iron-containing protein called haemoglobin.	They do not contain haemoglobin
2.	Red in colour	Irregular and colourless cell
3.	Cells contain enzymes and chemical	Contain a speific protein called anti Body.

4. Pulmonary circulation and systemic circulation.

Ans. Pulmonary circulation :- It is from the heart to the lungs and then to the heart.
Systemic circulation :- It is from the heart to rest of the body and back to the heart.

5. Auricles and ventricles.

Ans. Auricles :- i. Two upper chambers of heart are auricles.
ii. Auricles are thinly muscled.
Ventricles :- i. Two lower chambers of heart are called ventricles.
ii. The ventricle is more heavily muscled.

V. Match the column A with these in Column B :-

Ans.

1.	Artereis and vein	Pipes for transport in humans
2.	Circulation	The movement of material
3.	Carrier of oxygen	Red blood cells
4.	Waste products	Can poison an organ
5.	Food and oxygen	Materials needed by all living organisms
6.	Heart	A living pump

VI. Tick the correct option in the following :-

Ans. 1. a. 2. a. 3. c. 4. b. 5. c. 6. a.

10. Reproduction (Multiplication) in Plants

I. Answer the following questions :-

Q.1. What are the two types of reproduction in animals and how do they differ from each other ?

Ans. The two modes of reproduction are sexual and asexual .

Sexual reproduction :- Sexual reproduction involves two parents male and female gametes.

Asexual reproduction :- Asexual reproduction does not involve the union of gametes. New individual is produced from a single parent.

Sexual reproduction :- Sexual reproduction occurs in plants as well as in animals.

Q.2. What are the different types of pollination found in plants ? Describe them in detail.

Ans. There are two types of pollination in the plants.

i. **Self- pollination :-** When the pollen grains from the anther of flower are transferred to the stigma of the same flower or of another flower borne by the same plant it is termed as self pollination.

ii. **Cross- pollination :-** When the pollen grains are transferred from anther of one flower to the stigma of another flower of the same type borne on, another plant, it is cross pollination.

Q.3 What are the various parts of a typical plant ? Also draw a labelled diagram of a typical flower ?

Ans. Atypical flower consists of four sets of floral parts.

i. **Calyx (sepals) :-** It is the outermost whorl whose main function is to protect the bud of the flower.

ii. **Corolla (Petals) :-** Corolla is the second whorl of the flower, usually made of brightly coloured leaves called petals.

iii. **Androecium (Stamens) :-** The third whorl of the flower is androecium.

It is made up of stamens which represent the male reproductive organ of the flower. It is composed of two main parts : The stalk or filament and the anther. Anther possesses numerous pollen grains which produce male gametes.

iv. **Gynoecium or Pistil (Carpels) :-** The fourth whorl of the flower is gynoecium which is made up of carpels. The carpels represent the female reproductive organ of the flower. Each carpel consists of a basal swollen portion called ovary, anarrow stalk like portion called style and a single or many lobed structure, at the top of style : the stigma. The ovary contains many ovules and the female gamete is present inside the ovule.

Q.4. What is fertilization ? How does fertilization occur in a flowering plant ?

Ans. Fertilization is a step between pollination and seed formation. The fussion of male gamete with the female gamete is called fertilization after reaching the stigma, the pollen grains develop the pollen tube. This tube grows down through the style and the ovary towards the ovules. The male gamete travels along the pollen tube and reaches the ovule where female gamete is located. It fuses with the egg or female gamete. This fusion is known as fertilization.

Q.5. What is a seed ? How are seeds dispersed ?

Ans. Seed :- A seed contains an embryo one or two colyledons and a protective seed coat. After fertilized egg along with the ovule changes into seed. After the germination of the seed, the embryo develops into a new plant. The cotyledons often contain reserve food material for developing plant dispersal of seeds. Under favourable conditions the seeds give rise to a new plant after the mechanism of dispersal of seeds and fruit collect seeds fruits of Acer, Calotropis (madar).

Q.6. What are the various modes of natural vegetative propagation on plants ?

Ans. Natural methods of vegetative reproduction are performed by modified roots, stems and leaves of plants. In this type of a sexual reproduction in plants vegetative parts of the plants namely the root stem or leaf give rise to new plants. In this method of reproduction no reproductive organ takes part therefore no seeds are produced :

i. **Vegetative reproduction (By roots) :-** In sweet patato etc swollen roots are present. New plants arise from the swollen. roots buried in the soil.

ii. **Vegetative reproduction by stem :-** The stems such as bulbs runners rhizomes etc help the plants to multiply under favourable conditions.

iii. **Vegetative reproduction by leaves :-** The leaves do not help in

vegetative reproduction. However in Bryoplyllum, plantlels, develop along the leaf margins. When detached produce independent plants.

Q.7. What are the different methods of a sexual reproduction in plants ?

Ans. Asexual reproduction develop a new individual from a singal parent variouus methods of a sexual reproduction in plants are as follows :

a. **Binary fission :-** It is the most common method of a sexual reproduction in which an organisms divide into two daughters cell into almost two equal halves. Nucleus of the cells also divide into two parts. Each of these parts then grows into a full size bacterium.

b. **Budding :-** A sexual reproduction by budding in commonly seen in yeast. A bulb like projection called the bud is formed on the body. The nucleus of the body divides into two. Then one of the two nuclei passes into the bud. The bud detaches itself from the parent body.

c. **Spore formation :-** A spore is a tiny spherical cell that grows into a new individual. Pin mould produces spores. It is a type of fungus. The spores are released from a spore case called sporangivn present at the end of each structure. The spores are dispersed by wind. under favourable conditions, spores germinate to form new individuals.

d. **Regeneration :-** The ability of living things to repair themseleves or grow lost part is called regeneration. Plants generally have greater powers of regeneration than animals.

e. **Fragmentation :-** In some filamentous organisms such as spirogyra the filaments break up into two or more fragments. Each fragment or piece grows into a new individual.

f. **Vegetative reproduction :-** In this type of reproduction in plants vegetative part of the plants namely the root stem or leaf give rise to new plant.

Q.8. What are the various artificial method of vegetative reproduction in plants ?

Ans. The main artificial methods of vegetative reproduction are as follows :

1. **Cutting :-**

a. **Stem cutting :-** Cuttings are short lengths of the plant, which when removed and placed in the soil, with favourable conditions develop roots and leaves that grow into independent plants rose, sugarcane, grapes etc.

b. **Root Cutting :-** In plants like lemon lamarind etc root cutting when put in the damp soil gives rise to roots and shoots and form new plants.

2. **Layering :-** In layering roots are induced on the stem which it is still attached to the parent plant. This part of the plant is later detached from the parent plant and grown into a new plant.
3. **Grafting :-** In grafting commonly a small branch is introduced to rooted part of another plant. The inserted branch is called graft or scion and the rooted plant to which the cutting is attached is called a stock. The grafting ends of both graft and stock are cut oblignely and placed face to face and tied lightly. Rose, mango, apple, bear guava etc are all grown by grafting.
4. **Budding :-** Budding is almost simitar to grafting. In this method the base of the bud is inserted under neath the bank on the stem of another plant from which the rest of the shoot has been cut.

II. Write whether the following statements are ture or false :-

Ans. 1. F, 2. F, 3. T, 4. F, 5. F, 6. T, 7. F, 8. T, 9. F, 10. T, 11. F, 12. T.

III. Fill in the blanks with suitable words :

Ans. 1. Male sex cells in plants are called *Androeciun*.
2. Binary fission produces cells of *equal* size.
3. Budding is a kind of *Asexual* reproduction.
4. *Androecium* is the third whorl of the flower.
5. Grafting is a technique of *artifical method of* vegetative reproduction.
6. A bulb is an underground *shoot* with buds.
7. A furit is a matured *seed*.
8. The tiny stem of an embryo is called *colyledons*.
9. The *ovary* contains many ovules.
10. The calyx is made up of *sepals*.

IV. Give one word :-

Ans.
1. Fertilization.
2. Reproduction.
3. Unisexual.
4. Polination.
5. Ovary.
6. epicarp, mesocarp, endocarp
7. Dispersal.
8. Interguments.
9. Corolla (Petals)
10. Bulb.

V. Differentiate between the following :-

1. Asexual and sexual reproduction.

Ans. Asexual reproduction :-

i. one parent is involve

ii. No gametes or sex are involved

Sexual reproduction :- One male and one female gamete are required.

2. Binary fission and Budding.

Ans. Binary fission :- An organism divides into two daughter cells.

Budding fission :- A bulb like protection called bud is formed on the body.

3. Self-pollination and cross pollination.

Ans. Self-pollination :- Pollen grains from the anther of the flower are transferred to the stigma of the same flower or of another flower borne by the same plant.

Cross Pollination :- Pollen grains are transferred from anther of one flower to the stigma of another flower of the same type brone on another plant.

4. Unisexual and bisexual flowers.

Ans. Unisexual flower :- A flower in which only single reproductive organ either stamen or pistil is present.

Bisexual flower :- A flower in which both androecium and gynoecium are present.

5. Insect-pollinated flowers and wind-pollinated flowers.

Ans.

	Insect pollinated flower	**wind pollinated flower**
i.	These are brightly coloured flowers.	These are dull coloured flowers.
ii.	They are scented flowers	These flowers are not scente
iii.	These flowers produce nectar	These flowers produce large number of pollen grains.
iv.	These flower produce small number of pollen grains.	These flowers produce large number of pollen grains.
v.	The stigma of these flower are small and remain inside the the petals.	The stigma of these flowers are usually large and hang out of the petals.

6. Mound layering and Aerial layering.

Ans. Mound layering :- The lower branch of the plant is bent down to the ground and covered with soil leaving the upper growing tip.

Aerial layering :- The stem is gridled. It is covered with moss or wet cotton and wrapped properly by a wet cotton cloth.

VI. Name the following :-

1. Any two rhizonmes.

Ans. Ginger, Turmeric

2. Two plants in which leaves help in vegetative reproduction.

Ans. Bryophyllum, plantlets

3. Two agents of pollinated plants.

Ans. Humming bird, Insect

4. Two self-pollinated plants.

Ans. China roso, tomato

5. Two fleshy fruits.

Ans. Mango, Papaya

6. Three layers of pericrap.

Ans. Epicarp, mesocarp, endocarp

7. Reproductive organs of a flower.

Ans. Corolla, Stamens, POislil

8. Two insect-pollinated flowers.

Ans. Salvia, Raffesia

9. Any two bulbs.

Ans. Onion, Tulip

10. Two plants which produce spores.

Ans. Mushroom, Mosses

VII. Tick the correct option in the following :-

Ans. 1. d, 2. b, 3. d, 4. a, 5. b, 6. b, 7. a, 8. c, 9. d, 10. d.

11. Time and Speed and Their Measurements

I. Answer to following questions :-

1. What is time ? How did ancient people measure time ?

Ans. Time is the intertval between two events from ancient time man has been observing the pattern of Sunrise and Sunset, day and night, phases of moon, change of season etc.. He used movements of shadow cast by the Sun on Sundail, the quantity of Sand or water dropped from the upper vessel into a lower vessel through a narrow opening. People even measured the time by observing the melting of a candle.

2. How do people measure time now-a day ? write the multiples and submultiples of unit of time ?

Ans. People are using modern watches for measuring more accurate time. The solar day is divided into 24 equal parts and each part is called an hour. An hour is further divided into 60 equal parts and each part is called a minute again a minute is divided into 60 equal parts and each part is called a second. Second is taken as 81 unit of time and is equal to 1/86400th part of the solar day.

1 Solar day	=	24 hours
1 hour	=	60 minutes
1 Minute	=	60 seconds.

Number of seconds in one solar day = 24x6x60 = 86400 seconds

or 1 second = 1/86400 part of a solar day.

bigger units of time are year, decade century and millennium.

Century and millennium :

The relation of bigger units of time with SI units is shown as follows :

60 seconds (s)	=	1 minute (min)
60 minutes	=	1 hour (h)
24 hours	=	1 solar day
365 Solar Days	=	1 year
10 years	=	1 decade
10 decades (100 year)	=	1 Century
10 centuries (1000 year)	=	1 Millennium

3. How is time measured on a tewenty four hour clock ?

Ans. There are 24 hours in a day so time is divided into am and pm from just after 12 midnight till just before 12 noon we use a.m. along with time where as, for time just after 12 noon till just before 12 midnight pm is used along with time.

4. Describe motion is living and non living things ?

Ans. All living things move. They use different organs for motion or for moving from one place to another insects crawl with the help of their legs, animals like dear, cat, cow, lion etc use legs to go from one place to another. The movement in the plants is not visible because their movement is so small that it cannot be seen by the eyes in a short interval of time. Their parts show movement towards light and water. The non living things also move but their movements are not spontaneous i.e. they do not move their own. They need some external source of energy to make them move.

5. What is speed and what are its different kinds ? Explain in detail ?

Ans. Speed is the distance an object move in unit interval of time.

$$\text{Speed} = \frac{\text{Distance covered}}{\text{Time taken}}$$

$$v = S/t$$

Kinds of Speed :-

1. **Uniform speed :-** when a body covers equal distances in equal intervals of the time body is said to be moving with a uniform speed.
2. Non Uniform or variable speed :- When a body covers unequal distance in unequal intervals of time, the body is said to be moving with a non uniform or variable speed.

II. Write whethes the following statements are ture or false :-

Ans. 1. F, 2. F, 3. T, 4. T, 5. F, 6. T, 7. F, 8. T.

III. Fill in the blanks with suitable words :-

Ans. 1. A Stop watch measures time upto 1/10th of a second.
2. Galileo invented the first reliable pendulam clock in 1583.
3. Time is the interval between two events.
4. The speed is a vector quantity.
5. The SI unit of time is second.
6. In SI system, the unit of speed is meter/sec.
7. Direction mentioned with the speed of a body is called its velocity.
8. One solar day is equal to 86400 seconds.

IV. Match the statements :-

Ans.

1.	The ratio between the distance covered and the time	:	speed
2.	A device in which in which pendulum is used as timing device	:	Wall Clock
3.	A device is which a balance wheet is used as timing device	:	watch
4.	when a body covers equal distance in equal intervals of time	:	Uniform motion
5.	A device in which falling sand	:	Sand clock

V. Differentiate between the following :-

1. Uniform motion and non uniform motion.

Ans. Uniform motion :- When an object covers eual distances in equal intervals of time. It is uniform motion.

Non-uniform motion :- When an object covers unqual distance in equal of time. It is non-uniform motion.

2. Digital watches and atomic clocks.

Ans. Digital watches :- (i.) Use for measuring very short time in sports and laboratories.

(ii.) Measure time upto 1/10 Second.

Atomic clocks :- (i.) Use by scienctist.

(ii.) Measure time that are accurate to 10 millionth of a second.

3. Velocity and speed.

Ans. Velocity :- When a direction is mentioned along with the speed. It is called the Velocity.

Speed :- Speed of a moving body tells us how fast or slow the body is moving. But it does not indicate the direction of the body.

4. Uniform speed and variable speed.

Ans. Uniform speed :- when a body covers equal distances in equal interval of time. The body is said to be moving with a uniform speed

Variable speed :- When a body covers unequal distances in equal interval of time. The body is said to be moving with a non-uniform or variable speed.

5. A scalar quantity and a vector quantity.

Ans. Scalar quantity :- It possesses magnitule only.

Vector quantity :- It possesses magnitude and direction both.

VI. Tick (✓) the right option in the following :-

Ans. 1. b. 2. d. 3. b. 4. b. 5. a.

VII. Solve the following problems :-

1. A cyclist travelling at a uniform speed covers a distance of 9 km in 40 minutes find the speed of the cyclist in m/s.

Ans. speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{9\text{km}}{40\text{m}}$

1 Km. = 1000 m

9 Km. = 9 x 1000 = 9000 m.

1 Minute = 60 Sec.

40 Minute = 60 x 40 = 2400 sec.

Speed $= \frac{9000}{2400}$

$= \frac{15}{4}$ $= 3\frac{3}{4}$ m/s.

2. A girl riding a bicycle coversa distance of 50 metres in 20 seconds. What is the speed of the girl ?

Ans. Speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{50}{20}$ = 2.5 m/s.

3. The distance between two citics is 16 km. A person covers this distance in 2 hours. What is the speed of the person ?

Ans. Speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{16}{2}$ = 8 Km./hr.

4. Calculate the speed of a car that covers a distance of 120 km. in 3 hours.

Ans. Speed $= \frac{\text{Total distance}}{\text{Total Time}}$

$= \frac{120}{3} = 40$ km./hr.

5. A boys covers 50 m in 10 sec. and 35 m in next 5 sec. Calculate the average speed of the boy.

Ans. Total Distance = 30 + 35 = 9 m.

Total Time = 10 + 5 = 15 sec.

Average Speed $= \frac{\text{Total Distance}}{\text{Total Time}}$

$= \frac{90}{15} = 6$ m./sec.

12. Electric Current and Circuits

I. Answer the following questions :-

1. What is an electric current and what is the direction of flow of electric current ?

Ans. An electric current is a stream of moving electrons in a conductor. The direction of current is conventionally taken opposite to the direction of flow of electrons and is called the conventional current or simply current.

2. What are the sources of electric current ?

Ans. The sources of electric current are cells primary cell and secondary cell. In a cell the chemical energy is changed into electrical energy.

3. What do you mean by a simple electric circuit ? Show it with the help of a diagram ?

Ans. The path of an electric current is called a circuit. The different parts of a circuit are called components of the circuite. The circuit consists of four main parts :-

1. Source of electric current i.e.cell.
2. One applince eg bulb, heater.
3. Conducting wires.
4. Switches to complete and break the circuit.

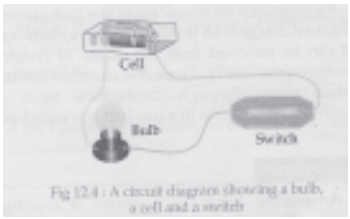


Fig 12.4 : A circuit diagram showing a bulb, a cell and a switch

In a simple electric cell the components are joined in a line, one after the other. The circuit contains a single cell, a bulb and a switch. There components are connected together by wire leads. When the switch is on, the bulb shines. The electroncs start flowing from the negative terminal of the cell through the wire and the bulb and re-enter the cell through its positive terminal and the circuit is said to be

closed. In the open circuit, the switch is off, the flow of current stops and the bulb does not glow.

4. How many types of circuits do yor know about ? Explain in detail. Take help of the labelled diagrams ?

Ans. There are two types of circuits series circuit and parrel circuit :

Fig 12.7 : The circuit diagram of a torch a series circuit

Series circuit :- In this the current flows through all the components in turn :

The circuit diagram showing series circuit

Parellel circuit :- Some circuit have branches each branch has a component we call it parellel circuit.

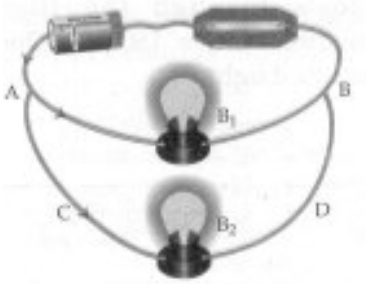


Fig 12.9 : Resistors in parallel

5. What is meant by electrial resistance ? Describe resistors in series and in parrel ?

Ans. When current flows through a conductor, it offers some obstruction to the flow of the current. This obstruction in the flow of current is called electrical resistance.

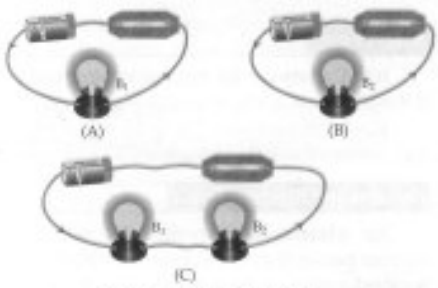


Fig 12.8 : Resistors in series

Electrical resistors in series :- In figure (A.B.) only single bulb is used and it is connected with the cell. When the key is switched on these bulb glow up. In figure 'C' both bulb 'B' and B_2 are connected in series. When the key is switched on, bulbs do not glow as much as they were glowing individually. This happens because filaments of bulbs offer. Some obstruction to the flow of curent. When both the bulbs are in series, obstruction. Offered is increased and the current passing through each bulbs reduces it causes decrease in brightness of bulb.

Electrical resistors in parellel. In the figure two bulbs are connected in paralled in the electric circuit. Each bulb is connected indvidually to the terminals A and B of the cell. That cells gets divided into the parts. On

switching the key boththe bulbs light up each having a same lightness as before. So the total brightness is equal to the sum of individual brightness of the bulbs. Due to the increase in current the combines brightness increase which shows the resistance in the flow of current is decreased.

6. How does electrical current develop a heating effect ?

Ans. When an electric current flows through a conducting wire a part or whole of the electrical energy is converted into heat energy of electric current. It is use in electric iron, heater etc.

7. Describe the ring system of house hold circuiting with the help of a diagram ?

Ans. The ring sytem consists of a ring circuit starting from the distribution board and running around all the rooms and coming back to the distribution board again. There are two separate routes by which the current can flow through various appliances. For each appliance, the connection is through double the thickness of the wire, so the wire can be of lower rating. Also the plugs and sockets of the same size could be used with separate fuses.

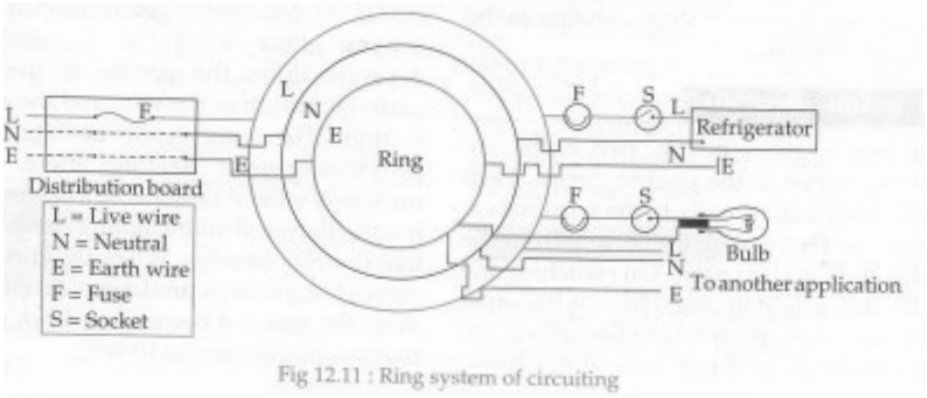


Fig 12.11 : Ring system of circuiting

8. What is a safety fuse and what is its position and working in an electric circuit ?

Ans. It is a safety device in an electric circuit and is defined as "It is the weakest part in an electric circuit which melts and breaks the electric circuit when the circuit gets overloaded.Position and working of a fuse in an electric circuit. The fuse wire is always placed in the live wire of an electric circuit, at a point, when the current enters the circuit a fuse socket consists of two parts.

1. **Porcelain casing :-** It consists of a hollow rectangular block of porcelain in which two rectangular brass terminals T_1 and T_2 are fixed. The casing is fixed to a wooden board. Thus live wire is connected to terminal T_1. There is no direct connection between the terminals T_1 and T_2. Thus no

current can flow from T_1 to T_2 unless connected by some wires.

2. **Porcelain grip :-** It consists of a rectangular solid porcelain block, on one side of which two rectangular copper clamps are provided. These clamps tightly fit in the terminal T_1 and T_2 . In between the copper clamps is fixed a fuse wire of appropriate current value. When the grip is inserted in the casing the current from terminal T_1 flows to terminal T_2 through the fuse wire.

   The fuse wire melts when a given circuit is overloaded, short circuit or power-fluctuations takes place. This stops the flow of electric current in a given circuit.

9. What are electromagnets and their uses ?

Ans. A coil with a core of iron nail or an iron bar which acts like a magnet, when electric current flows through it is called electromagnet.

Uses of electromagnets :-

1. Electromagnets are used for sorting out iron and steel articles from the other made of non-magnetic materials.
2. Very heavy loads of iron, steel grider and scrap can be lifted with the help of powerful electromagnets.
3. They are used to remove tiny iron and steel articles from the eyes.
4. They are used to sort out tin cans from other rubbish at refuse dumps.
5. They are used to make good permanent magnets. A permanent magnet does not lose its magnetism easily because it is made from steel.
6. They are used in construction of electric bells, electric fans, telephones electric motors etc.
7. They are used in television for deflecting eletron beam of the picture tube.

10. What are the main parts of an electrical bell ?

Ans. An electric bell is one of the most commonly used devices of electromagnets. It consists of the following parts .

1. **Electromagnet :-** A soft iron rod is bent in U shape and on each of its arms is mounted a wooden reel. Around each of the reel an insulated copper wire of a large number of turns, is wound. One end of the insulated copper wire is connected to the terminal T_1 and other end to the brass stud S.
2. **Armature :-** It is a soft iron bar suspended from stud S with the help of a flat spring such that the armature faces the poles of the electromagnet.
3. **Contact spring :-** It is a flat steel spring slightly bent and fixed to the armature with the help of screws. At the other end of the spring is

attached a contact point A, made of silver cadmium alloy. This alloy does not get oxidised easily due to sparking.

4. **Contact Screw adjusment :-** It consists of a brass pillar through which passes a brass screw, The tip of the screw is made of silver cadmium alloy so as to prevent the oxidation due to sparking. The contact screw adjusment can alter the frequency of ringing bell. The brass pillar is connected to terminal T_2 by a copper wire.
5. **Hammer and Gong :-** A steel hammer is attached to the armature. A gong is made of brass when the bell rings, the hammer repeatedly strikes against the gong and produces sound.

II. Write whether the following statement are true or false :-

Ans. 1. T. 2. F. 3. T. 4. F. 5. F. 6. F. 7. T. 8. F. 9. F. 10. F.

III. Fill in the blanks with suitable words :-

Ans. 1. A cartridge fuse is used in sensitive electric devices.
2. A steel bar placed in a current carrying coil changes into magnet.
3. The conductor having excess of electrons is said to be at lower potential.
4. A torch cell is an example of a Primary cell.
5. Storage batteries are used in cars, trucks etc.
6. Voltameter is used to measure the potential difference.
7. A Switch is a key which is used to break the circuit.
8. In an electic bulb both heat and light energy are produced.
9. The fuse is always connected to the live wire of the circuit.
10. Oersted showed a relationship between electricity and magnetism.

IV. Tick the right option in the following :-

Ans. 1. a. 2. d. 3. a. 4. c. 5. d. 6. 7. a. 8. c. 9. b.

V. Match the statement in column A with those in column B :-

Ans.

1.	A material used for making electromagnets	:	Soft iron
2.	A material which does not allow the electric current to pass through it	:	Wax
3.	A material used for making filament of a bulb	:	tungsten
4.	A material used for making heating element of a toaster	:	nichrome
5.	An alloy used as a material of fuse wire	:	fusible alloy
6.	A fuse used in expensive and sensitive electrical devices	:	cartridge fuse
7.	A device which is essential in an electric bell	:	electromagnet
8.	A magnetic device used for finding geographic directions	:	magnetic needle

9. Acombination of two or more cells : battery
10. A device used to detect the flow of an electric current in a circuit : galvanometer

Natural Phenomena

13. (Wind;Thunder and Lightning; Hurricanes or Cyclones)

I. Answer the following questions in detail :-

1. What is wind ? How are wind formed ?

Ans. The moving air is called wind. The movent of air from a high pressure area to a low pressure area is called a wind. The greater the difference between the two presssure areas, the faster the wind will travel.

When the sun warms the earth, the air above it expands. Due to this air pressure in a particular region is propped. The cooler and the heavier air than starts moving towards this low air pressure region. This blowing air from high pressure region to low pressure region is called wind.

2. Explain about thunder and lightning in detail.

Ans. Thunder strom is caused by violent air currents inside the thunder clouds. The moist and warm air inside the clouds rises up. Some times the water vapour present in it rapidly condenses to from tiny droplets of water, which freeze to form small particles of ice. During the consensation and freezing, a large amouint of heat energy is released. This energy further pushes up the air at a high speed water and ice particles rub against each other in rapidly rising air. This builds up a negative charge in the clouds. This electric charge is then released by the clouds by the stroke of lightning makes the air expand very, very faster than the speed of sound. This in turn produces a crash or thunder. Lightning and thundering usually occur almost simultaneously but we usually hear the thundering after a lapse of time.

3. What are the consequences of lightning and heavy rainfall ?

Ans. Lightning causes serious damage to animals and caught in a thunder storm. It can cause fire and destroys buildings. It can also damage electronic equipment such as televisions and computer etc. Lightning can burn trees and combustible article causing a serious fire. It happens due to intense heat produced by the flow of huge amount of charge between the clouds and objects concerned. Heavy rainfall may result into floods.

4. What are cyclones and how are they formed ?

Ans. A cyclone is a low pressure area in the atmosphere in which winds spiral inward. A cyclone may cover an area half as large as the entire united

states. All cyclones have two characteristic-The winds spiral in towards the centre and atmospheric pressure is lowest at the centre.

Air mases that from over land are dry and those that form over oceans are humid. Air masses that form in northern region close to the equator are warm. When these air masses move and meet, the air in them does not mix easily. The boundry between two air masses becomes sharp and distinct. The difference in temperature between land and sea surfaces can create a disturbances and forms a small wave or bridge in the polar front. At the bulge, the warm air pushes that the cold air making a warm front. The cold air moves around into the warm air and forms a cold front. The warm moist air is squeezed upward leaving only cold air near the ground lifting of the warm, moist air causes a storm centre with dark clouds and heavy precipitation. A storm centre formed in this way is called a cyclone.

5. What are the results of cyclones to the property and human lives ?

Ans. In India, tropical cyclones are produced in the Bay of Bengal and Arabian Sea in the months of October and November cyclones that originate in the Indian ocean have caused some of the greatest tragedies in history many cyclones travel inland, causing great damage to crops, settlements and human lives.

II. Write whether the following statements are true or false :-

Ans. 1. T. 2. T. 3. F. 4. F. 5. T. 6. T. 7. T. 8. T.

III. Fill in the blanks with suitable words :-

Ans.
1. Trade winds blow towards the *equator* throughout the year.
2. A *cyclone* is a huge natural engine.
3. Thunderstroms are caused by violent air current inside the *thunder (cumulus)* clouds.
4. The region of very low pressure inside a *hurricane* is called its eye.
5. The *hurricane* produce gaint waves in the sea along with heavy rains.
6. A cyclone in South-East Asia is called a *Typhoon*.
7. A lot of *heat* energy is produced during lightning.
8. A *Polar* front is created when a cold air mass invades a warmer air mass.

IV. Match the statements in column A with those in column B :-

Ans.

1. The instrument used to find out the direction of the wind	:	Wind vane
2. The names of stroms in Indian ocean	:	Cyclones
3. The name of breeze, which has speed of 6-12 km/h.	:	Light breeze
4. A spiralling strom formed over the tropical seas	:	Hurricane

5. Clouds formed from the mois and warm air : Cumulus clouds

V. Name the following :-

Ans. 1. The moving air : Wind
2. The instrument used to measure the speed of the wind : Wind vane
3. A cyclone in North America : Hurricane
4. The boundary between the cold, northern air masses and the warm, southern air masses : Polar Front
5. A Loud sound produced when lightning occurs. : Thundering.

14. Light

I Answer the following questions in detail :-

1. What is rectilinear propagation of light ? Explain with the help of an activity and few examples ?

Ans. The property of light travelling in a straight line is called the rectilinear propagation of light.

Activity :- To show that light travels in a straight line. Take three cardboards A, B and C. make a small hole in the centre of each cardboard keep them vertically so that the three holes are in straight line. Place a lighted candle near the hole of cardboard.A keep your eye near the cardborad C. The flame of the buring candle is seen clearly beacuse light is passing through the holes in a staight line. Now disturb the cardboard B. Now the flame is not visible. So it is conducted that light travels only in straight line.

Example :

i. Formation of shadows suggests that light travels in a straight line.
ii. When the headlight of a car is switched on the light appears to travel in a straight line.
iii. Beam of search light used in a light house or airport suggests that light travels in a straight line.

2. What do you undertand by the reflection of light ? What are its main principles ?

Ans. When light falls on the surface all or part of it is sent back from the surface. This is called refection of light. When a beam of light falls on .

i. Smooth and shining surface such as a plane mirror, most of its part is reflected and the rest passes through the material.
ii. A transparent material surface such as glass, it is partly reflected, partly absorbed and rest of it is transmitted.
iii. An opaque surface such as a metal foil, a part of it is partly reflected

and rest is absorbed by the surface.

3. What are images ? How are image is formed by a plane mirror ? Show it with the help of a diagram ?

Ans. A veiw of well illuminated object in a mirror or through a lens is called an image.To show an image formation by a plane mirror. Place a plane mirror upright with the help of a stand. Now place a lighted candle before. The flame of the candle O throws light in all directions. Take two points A and B on the mirror on which the incident rays OA and OB falls resprectively. These rays get reflected from the mirror and we see reflected rays AC and BD respected. The reflected rays appear to reach the eyes from point 'I' behind the mirror. This image cannot be obtained

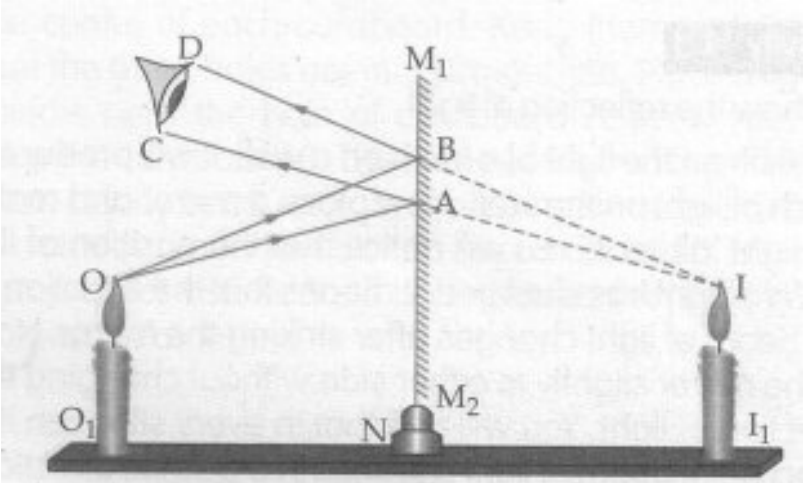


Fig 14.5 : Image formation by a plane mirror

on a screen. Such an image is called a virtual image. Measure the distances O,N and I,N both the distances are equal from this activity we conclude that.

i. The image formed by the plane mirror is behind the mirror and is virtual.
ii. The size of the image is same as that of the object.
iii. The image and its image are equidistant from the mirror.

4. What are spherical mirrors ? How many types of spherical mirrors you know about ?

Ans. A spherical mirror is a portion of spherical surface capable of reflecting light. There are two types of spherical mirrors.

i. **Concave mirror :-** A mirror in which the hollow inner surface functions as a reflecting surface is called a concave mirror.
ii. **Convex mirror :-** A mirror in which the outer building surface functions as a reflecting surface is called convex mirror.

5. Show with the help of an activity that the nature and size of an image formation is changed by a concave mirror by charging the position of the object ?

Ans. Place a concave mirror upright with the help of a stand. Now place a light candle before it at a distance of about 60cm. In between the mirror and the candle place white sheet of paper. Get a well defined image of the flame by moving the paper forward and backward.You will get an inverted and diminished image of the flame on the paper. Now place the lighted candle of about 25 cm from the cancave mirror and the paper screen at the back of the candle again move the sheet forward and backward.Till you get a well defined image of the flame on the paper. You will notice that the image formed on the screen is inverted and enlarged. We will get a real, inverted and enlarged image formed when an object is placed close to the mirror. But as the distance is decreased between the mirror and the object the image becomes virtual, errect an enlarged. A real, inverted and diminished image is formed when an object is moved away from the mirror. The image become highly diminished by increasing the distance between the mirror and the object.

6. What are the lenses ? How many types of lenses you knwo about ? Take the help of labed diagram ?

Ans. A lens is a transparent reflecting medium having a spherical surface on one or both sides. There are two types of lenses :

i. **Convex Lens :-** A lens which has one or two spherical surfaces such that it is thicker in the middle and tapering at the edges is called convex lens. There are three types of convex lens, double convex ot biconvex, plano convex and cancavo convex.

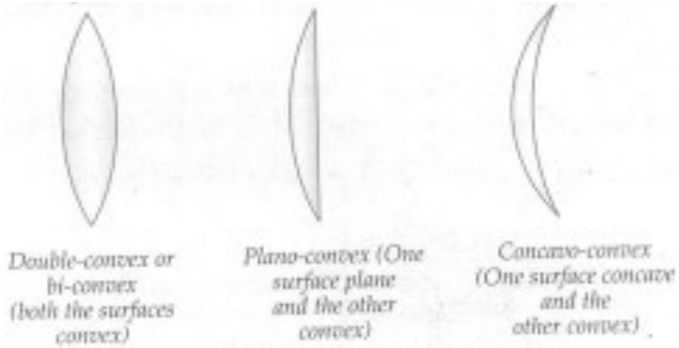


Fig 14.8 : Convex lenses

ii. **Concave lens :-** A lens which has one or two spherical surfaces such that it is thicker at edges and tapering in the middle is called a concave lens or diverging lens. There are three types of cancave lenses double concave bi-concave, plano-concave and convexo concave.

7. Describe the image formed by convex and concave lens with the help of a diagram ?

Ans. Image formed by convex lens :

i. When an object is fairly far away from the convex lens, a real inverted and diminshed image is formed.

ii. The image becomes larger as the object is slowly mount towards the lens till a stage comes when the size of the image becomes equal to the size of the object.

iii. When the object is further moved towards the lens, the size of the image becomes larger than the size of the object in all the cases the image formed is real and inverted.

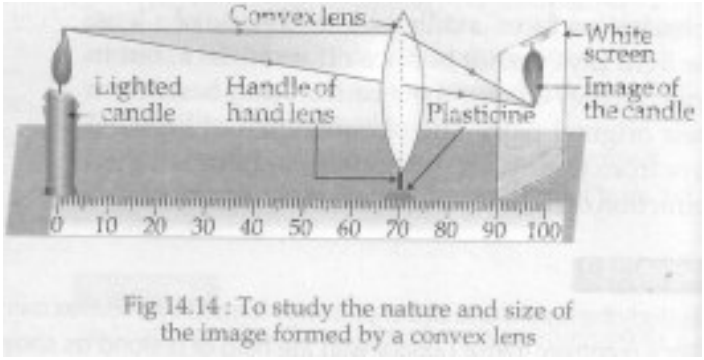
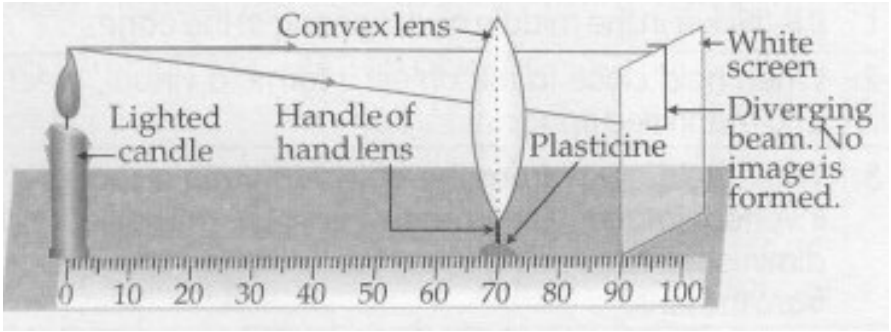


Fig 14.14 : To study the nature and size of the image formed by a convex lens

Image formed by concave lens :

i. A concave lens always form a virtual errect and diminished image of the object.

ii. When the concave lens move towards the lens the image formed is always virtual and erect. However the size of the image becomes larger but it never becomes equal to the size of the object.



8. How will you prove that light is composed of many colours ? What is newtions colour Dis c ?

Ans. Take a prism and allow ray of light to fall on one face of it place a screen on the other side of the prism and observe the band of cloured patches, showing the colours formed in the same order as in a rainbow.

A band of colours formed in this way is called spectrum. It has seven colours they are in the sequence as voilet, indigo, blue, green, yellow, orange and red. The order of colours in the spectrum is remembered by the word VIBGYOR here B stands for violet, I for indigo, B stands for Blue, G stands for green, Y stands for Yellow, O stands for Orange and R stands for red.Newton's Colour Disc.Sir Issac newton was the first to investigate that white light coming from the sun is composed of seven colours. To prove this he constructed a coloured disc, which is known as newton colour disc. It is a circular disc on which all colours of the spectrum of white light are painted in proper sequence i.e.VIBGYOR. The cardboard disc has a small parellel disc with a groove cut into its edge, round which thick string passes. This string also passes round a wheel, to which a handle is attached. When the wheel is rotated with the handle, the disc also starts rotating in the vertical plane.As the speed of rotation is increase the sectors of colours are no longer separately visible and a sensation of dull white colour is produced.

II. Write whether the following statements are ture or false :

Ans. 1. T. 2. F. 3. F. 4. F. 5. T. 6. T. 7. F. 8. T. 9. F. 10.T.

III. Fill in the blanks :

Ans. 1. White light is composed of *seven* colours.

2. Bending of rays of light on passing trough a medium is called *reflection of light.*
3. A piecce of transparent material which has one or two spherical surface is called a *lens.*
4. A *rainbow* is formed opposite to the position of sun, soon after the rains.
5. A *Convex* lens is thicker in the middle and tapering at the edges.
6. A smooth polished surface from which reflection takes place is called a *mirror.*
7. A reflecting surface which curves outward is called a *convex* mirror.
8. *Virtual* image cannot be taken on the screen.
9. Formation of shadows suggests that light travels in a *stright.*
10. *Rough* surface do not cause regular reflection.

IV. Match the statements in Column A and Column B :

Ans. 1. The bouncing off the rays of light from a smooth polished surface : refraction.

2. Bending of light from its path in another medium : Reflection.

3. The breaking of white light into seven colours : Dispersion.
4. A mirror whcih always from a diminished image : Concave mirror
5. A Policed curved surface which bends inward : Convex mirror.
6. A lens which always from virtual images : Concave lens.
7. Propagation of light in a straight line : Rectilenear prapagation.

V. Tick the correct answer :-

Ans. 1. d. 2. a. 3. a. 4. b. 5. c.

VI. Name the following :-

1. Two types of spherical mirrors.

Ans. a. Concave b. Convex.

2. Two types of images.

Ans. a. Virtual b. Real.

3. Two types of reflection of light.

Ans. a. Reflection of light b. Refraction of light.

4. Two types of lenses.

Ans. a. Concave b. Convex.

5. Colours of a spectrum in sequence.

Ans. VIBGYOR here V stands for violet, I for indigo, B stands for Blue, G stands for green, Y stands for Yellow, O stands for Orange and R stands for red.

15. Water

I. Answer the following questions :-

1. What is importance of water for sustaining life ?

Ans. All living organisms including human beings need water to remain alive. We need water not just to remain alive but also for our way of life.

Importance of water.

i. Water in living things.
ii. Water in the home.
iii. Water for irrigation.
iv. Water for eletric power.
v. Water for industries.
vi. Water for transport.
vii. Water for recreation.

2. What are the main sources of water ? Explain in detail ?

Ans. Main sourses of water are taps Tubewells, wells water tanks rivers, lakes

etc. But all these sources get water from rain. So, rain is the major sources of water.

i. **Rivers and lakes :-** Rivers and lakes, streams and ponds etc. The amount of water in a river depends on the amount of rainfall over the land which drains into the river and the amount of the rainfall over the land which drains into the river and amount of snow that on mountains is the source of big rivers.

ii. **Oceans :-** 97.4% of total water resources of the world is found in oceans, which is unuseable. This water is highly saline that is rich in salts and cannot be used for drinking, farming and maunfacturing.

iii. **Ground water :-** Cities which are faraway from rivers or lakes use under ground water.Some of the rain water seeps into the ground through the soil and reaches the hard rock collecting there as water table. It becames available to us as ground water. This ground water is used by plants for growth and development and is often used by humans for meeting daily needs of water. The flow of water in the form of natural fountains from the earth's surface is called a spring. Mineral water is often spring water as it contains dissolved minerals from the surrounding rocks. Spring water is filtered and clean springs are warm or hot.

3. What are the effects of scarcity of water on plants and human beings ?

Ans. For the scarity of water various factor are responsible Tremendously growing population is one of the major factors. Another factor is deforestion, which disturbs the water cycle in nature Deforestation results in the destruction of natural sources of water, such as wells, springs and streams. Sometime there is not enough water for irrigation crop. Lack of water in the soil eventually results in witting of crops. The crop finally dies. Prolonged absence of rains results in drought and drought causes mass starvation of humans and animals. This creates extreme difficult situation for surrival.

4. Write hazarals of dumping wastes into running water ?

Ans. Hazard caused by waste dumps in water :

i. **Effect on health :-** Polluted water can cause many diseases like diarrhoea, dysentry, typhoid, jaundice, hepatitis etc. The household sewage not properly disposed can mix with drinking water supply.

ii. **Effect on quality of water :-** The domestic sewage, industrial effluent and agricultural wastes decrease the quality of water to a considerable amount. A lake or river can become dead in due course of excessive dumping of water in it.

iii. **Effects of aqualic plants and animals :-** Due to dumping of wasters, the

quality of water goes down. This also disturbes the oxygen balanced in water, on which they depend factories and industries release some very harmful chemicals. They are dangerous and damage aquatic life.

5. Give a brief account of sewage treatment ?

Ans. In order to make the harmful sewage harmless to health it is treated in a sewage treatment plant. After that it is discharged into rivers.First of all, the raw sewage is passed through screens. These trap large objects such as stones and solid sand particles. The screened light is then left in settlement tanks or sedimentation tanks. Where other insoluble particles settle down and form a sediment called sludge. The further resulting liquid is treated by two different wages as follow :

i. **Activaled sludge :-** In this method the liquid from the settlement tank runs into an aerated tank. This contains micro-organisms which make the sewage harmelss.

ii. **Trickling filters :** In this methord, the liquid from the settlement is sprinkled over a trickling filter bed made of small stones and clinkers. Like activated sluge it also contains many micro-organisms on the surface of stones. The liquid is trickled on to the surface of the stones through holes on a rotating pipe. Now micro-organisms fed on the nutrients in the sewage. By the time the water drains out of the bottom of the tank which can be allowed to run into a river or the sea. Sludge is also formed during this process which settles out in the secondary settlement tank sluge obtained from the both the above methods is collected into large, closed tanks.Inside the tank serveral types of bacteria act on the sludge. Some of them produce methane, which is used as a fuel. This remaining solid matter is removed from the tank and is used as fertilizer.

II. Write whether the following statements are ture or false :-

Ans. 1. T. 2. F. 3. T. 4. T. 5. F. 6. T.

III. Match the statements in column A with those in column B :-

Ans.
1. Water available for drinking : 30%.
2. Activity for which water is in maxmimum demand : Agriculture.
3. Earth's surface coverd by ocean : 70%.
4. Water present in oceans : 97%.
5. Water used by human beings : Fresh water.

III. Fill in the blanks with suitable words :-

Ans.
1. About *978* present of all water is in the oceans.
2. *Sewage* is the liquid waste.
3. *Ocean* water is salty to taste.

4. Prolonged absence of rain results in *droughts*.
5. *70%* persent of the earth's crust is covered by oceans.
6. Drinking water is mainly obtained from *Rivers* and *lakes*.
7. Constructing reservoirs and *dams* help in the conservation of water.

IV. Define the following terms :-

1. **Underground water**
2. **Sewage treatment**
3. **Rain water Harvesting**
4. **Spring**
5. **Sanitary sewage system**
6. **Conservation of water**

Ans. 1. **Underground water :-** Some of the rain water seeps into the ground through the soil and reaches the hard rock collecting there as water table. It becomes available to us as ground water.

2. **Sewage treatment :-** In order to make the harmful sewage harmless to health it is treated in a sewage treatment plant. After that it is discharged into rivers.
3. **Rain water harvesting :-** Rain water harvesting is a method of direct collection of rain water from rooftops of the building. It can be done both on the rooftops of houses as well as of industries.
4. **Spring :-** The flow of water in the form of natural foundations from the earth's surface is called a spring.
5. **Sanitary Sewage system :-** The system of pipes that carries sewage or waste water from houses or other buildings is called a sanitary sewage systems.
6. **Conservation of water :-** Careful economic use of water is called conservation of water.

16. Forests

I. Answer the following questions :-

1. What is meant by a forest ? Give an account of various types of forests ?

Ans. Forests are an important natural resource. A biotic community having trees and other vegetations with a closed canopy is called a forest. Forest are divided into following three major groups :

i. **Coniferous forsets :-** These forests are made up of coniferous and ever green trees. These extend as a continuous belt around the North Pole region and high mountain in Europe, Asia and North America.

ii. **Temperate deciduous forests :-** Trees found in temperate deciduous forests mostly have flat leaves. The board and flat leaves of these trees help to do maximum transpiration. These forests are called deciduous because they lose their leaves in every autumn and grow new ones in the spring. Temperate deciduous forests are spread over large

areas of North America, Central Europe, East Asia and Australia.

iii. **Tropical rain forest :-** These forests grow in those regions that have warm and wet weather all year round.These regions include Central America and Northern part of South America Central and Western Africa, South East Asia, New Guinea the Racific inlands and North of Australia. In India they are found in Assam,Meghalaya, Andaman and Nicobar islands and slopes of western Ghats.

2. Give an account of the importance products which are obtain from the forest ?

Ans. Forests give us a large variety of products which is very useful to man kind. These products are :

i. **Food Items :-** Cereals, Pulses, Vegetables, Fruits, Spices, Oil Seeds, Beverage, Sugar.

ii. **Fuel Wood :-** Use for cooking food keeping the house warm.

iii. **Timber :-** Timber is used for making furniture, railway sleepers etc.

iv. **Bamboo :-** Wood of bamboo is useful in making rafting, roofing and walling etc. paper and news print.

v. **Lac :-** Produced by an insect living on trees like palash and kusum. It is a resinous secreation formed around the larva of the insect. It is used for making shellac and varnishes.

vi. **Essential oils :-** Used in manufacture of shampoos medicines,soaps cosmetics, perfumes etc.

vii. **Tannins :-** Tannins are found in almost all the plants but some of them contain substantial amount of it obtained from bark, wood, leaves, fruits and hard.

viii. **Rubber :-** Forest plants give us a useful product called Rubber.

ix. **Other forest products :-** Many important and useful medicines are obtained from plants.

3. Give a detailed account of the importance of forests ?

Ans. Importance of forests :-

i. **A habital for plants and animals :-** Forests provide a habital for a large number of organisms. A Peculiar forest has a specific flora and fauna. The tropical rain forests do not get sufficient light. So they have shade loving plants in plenty. Plants such as ferns, lichens and mosses usually grow in these forests. Due to humid atmosphere a large variety of epiphytes (Orchids), creepers and climbers grow here. Different types of birds and a large number of monkeys and lemurs live on the tree top. Elephant and tapirs are also found in these forests. The forest floor is full of amphibians reptiles and different

types of insects. Deer, bear, foxes and rabbit are found in these forests.

ii. **As retainers and source of water :-** Forests play a very vital role in maintaining the water cycle in nature. Plants release large amounts of water in the form of water vapour through the process of transpiration. The water vapour in the air is an important source of rainfall.

iii. **Maintaining the ground water level :-** Trees transpire water countinuously. This water comes down to land in the form of rain some of this water percolates down to increase water level of the water table.

iv. **As agents of water percolation :-** Forests act as speed breakers for heavy rains which may damage the upper ferlite soil. When forests are fell down, the soil is exposed to direct showers of heavy rain. This leads to floods. T he soil under the forests has a lot of humus which absorbs most of the rain water like a huge sponge. The water gradually seeps down into the ground. This movement of water is called percolation.

v. **Help to prevent soil erosion :-** The removal of top soil by natural agents like sun, water, wind etc is called soil erosion. The top soil is a very fertile soil. Removal of this soil leads to loss of agricultural land. Forests help to prevent soil erosion by covering the soil, protecting it from water lashes, speedy winds and the heat of direct sunlight.

vi. **Maintain humiality :-** Dampness or wetness in the air means humidity. It devotes the water vapour quantity in the air at a given time and temperature. It various from place to place and day to day with the changing temperature.

4. How are plants and animals interdepended ? Explain in detail ?

Ans. All the organisms depend on other living things for their survival for instance a rabbit needs grass to live and a tiger needs rabbit to live. It means that a rabbit is directly dependent on the grass and the tiger is indirectly dependent on grass. In other words it means that all living things are dependent on each other.

Dependence of animals on plant :-

i. **For Food :-** Plants prepare their own food but animals cannot. They depend on plants directly or indirectly for their food.

ii. **For shelter :-** Some animals specially birds make their shelter in the holes of the trees.They also make nests on the branches or bark of the trees and live their comfortably.

iii. **For Oxygen :-** Plants help in regulating the balance of oxygen and

carbon-di-oxide in the atmosphere.

Dependence of plants on animals :-

i. **For carbon-di-oxide :-** Carbon-di-oxide released by animals during the process of respiration is used by plants to prepare their food.

ii. **For Pollination and dispersal of seeds :-** Plants cannot move from one place to another and so need support in the pollination and dispersal of seeds.

iii. **For nutrients :-** Plants need a nutrient rich soil for their proper growth and development.

5. How does forests help in maintaining the level of the ground water level ?

Ans. Maintaining the ground water level :- Trees transpire water continuously. This water comes down to land in the form of rain. Some of the water percolates down to increase water level of the water table. The earth's surface has alternate layer of previous and impervious soil. Through the pervious soil water passes down and comes to a halt at the impervious layer. This water forms the ground water level. The upper most layer of the soil is usually pervious and so helps in the movement of water towards the ground water level and stores large amounts of underground water. Thus humus help in the downward movement of water for its collection.

6. What would happen if forests disappear ?

Ans. Large forest areas are cut every year for cultivation, irrigation and for construction of houses, building roads, dams etc.People often cut trees for fuel, wood, fodder timber etc. This barren and treeless land will cause many types of imbalances in nature. The natural cycle such as water cycle, food chain etc. are disturbed. When it rains most of the rain water is absorbed by trees and taken up by the stem to the leaves. It then evaporates during the process of transpiration. If no treeswere there, the rain simply runs off the soil into rivers. Much less goes back into the air as water vapour. The soil can be easily washed into rivers by the rain water filling up the river bed and causing flood. Loss of forests also means loss of a habitat for different types of animals and plants. It may result in extinction of some animals, birds and plants.

II. Write whethers the following statements are ture or false :-

Ans. 1. F. 2.T. 3. F. 4. T. 5. T. 6. F. 7. T. 8. T.

III. Fill in the balnks :-

Ans. 1. Quinine is derived from the bark of *trees*.

2. Forests occupy *1/5* of geographical area of India.

3. One of the main reasons behind deforestation is *demand of land*.

4. *Resius and terpentine* is extracted from the pine trees.

5. Evergreen forests are found in areas of heavy rains and *moderate* temperature.
6. Kattha is obtained from the wood of a *khair* tree.
7. *Tropical rain* forests are found in Assam.
8. Plant release a large amount of water vapour in process of transpiration.
9. The food chain starts from a *producer* and ends in a predator.
10. Plup of bamboo is used to make *paper* and newsprint.

IV. Match the statment in Column A with those in Column B. :-

Ans.
1. The producers of Foods : Forest.
2. Removal of trees : Deforestation.
3. A renewable natural resource : Producers.
4. Afforestation : Practice of planting trees.
5. The way in which living beings depand on each other : Interdependence.

V. Name the following :-

1. Three types of forests found in India ?

Ans. a. Coniferous forsets b. Temperate.

2. Any three trees which have needle like leaves ?

Ans. a. Pines. b. Firs. c. Spruces.

3. Any three states of India where tropical rain forests are found :

Ans. a. Assam b. Meghalaya c. Andaman and Nicobar island.

4. Two natural agents of soil erosion ?

Ans. a. Rainfall b. Strong winds.

5. Two reptiles commonly found in temperate deciduous forests ?

Ans. a. Snakes b. Lizards.

6. Any three forest product :

Ans. a. Fuel b. Wood c. fodder.

7. Two sources of essential oils ?

Ans. a. Sandal b. Khas.

8. Any three forest products ?

Ans. a. Bamboo b. Lac. c. Rubber.

9. Any two trees which are used as timber ?

Ans. a. Mahogany b. Rosewood.

10. Any two forests products use in medicines ?

Ans. a. Comphor b. Peppermint.

11. An oil used in paints and varnishes ?

Ans. a. Resius b. Tespentine oil.

12. The process of evaporation of water vapour from the trees ?

Ans. a. Transpiration.