Wave International
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Science and Technology-VIII (Solution)

Chapter 1 : Production of Crops and management

(A) Multiple Choice Questions :

Tick (✓) the correct answer :

1. (c) **2.** (c) **3.** (c) **4.** (a) **5.** (a) **6. (b)**

(B) Fill in the blanks with suitable words :

1. Agriculture **2.**Winter **3.** wheat, bajra **4.** vertical
5. nutrients **6.** position **7.** nitrogen

(C) Say wheather the following statements are True or False :

1. False **2.** True **3.** False **4.** True **5.** True **6.** True

(D) Match the Following :

1. Harvesting **2.** Honey bees **3.** Scattering seeds
4. Rainy season **5.** Cow, buffalo **6.** Silos

(E) Answer the following questions in very short :

1. In India there are two main seasons of crop are (i) Rabi Crops, (ii) Kharif Crops.

2. Kharif crops are grown in the rainy season from June to July and harvested in the month of September to November.

3. Traditional method and modern method are two modern method of irrigation.

4. Amaranthus, grass, wild oat, chenopodium etc, are some example of weeds.

5. The animals which damage crops are known as pests.

6. Pests can be destroyed by chemicals called pesticides. DDT, BHC (Benzene Hexachloride), malathion, diazinon etc. are some example of pesticides.

7. A large number of food items like milk, eggs, meat, fish and honey are obtained from the animals.Cows, goats and buffaloes are the milk giving animals and pigs, sheep, ducks, goats and chickens are the meat and egg giving animals.

(F) Answer the following questions in short :

1. The word "Agriculture" comes from the Latin word 'ager' meaning 'field' and the 'cultural' meaning 'care'. Thus Agriculture means growing of plants or rearing of animals for living organisms or human beings.

2. The word "Horticulture"comes from the Latin word 'Hortus' meaning 'garden' and 'cultura' meaning 'care'. Thus Horticulture means to deal with the growing and production of vegetables, fruits and ornamental plants. Vegetables and fruits are the most important items of our daily diet. These types of crops are grown in the small fields and orchards.

3. The series of of agriculture practice are :

(i) Preparation of Soil (ii) Selection and sowing of seeds
(iii) Adding manure and fertilizers (iv) Irrigation

(v) Weeding and crop protection (vi) Harvesting

(vii) Storage

4. After ploughing the field there may be big pieces of soil in the field which are known as crumbs. It is very necessary to break these crumbs. This step is completed by the planks for levelling the soil. Planks are made up of wood and iron and they help in levelling the field.

5. Before sowing the seeds, the selection of seeds is very important for the best crops. The farmers should select the only good quality, disease resistant and high yield seeds.

6. Winnowing is the process that the grains are to be separated from the chaff and hay with the help of blowing wind.

7. **Drip Method :** In this method of irrigation the water falls drop by drop at the position of the roots. This method help plants to get regular water supply and involves no wastage of water.

(G) Answer the following questions in long :

1. The various steps performed by the farmers with the help of some implements for growing crops are called the agriculture practices.

The common steps used by the farmers are follows :

(i) Preparation of Soil : Preparation of soil is the first step and it is most important for growing the crops. The preparation of soil include two steps : (i) ploughing and (ii) levelling.

(ii) Selection and sowing of seeds : Before sowing the seeds, the selection of seeds is very important for the best crops. The farmers should select the only good quality, disease resistant and high yield seeds.

(iii) Adding manure and fertilizers: Crop plants require nutrients for growth. Plants absorbed the nurtrients from the soil. To maintain the fertility of soil, manuring and fertilizer is very important.

(iv) Irrigation : Water is most important for the seeds to germinate. Irrigation is the process of watering crops in the field at different times.

(v) Weeding and crop protection :

Some uncultivated plants in a field that are grown along with the crop plants and are undesirable which are known as weeds. The removal of weeds from the crop plants in the field is called weeding.

The protection of crops is very important. Crops can be protected from stray animals by putting up a fence all around the field. Some commonly used pesticides are DDT, BHC (Benzene Hexachloride), malathion, diazinon etc.

(vi) Harvesting, Threshing and Winnowing : The process of cutting and collecting the matured crops in the field is called harvesting. After the harvesting, threshing is done in which the grains are separated from the harvested crops. It is completed by a machine known as thresher. After the threshing, the grains are to be separated from the chaff and hay. This is known as winnowing.

(**vii**) **Storage of Crops :** After completing all the processes the storage of crops is very most important. To save the grains or seeds are dried in the open sun. This reduces their moisture content. Then they are stored in gunny bags or bins.

2. Crop plants require nutrients for growth. The upper layer of soil is rich in various nutrients. Plants absorbed the nurtrients from the soil. To maintain the fertility of soil, manuring and fertilizer is very important. The natural fertilizers are obtained from plant and animal wastes while chemical fertilizers are produced in factories. When the crops are grown in the field, they absorb nutrients from the soil. This makes the soil infertile. To prevent this from happening, the farmers usually add fertilizers to the soil. They contain nutrients that are necessary for plant growth. Besides this, manures are also added to the soil. They are organic fertilizers that are rich in organic nutrients and contribute to the fertility of the soil.

3. Water is most important for the seeds to germinate. Irrigation is the process of watering crops in the field at different times. The plants absorbed the nutrients and minerals through the roots from the soil. The time and frequency of irrigation differ from crop to crop and soil to soil. Water protects the plant from frost and hot air currents.

4. The protection of crops is very important.The animals which damage crops are known as pests and these can be destroyed by chemicals called pesticides. Crops can be protected from stray animals by putting up a fence all around the field. Some commonly used pesticides are DDT, BHC (Benzene Hexachloride), malathion, diazinon etc. They are either sprayed by hand-operated machines or by the low flying aircraft. If the area to be covered is large.

5. After completing all the processes the storage of crops is very most important. Fresh crop produce contains a lot of moisture. If the grains or seeds are stored in this condition. They get spoilt or are attacked by Microbes. To save the grains or seeds are dried in the open sun. This reduces their moisture content. Then they are stored in gunny bags or bins. On a large quantity the grains are stored in silos and grainaries. Proper amount of the insects repellants are mixed with the grains to protect it while storing.

6. Nitrogen is an essential nutrient for all living organisms. Seventy eight percent nitrogen is present in our atmosphere but the living beings cannot utilize the nitrogen directly. The process of conversion of atmospheric nitrogen into compounds and making it available for plants is called the nitrogen fixation. Nitrogen fixing bacteria fix nitrogen into nitrogen rich compounds. These bacteria also help replace the nitrogen compound in the soil. The sequence in which nitrogen in the atmosphere is passed into the soil and released back into the atmosphere is called Nitrogen Cycle. Plants use the nitrogen compound to make their own food. The animals eat the plants when the plants and animals die, the nitrogen compound are returned to the soil and this process is repeated again and again. Thus the nitrogen cycle is completed.

(H) Define the following :

1. **Seed drill :** Seed drill is a very effective method. It is used for sowing the seeds. The seed drill sows the seeds in the proper distance and depth. A seed-drill consists of seed bowl at the top. The drill is attached to a plough. It may be pulled by bullocks or by a tractor. It is very easy and faster or also saves the times.

2. **Sowing of seed :** Sowing can be done by scattering seeds by hand itself in the field which is called broadcasting. But it is not an effective method. The sprinkling of seeds manually makes them prone to consumption by birds. This process does not ensure that the seeds are sown at correct depth and uniform spacing.
3. **Weedicides :** The weeds are destroyed without affecting the crops by the chemicals, metachlor, dalphon, 2, 4-D, 2, 4, 5-D etc. These chemicals are known as weedicides.
4. **Harvesting:** The process of cutting and collecting the matured crops in the field is called harvesting. The harvesting is done by the sickle and with the help of a machine called harvester.
5. **Animal Husbandry :** The rearing of animals on a large scale for food, shelter and care is known as animal husbandry. A number of food items like milk, eggs, meat, fish and honey are obtained from the animals.

(I) Give two example of each of the following :

1. Potato, Gram 2. Cow, Buffalow 3. Sheep , Chicken
4. Rice, Maize 5. Metachlor, Dalphon

(J) Look at the picture given below:

1. Drip method 2. Thresher machine 3. Spraying of weedicide
4. Harvesting with the help of sickle 5. Sprinkler method
6. Winnowing

(K) Discussion in group:

Do yourself

Chapter 2 : Micro-organisms

(A) Multiple Choice Questions :

Tick (✓) the correct answer :

1. (b) **2.** (b) **3.** (c) **4.** (a) **5**. (b) **6.** (c)

(B) Fill in the blanks with suitable words :

1. nutrients **2**. microscope **3.** Micro-organisms **4**. lactobacillus
5. leguminous plants **6.** dehydration **7.** sugar

(C) State the following statements are True or False :

1. False **2.** True **3.**True **4.**True **5.**True

(D) Match the Following :

1. Fungi **2.** Virus **3.** Bacteria **4.** Algae **5.** Protozoa

(E) Answer the following questions in very short :

1. Bacteria, fungi, virus, protozoa and algae are five types of microorganisms .
2. The process of curd formation from milk is called curding of milk.
3. Lactobacillus bacteria is used in curding of milk.
4. Bacteriophage, influenza are the two examples of viruses.
5. Algae are the found in the lakes and pond.
6. Rhizopus and Penicillium are the example of fungi.

(F) Answer the following question in short :

1. The 'Micro' meaning 'small' and 'bios' meaning 'life'. The living organims which cannot be seen by the naked eyes are called micro-organisms or microbes.

2. Microscope is an instrument that makes the small things look bigger that is, it magnifies the objects. Micro-organisms can be seen only with the help of microscope.
3. Vaccines are the substance used to produce immunity to disease in the human body. Immunity is the ability of the body to resist or fight from a disease.
4. The process of conversion of sugar in the absence of oxygen into an acid or an alcohol by the action of yeast is known as fermentation.
5. Micro-organisms are very useful to humans in many different ways. Micro-organisms which are useful for us are called friendly micro-organisms. The uses of micro-organisms can be divided into commercial, agricultural, medicinal and environmental.
6. Dehydeation is an effective method of food preservation.The process of removal of moisture (water) from fruits and vegetables are known as dehydrations.
7. This process was discovered by French scientist Louis Pasteur. In this process the milk is preserved by this method. Milk is heated at 65–75°C for about 15 minutes and then cooled down quickly to prevent the remaining bacteria from growing. Milk is boiled before consumption.

(G) Answer the following question in long :

1. Microbes can be divided into five categories : bacteria, fungi, protozoa, algae and viruses.

   Bacteria: Bacteria are the oldest organisms. They are the most common micro-organism that are found everywhere. Bacteria are unicellular and are found in different shapes like rod shaped (bacilli), spherical shaped (cocci), curved shaped (commas) and spiral shaped (spirilla).

   Fungi : Fungi are the unicellular like yeast and some fungi are multicellular like mould. Fungi are commonly called the bread mould. Fungi belong to a group of micro-organisms and its are the eukaryotic micro-organisms that cannot make their own food. They depend only on dead and decaying matter for nutrition. For example : Rhizopus and Penicillium.

   Protozoa : Protozoa are the single celled micro-organism. Protozoa are the heterotrops in nutrients they can not prepare their own food. They move one place to another place and capture the food. For example : amoeba, paramecium, euglena and plasmodium.

   Algae : Algae are the unicellular and multicellular micro-organisms. They are found in the lakes and ponds. There are groups of simple plants and they possess chlorophyll and can make their own food. For example : Chlamydomonas, chlorella and diatoms etc.

   Viruse : Virus are the smallest of all micro-organisms. These are found almost everywhere. This group of micro-organisms is too small in size. Viruses can not be seen without microscopes.Viruses are different from other microbes. They can live inside plants, animals and bacteria as well, while outsides any living body, they show characteristics of a non-living thing. Bacteriophage, influenza are the examples of viruses.

2. **The commercial uses of Micro-organisms :**
   (i) **Making Curd or Cheese and Bread :** The curd or cheese is made of milk. When you add the small amount of curd into the warm milk and keep for few

hours, the milk is converted into the curd. It is possible because the milk contains a sugar called lactose and the curd contains the certain bacterium Lactobacillus which helps in the formation of curd. Lactobacillus converts the lactose in the milk into the lactic acid. The process of curd formation from milk is called curding of milk.

(ii) **Bread :** Yeast is a single-celled fungus. Yeast plays a major role in the preparation of bread. Yeast is the beneficial fungus. Yeast is also used to improve the flavour of certain types of cheese. Yeast reproduces rapidly and produces CO2 during respiration. Due to production of $CO_2$the dough rises and the volume increases. When the bread is baked, carbon dioxide is released living behind pores that makes the bread porous and spongy.

3. When the human body is invaded by disease causing microbes, it starts producing the substance called antibodies. Antibodies surround the invader microbe and then eat it. Vaccines are the substance used to produce immunity to disease in the human body. Immunity is the ability of the body to resist or fight from a disease. The body fights and kills these microbes by producing suitable antibodies. These antibodies remain in the body and protect it from disease causing microbes. Vaccines have been developed against the polio, cholera, typhoid, small pox, whooping cough etc. Some microbes are also used as food supplements. For example, chlorella lives inside the human body and helps in the digestion of food.

4. **Storage and food Preservation :** Food preservation includes preventing the growth of bacteria, fungi and yeast or other micro-organisms. Micro-organisms grow easily on food, cloths, paper or many other things and moist atmosphere. The process by which spoilage of perishable foods is prevented using chemical or physical method is called Food preservation.Boiling, dehydration, Smoking, Pasteurization, canning, salting and sugar, Freezing or Refrigeration and chemical method etc are the most common methods used for food preservation.

5. **Food poisoning :** If the food is not stored properly some microbes spoil the food and produce the poisonous substances which, if consumed, lead to illness. Bacteria and the fungi multiply fast in warm and humid conditions by digesting the nutrients of the food and spoil the food. The spoiled food can be identified by its unpleasant smell, bad taste and changed colour. The symptoms of poisoning of food are fever, vomiting, diarrhoea and headache etc.

(H) Write one word for the following:

1. Canning 2. Cholera 3. virus 4. Microscope 5. Anthrax

(I) Definethe following

1. **Pasteurization :** Pasteurization process was discovered by French scientist Louis Pasteur. In this process the milk is preserved by this method. Milk is heated at 65–75°C for about 15 minutes and then cooled down quickly to prevent the remaining bacteria from growing. Milk is boiled before consumption.

2. **Food preservation :** The process by which spoilage of perishable foods is prevented using chemical or physical method is called food preservation.

3. **Food Poisoning :** If the food is not stored properly some microbes spoil the food and produce the poisonous substances which, if consumed, lead to illness. Bacteria and

the fungi multiply fast in warm and humid conditions by digesting the nutrients of the food and spoil the food.

4. **Protozoa:** Protozoa are the single celled micro-organism. Protozoa are the heterotrops in nutrients they can not prepare their own food. They move one place to another place and capture the food. For example : amoeba, paramecium, euglena and plasmodium.

(J) Discussion in Group

Do yourself

Chapter 3 : Synthetic Fibres and Plastic

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (a) **3.** (b) **4.** (a) **5.** (c) **6.**(a)

(B) Fill in the blanks with suitable words :

1. polymers **2.** artificial **3.** strong, durable **4.** polyester
5. thermosetting plastic **6.** poor **7.** bakelite

(C) State the following statements are True or False :

1. True **2.** True **3.** False **4.** True **5.** False **6.** True

(D) Match the following :

1. Non-biodegradable **2.** Bakelite **3.** Used to make tiles **4.** Silk, Wool
5. Rayon **6.** Mixture of terrylene

(E) Answer the following question in very short :

1. Cotton, rayon, nylon, polyester, acrlic, polythene, spandex, polyvinyl chloride melemine and bakelite are some example of synthetic fibre.
2. Nylon fibres absorbs very little amount of water and do not wrinkle and long elastic.
3. The full name of PVC is Polyvinyl chloride.
4. There are two types of plastic. Thermoplastics and Thermosetting plastic.
5. Three synthetic fibre are Rayon, Nylon, acrylic and three natural fibre silk, wool, jute.

(F) Answer the following question in short :

1. Rayon is synthetic fibre. It has a silky texture. Rayon is also known as artificial silk. Some artificial fibres like rayon are obtained from natural material like cellulose which is obtained from the wood pulp. Rayon carpet is the example of rayon.
2. The three characteristics of synthetic fibre are (i) Synthetic fibre are thin and long material.(ii) Synthetic fibre are made up of small units are called monomers. (iii) Rayon, nylon, polyester and acrylic are some synthetic fibre.
3. The advantages of synthetic fibre are :
   - **(i)** The production of synthetic fibre is independent of agricultural crops and animals farming.
   - **(ii)** They are quick drying and need very little or no ironing.
   - **(iii)** Synthetic fibre have very fine texture. They are very soft and smooth.
   - **(iv)** The fibre are not affexcred by the action of chemicals, oisture and the bacteria easily.

4. PVC is also thermoplastic which is the polymer of vinyl chloride. It is not flexible. Polyviyl chloridre is used to make the plastic dolls, electric wire, waterpipes, sanitaey fitting and hand bags etc.

5. Melamine is also a themosetting polymer. This type of material is more resistance to heat than any other plastic. It is hard and high polish polymer. Melamine is used for making the floor tiles, unbreakable dinner wares and decorative objects.

(G) Answer the following question in long :

1. Every thing almost are around us is made of one or the other kind of plastic. plastic is one of the most commonly used material in now- a- days. Like synthetic fibre, plastic is also polymer. Plastic are the man mase materials. A synthetic material which can be easily moulded into any desired shape on heating process is called a plastic. Chair, comb, buckets, tables, water bottles, electric switches and any many other things. plastic are two types (i) Thermoplastics(ii) Thermosetting plastics

2. **Properties and uses :** Polyester fibres do not get wrinkled. It is strong , light weight and softer then the nylon fibre. Polyester fibres absorbs very little water and get dry very quickly and do not damage by the sunlight or change of weather. Polyester fibre is used in textiles in making clothes like trousers, shirts and other dress materials. polyester fabrics used for convevor belts, safety belts, coated fabrics and plastic suppoering with high energy absoption.

3. **Disadvantages of synthetic fibre :**
   (i) Synthetic fibers are inflammable. They catch fire easily. These fibers will melt on heating and stick to the skin causing severe burns.
   (ii) Synthetic fibers are non-biodegradable. Therefore, they cause soil pollution.
   (iii) The texture of synthetic fibre is very fine with hardly any pores. Hence, clothes made of synthetic fibers worn during summer makes us feel, uncomfortable because it prevents the sweat from coming out.
   (iv) In dry weather, the fabrics made from synthetic fibers tend to develop static electricity. The sparks due to static electricity can be seen at night. These sparks may cause some skin problems in certain people.

4. Plastics are non-biodegradable materials. The material which do not decompose to harmless materials through the action of air, water and bacteria over a period of time are called the non-biodegradable materials. For examples : plastic, glass, metals etc.

   The materials which get decomposed to harmless materials through the natural process like as bacteria, air and water, action over a period are called biodegradable materals. For examples : paper, leaves, leftover food, etc. Burning of the plastic is not good for environment because burning of plastic is release toxic gases which caused air pollution and causes health hazards and most of the plastics wastes is buried in the soil, it remains there for a long time and does not allow to rain water to seep through the ground. Plants growing in that area do not get sufficient supply of water and their growth is affected.

5. **Measures for saving the environment are : (i)**. The plastic bags can be replaced by using the jute, cloth or paper bags which are biodegradable and reusable. As the result, the uses of plastic bags will be reduced.
   (ii) The process of recycling of the plastic material included collecting, sorting, chopping, melting and the remoulded. It works there is strong community co-orperation.

(iii) Do not throw the plastics things into the water because the plastics materials pollute the water and the water can not used by the living organism.

(H) Write three uses of the following :

1. Carpet, bandage, fibre
2. Socks, Swimwear, Track pants
3. Textile, conveyor belts, shirts
4. Electic switch, handles of utensils
5. Socks, sweaters, gloves
6. PVC pipes, tapes, decorative objects
7. Bags, sheets, buckets
8. Floor tiles, decorative objects, unbreakable dinner sets

(I) Differetiate between the following :

1.

S. No	Rayon	Nylon
1.	Rayon is a synthetic fibre. It has a silky texture.	Nylon fibers are highly are very strong, durable, elastic and light.
2.	Rayon fibres have shine like silk and can be woven into fabric.	Nylon fibers are absorb very little amount of water and do not wrinkle and long elastic.
3.	Rayon is very cheap compared to silk.	It hardly gets damaged even after being used continuously.

2.

S. No	Fibres	Plastics
1.	Synthetic fibers are stronger than the natural fibers and are the abrasion resistant. This type of fibre are east to maintain.	Plastic is a material consisting of any of a wide range of synthetic or semi-synthetic organic compounds.
2.	Synthetic fibers are does not get wet. So the fabrics are made from synthetic fibers dry up quickly.	Plastic materials like polyvinyl chloride (PVC) and polyethylene are used to make flooring less prone to wear and tear. It also decreases the sound pollution level and can be cleaned easily.
3.	Synthetic fibers are does not get wet. So the fabrics are made from synthetic fibers dry up quickly.	Polythene is made up of long chains of ethene (C2H4) molecules are joined each to each.

3.

S. No	Natural Fibre	Synthetic Fibres
1.	All of the natural fibres comes from nature.	Synthetic fibres are completely man made.
2.	No need for chemical solution for yarn production.	Synthetic textiles products is not as comfortable as natural fibres.
3.	Its grows with its natural colour.	It is easy to chang in fibre structure.

(J) Discussion in Group :
Do yourself

Chapter : 4 Materials : metals and Non-metals

(A) Multiple Choice Question (MCQ) :
Tick (✓) the correct answer :
1. (c) **2.** (b) **3.** (b) **4.** (c) **5.** (c)

(B) Fill in the blanks with suitable words :
1. thermometer **2.** conductors **3.** Bromine **4.** Bromine **5.** carbondioxide

(C) State the following statements are True or False :
1. False **2.** False **3.** True **4.** True **5.** True

(D) Match the following :
1. Metalloids **2.** Jewellary **3.** Non-metal **4.** Copper

(E) Answer the following question in very short :

1. Iron, copper, gold, zinc, lead, aluminium are some example of metals.

2. Graphite, sulphur, diamond, bromine are some example of non-metals.

3. Graphite non metals is a good conductor of electricity.

4. (i) Metals like iron is used as steel in construction of buildings and making machines.
(ii) Gold, silver and platinum are the metals used to make jewellery.

5. (i) Chlorine is used as disinfectant for water purification.
(ii) Oxygen is used for breathing by the living organisms.

(F) Answer the following question in short :

1. Metals are the materials that are strong, hard, shiny and durable. For example : Iron, copper, gold, aluminium, zinc, lead etc. are some common metals. Metals are the good conductors of heat and electric current.

2. Non-metals are the materials that do not have the properties of metals i.e. malleability, lustre, sonority etc. For example : graphite, sulphur, oxygen, bromine, diamond etc. Diamond is the hardest naturally occurring material. Non-metals are the bad conductors of heat and electric current.

3. The metalloids are a unique group of elements. The elements which have the properties of both metals and non-metals are called metalloids. They are also known as semi-metals. For example : Boron, silicon, germanium and arsenic etc.

4. **Physical State :** All the metals are solids at the room temperature. The only exception is mercury which is liquid at room temperature. All the metals have a different property of physical state. For examples : Iron, copper, zinc, aluminium etc.

5. Electroplating is the process that metals like iron are coated with a layer of another metal such as tin and zinc by an electrochemical cell.

6. **Sonority of metals :** Metals are the sonorous. Most metals produce a ringing sound when struck. The metals that produce a sound on striking a hard surface are said to be sonorous. For example : Iron bells.

Sonority of non- metals : Non-metals are not sonorous. Non-metals do not produce a ringing sound when hit with another object. For example, a rubber pad does not make sound.

(G) Answer the following question in long :

1. The physical proprties of metals are :

(i) Physical State : All the metals are solids at the room temperature. The only exception is mercury which is liquid at room temperature. For examples : Iron, copper, zinc, aluminium etc.

(ii) Lustrous nature : All the metals have lustrous nature. Metals shine in their pure state. This property of shining is called metallic lustre. For example : Gold, a sheet of aluminium foil.

(iii) Ductility : Ductility is another important characteristic property of metals. Most of the metals are ductile. But all the metals are not equally ductile. Some metals are more ductile than the others. Gold is the most ductile metal.

(iv) Density : Metals have high densities and, therefore, tend to sink in water. Metals, except sodium and potassium have high densities. Sodium and potassium have much lower densities. For example, tin and lead sink in water because of their high densities.

(v) Malleability : The metals are the malleable. It is the virtue by which substance can be hammered into making thin sheets. Silver can be beaten to very thin leaves which are used as silver varak.

(vi) Sonority or Sonorousness: Metals are the sonorous. Most metals produce a ringing sound when struck. The metals that produce a sound on striking a hard surface are said to be sonorous. For example : Iron bells.

(vii) Conduction of electricity : Metals allow current to pass through them. All metals are the good conductors of electricity. For example : The wires of copper and aluminium.

(viii) Conduction of heat : Metals are good conductors of heat because the metals allow heat to pass through them. Silver metal is best conductor of heat. It has the highest thermal conductivity. Copper and aluminium metals are also very good conductors of heat.

2. Chemical properties of non metals:

(i) **Reaction with Oxygen**

1. Non-metals react with oxygen to form non-metallic oxides.

Non-Metal + Oxygen → Non-Metallic oxide

2. Carbon burns in oxygen to form carbon dioxide.

$C + O_2 \rightarrow CO2$

(ii) **Reaction with Water**

Non-metals do not react with water. Chlorine dissolves in water to form an acidic solution. When this solution is heated, it forms hydrochloric acid and oxygen.

$2Cl_2 + 2H_2O \rightarrow 4HCl + O_2$

(iii) **Reaction with Acids and Bases**

Non-metals do not react with dilute acids. They react with concentrated acids to form complex products and non-metals react with bases are complex. For example : Sulphur reacts with concentrated nitric sulphuric acid.

$S + 6HNO_3(Conc.) \rightarrow H_2 + 6NO_2 + 2H_2O$

3. Corrosion of metals is a natural process. Corrosion is defined as the slow eating away of metals layer by layer due to action of oxygen, moisture and other gases present in the atmosphere. For example - When iron is exposed to air and moisture it combines with water and oxygen to form rust which is an oxide compound of iron. The outer layer of the iron gets covered with a brown coloured layer of rust which keeps falling off. The rust continues to form till the iron is used up. Both oxygen and water are necessary for rusting.

4. Prevention of corrosion is most important of the metals . Some of the ways of prevention are as follows :

(i) By Oiling and Greasing : The iron metals are coated with grease and oil to prevent the contact of moist air.

(ii) By Coating with Paint : The iron bridges, bodies of vehicles, railway coaches and many other things are coated with paint. A thin layer of paint prevents the contact of air moisture.

(iii) By Galvanizing : Iron metals are coated with a layer of zinc which is more resistant to corrosion than the paint.

(iv) By Electroplating : Iron metals are coated with a layer of another metal such as tin and zinc by an electrochemical cell.

(v) By Tinning and Alloying : The metals of copper and brass vessels are coated with tin to prevent corrosion due to moist air and some metals when alloyed with other metals become more resistant to corrosion. For example : the stainless steel is an alloy of iron with nickel and chromium which does not rust easily.

5. The physical properties of non metals are :

(i) Physical State : Non-metals have been found to exist in all the three states solid, liquid and gas. All non-metals are solids or gases at room temperature. Bromine is an exception. It is liquid at room temperature.

(ii) Lustrous nature : Non-metals are non-lustrous. They do not shine or glow. But graphite has some lustre.

(ii) Ductility : Non-metals are not ductile. They cannot be drawn into wires.

(iv) Density : Non-metals usually have low densities and are soft. Diamond is the hardest natural material.

(v) Malleability : Non-metals do not show the property of malleability. They break into pieces when hammered.

(vi) Sonority or Sonorousness: Non-metals are not sonorous. Non-metals do not produce a ringing sound when hit with another object. For example, a rubber pad does not make sound.

(vii) Conduction of electricity : Non-metals are not good conductors of electricity like metals. The electric current does not pass through non-metals. For example, the plastic tapes do not conduct electricity.

(viii) Conduction of heat : Non metals are not good conductor of heat. The only exception to this is graphite which is a good conductor and is used in making the electrodes in batteries and electrochemical cells.

H. Complete the following equation :

1. NaO_2 2. $Mg(OH)_2$ 3. $2HCl + O\uparrow$ 4. $Zno + H_2$

I. Define the following :

1. **Oiling and Greasing :** The iron metals are coated with grease and oil to prevent the contact of moist and air.
2. **Rusting :** When iron is exposed to air and moisture it combines with water and oxygen to form rust which is an oxide compound of iron.The outer layer of the iron gets covered with a brown coloured layer of rust which keeps falling off. The rust continues to form till the iron is used up. Both oxygen and water are necessary for rusting.
3. **Sonority or Sonorousness:** Metals are the sonorous. Most metals produce a ringing sound when struck. The metals that produce a sound on striking a hard surface are said to be sonorous. For example : Iron bells.
4. **White Phosphorus :** White phosphorus is an exception. It rapidly burns in air at room temperature to form its oxides. Therefore it is stored under water.

$$P_4 + 5O_2 \rightarrow 2P_2O_5$$

5. **Ductility :** The property which allows the metals to be drawn into thin wires is called ductile. Ductility is another important characteristic property of metals.
6. **Tinning :** Tinning is the process that the metals of copper and brass vessels are coated with tin to prevent corrosion due to moist air and some metals when alloyed with other metals become more resistant to corrosion. For example : the stainless steel is an alloy of iron with nickel and chromium which does not rust easily.

J. Discussion in group:
Do yourself

Chapter 5 : Coal and Petroleum

(A) Multiple Choice Question (MCQ) :
Tick (✓) the correct answer :
1.(b) **2.**(c) **3.**(c) **4.**(a) **5.**(a) **6.** (a)

(B) Fill in the blanks with suitable words :
1. exhaustible **2.** conversion **3.** coke **4.** moth **5.** hundred

(C) State the following statements are True or False :
1. True **2.** False **3.** True **4.** True **5.** True **6.** True

(D) Match the following :
1. Petroleum **2.** Coal **3.** Black gold **4.** Petroleum gas **5.** Natural gas

(E) Answer the following question in very short :

1. There are two types of natural resources are Exhaustible Natural resources and Inexhaustible resources.
2. Petroleum, coal, plants are the example of exhaustible natuaral resources and Air, water, sunlight are the example of inexhaustible resources.
3. Coal, petroleum and natural gas are the example fossil fuels.
4. Coal are found in state of Odisha, West Bengal, Madhya Pradesh, Bihar, and Jharkhand in India.
5. Petroleum gas, kerosene, petrol, diesel, lubricating oil, paraffin wax and biyuman are the various products which we obtained from petroleum.

(F) Answer the following question in short :

1. Exhaustible natural resources are present in limited amount in nature and do not reproduce themselves. They are completely being used by the human beings. They are also known as non-renewable resources. For example, petroleum, coal, plants etc.
2. Inexahustible natural resources are present in unlimited amount in nature and they are not yet used completely by the human. It is also known renewable resources. For example : Air, water and sunlight etc.
3. Fossil fuels are fuels obtained from the remains of decayed plants and animals preserved in the earth's crust. Fossil fuels that are being used today were formed millions of years ago. We should study to know more details about the fossil fuels.
4. Coal gas is also one of the by-products in the processing of coke. It is obtained by the destructive distillation of coal. Coal gas is the mixture of hydrogen, methane and the carbon monoxide. Coal gas is used as fuel mainly for heating in many industries.
5. **Coke :** Coke is almost pure form of carbon. It is porous and a very important substance obtained from coal. It is obtained from destructive distillation of a particular type of coal. It is used in the manufacturing of steel and in the extraction of many types of metals.

Petrol : Petrol is also known as a liquid gold. When the petrol is the contact of air it is flown up. Petrol is mainly used as fuel in automobiles and it is also used for dry cleaning of delicate fabrics and clothes.

(G) Answer the following question in long :

1. When the trees and the plants lost their leaves and died, their leaves and the dead material got buried into the layers of rotting vegetation. Pressure from the overhead layers pushed these layers together to form a layer of soft material called peat. Sometimes mud and sand were washed over the layers of the peat pressing them even further and tighter together. This made a soft brown coal or lignite, which had the moisture content and the carbon of 25-35%. It is softest type of coal.The movement inside the earth's crust helped to turn that lignite into hard black coal that is known as bituminous coal. It contains the carbon percentage of 60-80%. It has the lesser moisture and more carbon content. Anthracite is the hardest type of coal. Anthracite contains the highest carbon percentage of 92-98%. Carbonization is the slow process of conversion of dead vegetation into coal. Coal is primarily made up of carbon, hydrogen, oxygen, nitrogen and some amount of sulphur.
2. The formation of petroleum or crude oil is same as the formation of coal. Petroleum was formed due to decomposition of the organisms living in oceans and seas millions of years ago under the high temperature, high pressure and in the absence of the air. When these plants and animals died they got buried in sand at the bottom of the sea. Over millions of years, they got covered with more and more sand and went deeper into the earth's crust. Under high pressure and temperature their bodies decomposed to form petroleum and natural gas.
3. **The uses of coal and petroleum are :** Coal is used in different varieties for different purposes :
   (i) Coal is used as a domestic fuel.
   (ii) Coal is the largest source of fuel used to generate the electricity.
   (iii) Coal is used to make steam for heating.

(iv) Coal is used in manufacturing industries for heat and power applications.

(v) Coal is used to obtain coke and coal gas which are excellent fuels.

1. LPG is used for domestic fuel as cylinders in our homes.

2. Kerosene is used as domestic fuel like LPG.

3. Petrol is mainly used as fuel in automobiles.

4. Diesel is used in trucks,buses, reailway engines, water pumps and also used in genrators.

5. Paraffin wax petroleum is used for making candles, shoe, polishes, cosmetic and vaseline.

4. Natural gas is a very important fuel. It is a fossil fuel formed by decomposition of very small aquatic plants and animals. It is obtained along with petroleum from oil wells. It is a mixture of methane, higher alkanes, carbon dioxide, etc. Natural gas is found in deep underground rock formation as fossil fuel. It is one of the most important fuels. It is easy to transport through pipes and can be compressed and stored under high pressure. It is also known as compressed natural gas (CNG). Natural gas mainly consists of methane. Natural gas can be used directly for burning as fuel. It is a clean fuel as it creates least pollution. It gives a lot of heat on combustion. Natural gas is used as starting material in many industries, such as fertilizer and chemical.In India natural gas reserves are found in Tripura, Rajasthan, Maharashtra, and Krishna and Godavari delta.

5. The disadvantages of fossil fuels :

(i) Pollution is a major disadvantage of fossil fuels. This is because they give off carbon dioxide when burned thereby causing a greenhouse effect. This is also the main contributory factor to the global warming experienced by the earth today.

(ii) Burning of these fuels causes air pollution. It is also resulting in global warming, which is a result of increased levels of carbon dioxide gas in the atmosphere.

(iii) Coal also produces a large amount of carbon dioxide when burned compared to burning oil or gas. Additionally, it gives off sulphur dioxide, a kind of gas that creates acid rain.

(iv) The oxides of sulphur and nitrogen are present in polluted air, mix with water vapour to form clouds and fall down as acid rain, that damages building, plants, soil etc.

(v) Use of crude oil causes pollution and poses environmental hazards such as oil spills when oil tankers, for instance, experience leaks or drown deep under the sea. Crude oil contains toxic chemicals which cause air pollutants when combusted.

(vi) Partial combustion of coal and petroleum fuels produces carbon monoxide, which is a poisonous gas. This is the reason one should not stay in a closed room where coal is burning.

6. Natural resources are very important for us. Non-renewable natural resources are limited. Their conservation is very important for future. PCRA (Petroleum Conservation Reserach Association) has given the following suggestions to save petrol for future generation :

(i) Drive at constant and moderate speed.

(ii) Get your vehicle serviced regularly.

(iii) Switch off the engine at traffic lights or when you have to wait for some one.

(iv) Use public transport and bicycles for short distances.

(v) Maintain correct tyre pressure.

(vi) Utilize renewable energy sources as much as possible. Encourage use of solar cooker, pump etc.

7. We must develop energy saving methods to avoid wastage of energy. We should remember "energy saved is energy produced."

H. Define the following :

1. Coke : Coke is almost pure form of carbon. It is porous and a very important substance obtained from coal. Coke has high percentage of carbon and very low percentage of impurities. It is obtained from destructive distillation of a particular type of coal. Coke is used as fuel, as reducing agent in the smelting of iron ore in blast furnace. It is used in the manufacturing of steel and in the extraction of many types of metals.

2. Coal Tar : Coal tar is obtained as one of the by-products while obtaining the coke or coal gas. Coal tar is a highly viscous liquid and brown-black in colour. It is a variable mixture of many substances. It is obtained by the process of destructive distillation of coal. It is a mixture of 200 different substances. Coal tar is used in the manufacturing of many products; such as synthetic dyes, drugs, explosives, perfumes, plastics, roofing material, etc. as starting material.

3. Petrol : Petrol is also known as a liquid gold. In pterol, the carbon atoms are in number of 5 to 10, and boiling range of petrol is 40°C to 170°C. When the petrol is the contact of air it is flown up. Petrol is mainly used as fuel in automobiles and it is also used for dry cleaning of delicate fabrics and clothes.

4. Lubricatin Oil : Lubricating oil is a thick, heavy liquid. Carbon atoms are found in lubricant oil in number of 17 to 20. It is used for smooth running of machines and vehicles.

5. Paraffin Wax: 20 to 30 carbon atoms are found in paraffin wax. This type of petroleum is used for making candles, shoe polishes, cosmetics and vaseline.

6. Fractional distillation of oil : Fractional distillation is the separation of a mixture into its component parts, or fractions, separating chemical compounds by their boiling point by heating them to a temperature at which one or more fractions of the compound will vaporize.

I. Tick the odd- one out giving reason :

(i) Asphalt : Asphalt also known as bitumen is a sticky, black and highly viscous liquid or semi-solid form of petroleum.

(ii) Natural Gas : Natural gas is a fossil fuel formed by decomposition of very small aquatic plants and animals. It is obtained along with petroleum from oil wells.

(iii) Plastics : Plastic is a man made resources.

(iv) Wood : Wood is obtained from forest. It is a natural resource.

J. Write two example for each of the following :

1. Coal, Petrol 2. Air, Water, 3. Petroleum, Coal

K. Discussion in group :

Do yourself

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (c) **2.** (a) **3.** (b) **4.** (a) **5.** (b)

(B) Fill in the blanks with suitable words :

1. charcoal **2.** non-combutible **3.** oxygen **4.** ignition **5.** stored
6. water **7.** blue

(C) State the following statements are True or False :

1. True **2.** True **3.** True **4.** False **5.** True **6.** True

(D) Match the following :

1. Bright white light **2.** Fire extinguisher **3.** glass **4.** Kerosene
5. Explosive combustion **6.** Gaseous fuel

(E) Answer the following question in very short :

1. Oxygen is the supporter of combustion.

2. There are four types of combustion are (i) Rapid combustion (ii) Spontaneous combustion (iii) Explosion Combustion (iv) Slow Combustion.

3. There are two types of substance are (i) Combustible (ii) Non- Combustible.

4. The innermost zone of candle is black in colour and dark zone of a candle. It contains hot wax vapours and it is the coldest part of the flame.

5. Natural gas, Bio gas and Petroleum gas are the example of gaseous fuels.

(F) Answer the following question in short :

1. The Process of giving off heat by a substance after reaction with oxygen is called combustion. In the process of combustion, light is also given off along with heat. Combustion is a chemical process. Combustion is the process in which the substance burns in the presence of air (oxygen) to give heat and light. For example: Charcoal burns in air to give carbon dioxide and heat.

2. The substances which burn in the presence of oxygen or air are called combustible substances. Combustible substances are also known as fuels. For example : wood, charcoal, LPG, kerosene, petrol, diesel, etc.

3. The substance which helps for the combustion of a substance is called supporter of combustion. Oxygen is considered to be supporter of combustion. If the supply of supporter of combustion is cut off, the combustion of substance also stops.

4. Substances with ignition temperature below room temperature start burning on exposure to air. The combustion which is produced without application of external source of heat is called spontaneous combustion.

5. The heat given out by a fuel is measured in terms of calorific value of the fuel. The amount of heat produced when one unit mass of a fuel is completely burnt in air or oxygen is called its calorific value. The unit of calorific value is kilojoule per gram (kJ/g).

6. When the water is thrown over the burning of substances, its temperature drops below its ignition temperature. Water cannot be used to extinguish fire caused by burning of oil, petroleum, etc. because being heavier than them, it sinks down and the oil keeps burning on top. Water should not be used to extinguish fire caused by short

circuit or any other electrical disruption. This is because it conducts electricity and can give shock to the person who is fighting against fire.

(G) Answer the following question in long :

1. Any combustible substance does not catch fire until it is heated to a certain minimum temperature. Ignition temperature is defined as the minimum temperature at which a substance starts burning and catch fire. The ignition temperature of petrol is about 246ºC. This means, if the petrol is heated to this temperature, it will burning start at 218 – 248°C. Ignition temperature of petrol is lower than that of kerosene.

2. All the gaseous combustible substances burn with a flame. A flame is the shining zone in which a combustible gaseous material undergoes combustion producing heat and light. Temperature of the flame of different fuels is also different. All materials do not burn with a flame. The flame produced by burning LPG is blue. The flame produced by kerosene when burnt in a lamp is yellow and smoky, but when burnt in a stove, the flame is blue and smokeless. A flame can be classified into two types viz. luminous flame and non-luminous flame.

3. The earliest surviving candles are originated in China around 200 B.C. Candles are made from paraffin wax. Paraffin wax is obtained from the residue, left during the fractional distillation of crude oil. It is a petroleum product and a mixture of higher hydrocarbons. Paraffin wax vaporises on heating. A candle flame is divided into the following three zones :

(i) The innermost zone : It is black in colour and dark zone of a candle. It contains hot wax vapours and it is the coldest part of the flame.

(ii) The middle zone : The middle zone is moderately hot and is yellowish in colour. This is because of partial combustion. Some unburnt carbon particles present in the zone become red hot and impart yellow colour to the flame. This region is moderately hot. This zone is also known as luminous zone of incomplete combustion.

(iii) The outer most zone : The outermost zone of the flame is blue in colour and it is the hottest part. This is because of complete combustion. The wax burns here completely and produces carbon dioxide, water vapour and heat. This is also known as non-luminous zone or zone of complete combustion.

4. The substances that burn to produce heat and light are called fuels. On the basis of the physical state they are classified into three types : solid, liquid and gaseous fuels.

(i) Solid Fuels : Solid fuels are combustible substances which are solid at room temperature. Solid fuels mainly contain carbon both as free and combined carbon. For example, wood, charcoal, coal, coke, cow dung cake etc. are some solid fuels.

(ii) Liquid Fuels : Liquid fuels are the fuels that exist as liquid at room temperature. For example, kerosene, petrol, diesel, fuel, oil, alcohol, benzene etc. Petrol, diesel and kerosene are mixtures of hydro-carbons.

(iii) Gaseous Fuels : Gaseous fuels are combustible gases or mixtures of combustible gases. For example : The fuels like natural gas, biogas and petroleum gas which exist in gaseous state at room temperature.

5. The disadvantages of burning fuels are :

(i) Burning of fossil fuels produces a lot of carbon dioxide which is a green house gas. As the percentage of carbon dioxide increases in air it causes global warming by increasing the average temperature of the earth. This is leading to unpredictable weather patterns, melting of glaciers and rising of sea levels.

(ii) Incomplete combustion of carbon containing fuels like petrol, kerosene and diesel produces carbon monoxide. It is a poisonous gas. If a person is exposed to carbon monoxide for a long time, it may prove fatal and he may even die. That's why it is dangerous to burn coal in a closed room.

(iii) Burning of petroleum releases lead into the air which is a very harmful pollutant. For this reason, unleaded petrol should be used in automobiles.

(iv) For generating electricity from water a large number of dams are constructed. This involves massive deforestation and disturbance to the local habitats.

H. Define the following :

1. **Rapid combustion :** When we light a candle, a lamp or a gas stove they continue to burn as long as the fuel is available. The combustion in which a large amount of heat is produced within a very short time is called rapid combustion.
2. **Non-Combustible substance:** The substances which do not burn are called non-combustible substances. For example sand, water, glass etc. are the non-combustible substances.
3. **Efficiency of fuels:** The heat given out by a fuel is measured in terms of calorific value of the fuel. The amount of heat produced when one unit mass of a fuel is completely burnt in air or oxygen is called its calorific value. The unit of calorific value is kilojoule per gram (kJ/g). For example, calorific value of methane is 55 kJ/g. This means when one gram of methane burns completely it produces 55 kJ energy.
4. **Contolling of fuels:** Fuels is very useful for us but contolling of fuels is very important because when it caught fire, can cause a lot a damage to life and property.
5. **Foamite Fire Extinguisher :** Sand can also be used to extinguish small fire by forming a blanket over the fire and making deficient in oxygen.

I. Write two examples for the following :

(1) Kerosene , Petrol (2) Coal, Coke (3) Natural gas, Biogas

(4) LPG, Diesal (5) Sand , water

J. Discussion in group :

Do yourself

K. Activity

Do yourself

Chapter 7 : Conservation of Plants and the Animals

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (c) **3.** (a) **4.** (a)

(B) Fill in the blanks with suitable words :

1. 1973 **2.** diversity **3.** characteristics **4.** twelve **5.** flora
6. forest **7.** reforestation

(C) State the following statements are True or False :

1. False **2.** False **3.** True **4.** False **5.** True **6.** True

(D) Match the following :

1. Endangered species **2.** Extinct Species **3.** Plants in a region
4. Soli erosion **5.** Habitat protection

(E) Answer the following question in very short :

1. Desert national park, Gir natioanl Park, Kanha national park.

2. International Union for Conservation of Natureid the full form of IUCN.

3. We obtained fruits, wood, pulp, rubber, etc from the plants.

4. The different types of plants belonging to a certain area, are known as flora. For example, silver, sal, teak, mango, jamun etc., are the constitute of the flora .

5. All animals found in a certain area constitute the fauna. For example, dog, frog, insect, cheetal, wolf, leopard etc.

(F) Answer the following question in short :

1. Biodiversity is important in the following ways :

(i) Maintenance of ecosystem
(ii) Helps in cycling of nutrients
(iii) Helps in soil formation and protection
(iv) Provision of biological resources such as food, medicine and many other products.

2. Species is a group of organisms that are capable of interbreeding and producing fertile offspring. For example, deer refers to a family of 34 species including varieties of deer like, reindeer and elk. The member of species has common characteristics.

3. Project tiger is one of the largest and most successful conservation programmes in India. Project tiger was launched by the Indian government in 1973 to protect the tigers in the country. Today, there are 39 tiger reserves in 17 states of India. In the beginning nine sites were identified all over India as tiger reserves.

4. The species which are likely to become endangered species if the causative factors continue to operate are called vulnerable species. For example, musk deer, chinkara deer, pacific sea horse, black buck, leopard, whipray etc.

5. The vulnerable and endangered species collectively are called threatened species. For example, Bengal tiger, sea turtle etc.

6. Paper making from the trees. Paper mills convert the wood of a tree into pulp and then pulp is bleached and rolled into paper. The paper can be recycled five to seven times for use. Recycling helps to save energy and water needed to manufacture paper. Recycled paper is made up from waste paper. Different types of papers are recycled into different types of new products. Some papers are not be recycled. For example : tissues, napkins, paper towels, paper cups, candy wrapper and glossy paper.

(G) Answer the following question in long :

1. The 'term biodiversity' is derived from Greek words 'Bios' meaning life and 'diversity 'meaning forms. The huge variety of living organisms on the earth is termed as

biodiversity. Biodiversity includes all forms of life—plants, animals and micro-organisms. Biodiversity is not distributed uniformly across the globe. Some areas have greater biodiversity than the others. Forests are the regions where the biodiversity is more.India has a big diversity, where are the different types of habitats s ch as wetland, deserts, mountains and rain forests. All the components of our environment maintain an ecological balance. Different organisms are dependent on each other directly or indirectly. Plants are the source of food, medicines, fodder, fibres, timber, fertilizers, rubber etc. and animals provide a number of products such as meat, fish, milk, egg, honey, wool and silk..

2. A biosphere reserve is a large multipurpose protected area for conservation of wildlife, plant and animal resources. It is a protected area developed to conserve biodiversity.

In our country there are twelve biosphere reserves are Nilgiri, Sundarbans, Debong Deband, Manas, Nandadevi, Nokook, Gulf of Mannar, Pachmarhi, Konchanjungha, Dibru Saikhowa, Similipal, Great Nicobar. A biosphere reserve may also contain other protected areas in it. For example : the Pachmarhi Biosphere Reserve consists of one national park named Satpura and two wildlife sanctuaries named Bori and Pachmarhi.

3. Wildlife sanctuaries are the areas which help in preservation of species of wild plants and animals. Our wild life sanctuaries also provide safe habitats for some of the threatened wild animals like black bug, white eyed buck, elephant, golden cat, pink headed duck, gharial, marsh crocodile, rhinoceros and python etc. These provide protection and suitable living conditions to wild animals. In these areas, killing (poaching) or capturing of animals is strictly prohibited. Some of the threatened wild animals such as marsh crocodiles, gharial, black buck etc. are protected and preserved in our wild life sanctuaries. The number of sanctuaries in our country is 441. These cover about 1,07,310 sq.km, which is 3·02 percent of country's geographical areas.

4. National parks are large and diverse reserves which help in protection of different ecosystems. These can protect flora, fauna and many other aspects of the ecosystem. Different wild animals like snow leopard, clouded leopard, marbled cat, panda, black bear, blud sheep, wild ass, toucan, musk deer etc. are protected from getting extinct.There are 102 national parks in our country Satpura national park is the first reserve forest of India. Gir National Park, Jim Corbett National Park, Desert National Park, Hazaribagh National Park, Kanha National Park, Madumalai Sanctuary are some national parks in India.

5. Forests are the precious wealth of living organisms. They provide us with many useful things like food, wood, oxygen and many other things. They are source of livelihood for tribal people living in the forest and help to retain rain water for longer time which in turn maintains the water table. The cutting down of forest trees on a large scale due to natural and man made causes is called deforestation. Deforestation disturbs the ecosystem.

(H) Define the following :

1. **Endangered species :** Some species which are at high risk of becoming extinct are called endangered species. Endangered species are limited number of individual

survivals of that area. For example : The Indian rhinoceros, Asiatic lion, Asiatic wild ass, crocodile, great Indian bustard etc.

2. **Extinct species :** Animals or plants that have disappeared and no longer exist anywhere on the earth are called the extinct species. For example, dinosaur, dodo bird, Caspian tiger are extinct species. The extinct plants in our country included Brahmkamal and Sarapagandha.
3. **Migration :** Migration is the movement of animals in large number from their original habitat to another place in order to overcome unfavourable conditions posed by climate of that particular habitat. Many birds fly to far away areas every year during a particular time because of climatic changes.
4. **Rare species :** The species of this type which at present exist in small number are called rare species. For example : Golden cat, Indian pied hornbill, crestless Himalayan porcupine are some rare species.

I. Discussion in Group

Do yourself

J. Science Puzzle :

1. SPECIES 2. RECYCLING 3. REFORESTATION 4. NATIONAL
5. BIOSPHERE

Chapter 8 : The cells : Structure and Functional

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (b) **2.** (a) **3.** (c) **4.** (c) **5.** (b)

(B) Fill in the blanks with suitable words :

1. Cell **2.** Honey comb **3.** microscope **4.** unicellular
5. cytoplasm **6.** cell membrane

(C) State the following statements are True or False :

1. True **2.** True **3.** False **4.** False **5.** True

(D) Match the Following:

1. Outermost layer of the planet **2.** Division of the nucleus
3. Give colour to the plants **4.** Helps in cell Division
5. Power house of the cell.

(E) Answer the following question in very short :

1. A cell is the basic unit of structure and function of an organism.
2. Robert Hooke discovered the cell.
3. Amoeba and paramecium are the example of unicellular organisms.
4. Unicellular and multicellular are two types of organisms
5. Ribonucleic acid and Deoxyribonucleic acid

(F) Answer the following question in short :

1. Organisms that are made up of a single cell and perform all their vital activities are called unicellular organisms. A single cell performs all the metabolic functions like

nutrition, respiration, excretion, reproduction etc. Amoeba is an example of unicellular organism.

2. Organisms that are made up of more than one cell are called multicellular organisms. Multicellular organisms are made up of different cells of different shapes and different functions. Mostly in life that can be seen with the naked eye is multi-cellular, as are all animals and plants.
3. Cells are differ in their shapes and sizes. Plant and animal cells have a number of similarities and differences. All plant and animal cells can be divided into three parts : The cell membrane, cytoplasm and the nucleus. The liquid substance of the cell is called the protoplasm. It includes the cytoplasm and nucleus.
4. Cell division is the first stage of growth in living organisms whereby cells divide to form new cells. This process is called cell division. This process helps in the growth of organisms. Cell division also increases the number of cells in an organism, and also replaces the dead or damaged cells with new ones.
5. The cytoplasm is the jelly like transparent liquid substance present inside the cell membrane. A number of tiny components or structures called the cell organelles are present in the cytoplasm. The various organelles present in the cytoplasm are mitochondria, endoplasmic reticulum ribosomes, Golgi bodies, Lysosomes, vacuoles and plastids etc.

(G) Answer the following question in long :

1. The three cell Organelles are :

(i) Ribosomes : Ribosomes are small spherical shaped structures. Ribosomes are found both in the plants and animals. They help in protein synthesis and made up of numerous protein and RNA.

(ii) Golgi Bodies : It is also known as the Golgi apparatus. It is made up of tubules, vesicles and smaller vacuoles. The Golgi bodies take proteins made by the endoplasmic reticulum and expels them out of the cell when needed. Golgi bodies synthesize, store and secrete many substances.

(iii) Lysosomes : Lysosomes are mainly found in animal cell and a few plant cells. They help in the cellular digestion and engulf bacteria and viruses that enter the body. It is also known as the suicide bags.

2. Chromosomes : Chromosomes are thread like structure present in the nucleus. Chromosomes contain the deoxyribonucleic acid. It is the hereditary material that are passed on from one generation to the next. Heredity units called genes. Genes are responsible for passing genetic characteristics from the parents to the offsprings.

On the basic of the composition of nucleus, cells can be divided into two types :

(a) Eukaryotic Cells (b) Prokaryotic Cells

3. The difference between a plant cell and an animal cell :

S. No	Plant Cell	Animal Cell
1.	It usually has one or two large vacuoles. Cetrosomes are absent in the plant cell.	Vaculoes are either absent or are smaller in size. Cetrosomes are absent in the animal cell.

2.	Plant cells are the largerin the size.Cell wall is present and it is the outermost layer of the plant cell.	Cell wall is absent. The outermost layer of the animal cell is the plasma membrane.
3.	Plastids are present in the plant cell.Lysosomes are absent in the plant cell.	Plastids are present in the animal cells. Lysosomes are present in the animal cell.

4. **Microscope :** A microscope is an instrument used to see objects too small for the naked eye. A Dutch called Anton Van Leeuwenhoek was the first man who invented a microscope. The simplest microscope is a magnifying glass. A magnifying glass is also called simple microscope. Magnification of a simple microscope may be seen clearly with it. Many more powerful microscope were later invented for example compound microscope and electron microscope.Compound microscopes are also called as light microscopes. It is an instrument used to magnify the specimen up to 4,000 times. While electron microscope is used for very large magnification of the specimen, it magnifies the specimen upto 1,00,000 times.

5. The difference between Unicellular or Multicellular Organisms are :

S. No	Unicellular Organisms	Multicellular Organisms
1.	The life span of unicellular is short due to heavy pressure of work.	The life of span is long due to limited pressure of work for each cell type.
2.	The body of the organism is composed of a single cell.	The body of the organism is composed of numerous cells.
3.	This type of organism is capable of division.	In this type of organism, some cells lose their capacity to divide.
4.	A single cell carries out all the life process.	Different cells are specilalized to perform different function.

(H) Define the following :

1. **Plastids :** Plastids are found only in plant cells and is absent in animal cells. There are three types of plastids based on type of pigment they contain.
2. **Chloroplast :** Chloroplasts are green in colour because they contain the green pigment called chlorophyll. Green coloured plastids are known as chloroplasts. Chloroplast is very important for the process of photosynthesis. Plants used photosynthesis to convert water and carbon dioxide into glucose.

(I) Identify the picture given below : (a) Red Blood Cells (b) Plastids (c) Mitochondria (d) Human chick cell (e) Amoeba (f) Paramicium

(J) Do yourself

(K) Discussion in group :

Do yourself

(L) Do yourself

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (b) **3.** (b) **4.** (a) **5.** (a) **6.** (c)

(B) Fill in the blanks with suitable words :

1. active, single **2.** internal **3.** embryo, foetus **4.** male, female

5. asexual reproduction

(C) State the following statements are True or False :

1. True **2.** True **3.** False **4**.False **5.** False

(D) Match the following :

1. Budding **2.** Zygote **3.** Largest cell **4.** Sperms **5.** Crow

(E) Answer the following question in very short :

1. There are two modes of reproduction these Asexual Reproduction (b) Sexual Reproduction.

2. Cow and mice are the two viviparous animals.

3. Hydra is an example of budding.

4. Cat and dog are two animals of internal fertilization.

5. Three parts of sperms are nucleus, a middle piece and a long tail.

(F) Answer the following question in short :

1. The placenta plays a crucial role during pregnancy. The placenta is an organ that develops in the uterus during pregnancy. Placenta provides oxygen and nutrients to the growing baby and removes waste products from your baby's blood.

2. In sexual reproduction of animals there are two parents male and female are involved. Both male and female individuals produce reproductive cells called gametes. The male gamete is called egg or ovum. Such organisms are known as unisexual. Cockroaches, frogs, fish, birds, reptiles and human are unisexual.

3. The animals that lay eggs are called oviparous animals. For example : frogs, lizards, butterflies etc. The animals that give birth to young ones are called viviparous animals, for example, cows, humans, mice etc. Hen lays eggs but cat gives to birth young ones. Fish also lays eggs which later hatch into young fish but whales give birth to young ones.

4. A sperm is single celled and has three parts a head with nucleus, a middle piece and a long tail. The tail helps the sperm to move the reach and egg cell. Sperm is smaller in size and capable of performing locomotion.

5. Ovum is inactive and larger in size due to presence of yolk. It is a single celled structure like sperm and the spherical shape. It contains the larger quantity of nutrients that provide nutrition to the developing embryo until is starts receiving nutrition from the mother.

6. The life cycle of a frog has four distinct stages are :

Egg → Tadpole → Froglet → Adult frog

The tadpole look very different from the adult frog. The various changes that occur in the life cycle of frog are controlled by the thyroxine hormone.

(G) Answer the following question in long :

1. (i) Male reproductive organs consists of a pair of testes. It is an endocrine gland forming gonad in males. They are placed in a bag like structure called as scrotum which descends from the abdominal regions. Each testis is made up of coiled tubules which produce male gametes called sperm. Testis also secretes a hormone called as testosterone.

(ii) Two sperm ducts, one from each testis, the sperms from the testes leave through the sperm ducts and transport sperms into penis. It is also known as vas deferens.

(iii) The penis is the muscular. It has a long shaft and enlarged bulbous-shaped tip called the glans organs. Penis receives both urinary tube and sperm duct and serve as a common transporting organ for urine and semen. It opens out through small tube called as urethra.

2. Female reproductive organs consist of a pair of ovaries, two oviducts, uterus, vagina and vulva.

(i) A pair of ovaries (singular-ovary) that produce eggs or ova (singular-ovum). The egg is much bigger than the sperm. A single egg is produced by one of the ovaries each month. This process is called ovulation.

(ii) A pair of oviducts which is also known as fallopian tubes, joins the ovaries with the uterus. The oviducts carry the egg (ovum) from the ovary to the uterus.

(iii) At uterus, development of the fertilized egg and foetus takes place here. Uterus is also known as womb.

(iv) Vagina is a muscular tube, the uterus opens into the tube. The vagina receives the penis, through which sperms are discharged into it.

3. The process of reproduction in which only a single parent is involved is known as asexual reproduction. Asexual reproduction is seen in organisms like Amoeba and Hydra. Few of the different types of asexual reproduction are budding and binary fission.

Budding : In this method of asexual reproduction, a small bulb like projection called 'bud' is formed on the body of the animal. The hydra is reproduced by budding. The nucleolus of the parent hydra divides into two and one of the nuclei moves into the bud. After some time these buds separate from the parent body and develop into new individuals.

Binary Fission : Binary fission is common in unicellular organisms like amoeba. During reproduction the nucleus starts dividing into two nuclei which is followed by division of the cytoplasm into two separate parts. Each part receives nuclei of its own. Finally two amoeba are formed from a single parent by the process of binary fission.

4. The term 'test tube babies' is misleading as the baby cannot be grown in a test tube. It is only fertilization between sperm and egg. In certain woman, the oviducts or the fallopian tubes are blocked such woman cannot bear the babies because the sperm can not reach the egg for fertilization. In such cases, the medical science has discovered and developed a technique known as in vitro fertilization. In this technique the sperms of male parents and the eggs of female parents are collected and kept together for a few hours in a glass dish or test tube in laboratory. In case the fertilization takes place, the zygote is allowed to develop in the test tube for about a week and it is

introduced into the female's uterus for further development. The embryo and foetus develop inside the woman's womb like a normal baby. The babies are born through this technique of in vitro fertilization are called the test tube babies.

5. The production of an exact copy of a cell, any body part or a complete organism by non-sexual method is called cloning. Cloning was successfully done for the first time at the Roslin institute in Edinburg, Scotland, on 5th July 1996, by lan Wilmut and his colleagues. They successfully cloned a sheep and named it Dolly. Dolly was formed by taking a cell from the udder of her bilogical mother. Her embryo was then placed inside a female sheep that went through a normal pregnancy. Unfortunately, dolly died on 14th February 2003 due to lung disease, when she was six.

6. There are four different stages in the life cycle of butterfly :

Egg → Caterpillar (larva) → Pupa → Butterfly

If you look at the diagram carefully, you will notice that the caterpillar and the pupa look very different from the adult butterfly. The changes that occur during the different stages of a butterfly are controlled by two hormone and ecdysone.

(H) Define the following :

1. **Zygote :** The male and the female gametes fuse to form the Zygote.
2. **Urethra :** The urethra is a tube that connects the urinary bladder to the urinary meatus for the removal of fluids from the body
3. **Metamorphosis :** The process of transformation of the larva into an adult through drastic changes is known as metamorphosis.
4. **Scrotum :** The scrotum is an anatomical male reproductive structure that consists of a suspended sack of skin and smooth muscle that is dual-chambered, present in most terrestrial male mammals and located under the penis.
5. **Fortus :** The stage of the embryo when all the body parts can be identified is called foetus. After 36 weeks when the foetus gets fully developed.

I. Give two examples of each of the following :

1. Frog , Lizaed 2. Cows, Mice 3. Amoeba, Hydra
4. Fish ,Bird 5. Butterfly , Frog

J. Identify the process shown :

1. Budding in Hydra 2. Binary fission in Amoeba
3. Life cycle of Butterfly 4. Life cycle in frog

K. Discussion in group :

Do yourself

L. Do yourself

Chapter 10 : Reaching the Age of Adolescence

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (c) **2.** (b) **3.** (c) **4.** (c) **5.** (a)

(B) Fill in the blanks with suitable words :

1. harmones **2.** adolescence **3.** body shape, sex harmone
4. developed **5.** adulthood

(C) State the following statements are True or False :

1. True **2.** False **3.** False **4.** True **5.** True **6.** True

(D) Match the following :

1. Acne **2.** Physical exercise **3.** 40-50 years **4.** Pituitary gland **5.** Adrenalin

(E) Answer the following question in very short :

1. Growth and Sex harmone are two types of harmones.

2. Shoulder becomes broader and chest becomes wider during puberty in boys.

3. The waist becomes wider and broader, breast starts getting enlarged during puberty in girls.

4. Strogen harmone in girls and testosterone harmone in boys are secreated by the pituitary gland.

5. There are 23 pairs of chromosomes are found in human beings.

(F) Answer the following question in short :

1. Reproductive health is a general state of a person's physical, mental and social well being. For proper development of body adolescents should take care of their health. To remain healthy an individual should be free from any disease and anxiety.

2. Infancy is the period or stage of growth from birth to about 2 years of age. During this period , the babies grow very fast and childhood is the stage of growth from about 2 years to 11 years of age is called childhood. During this stage the children grow in size and weight at a steady rate.

3. In girls, the ovaries produce a sex hormone called strogen which makes the body develop female characteristics and in boys, the testes produce a sex hormone called testosterone. This hormone makes the body develop male characteristics. The production of both these hormones is controlled by the pituitary gland, which is also called the master endocrine gland.

4. The changes in body shape in girls and boys are different. In girls, the body shows curves in certain parts and the region below the waist becomes wider and broader, breast starts getting enlarged. In boys, shoulder becomes broader and chest becomes wider and the body muscles grow more prominently.

5. Physical exercise is very necessary to be fit and to have a healthy body. All young girls and boys must do some physical exercise like walking, running and jogging, swimming and cycling etc. It enhances growth, increases blood circulation and releases tensions.

(G) Answer the following question in long :

1. The stage between childhood and adulthood is called adolescence. Adolescence begins around the age of 11 years and lasts up to the age of about 18-19 years and they are known as adolescents.Since the adolescence stage covers the 'teens', adolescents are usually called teenagers. During this period, the body grows rapidly and there appears visible physical differentiation in boys and girls, puberty marks the time when a child's body starts turning into an adult's body and the boys and girls become capable of reproduction. When an adolescent reaches reproductive maturity, puberty ends. The end of adolescence is the beginning of adulthood.

2. In boys, the testes become mature and begin the production of sperms. In girls, the ovaries and eggs become mature and ovaries begin to release ovules. Usually a single egg is produced during an ovulation cycle. Wolffian ducts develop into male sex organs, and Mullerian ducts develop into female sex organs. Which sex organs develop depends on the presence of a Y chromosome and the male hormone testosterone. At eight weeks, the internal genitalia will begin to form. If the embryo has both an X and a Y chromosome and produces the two hormones, then the testosterone will stimulate the Wolffian duct to develop male sex organs, including the vas deferens and the seminal vesicles. If there's no Y chromosome, but two X chromosomes instead, then the embryo is female. The Wolffian duct will degrade, and the Mullerian duct will develop into female sex organs such as the uterus, fallopian tubes and part of the vagina. Rarely, the embryo will have an X and a Y chromosome, but will fail to produce testosterone or AMH; such an embryo is termed intersex, as it has both male and female sex organs.

3. **Menstrual Cycle :** The shedding of the uterine thickening along with its blood vessels at the end of menstrual cycle is called as menstruation. The menstrual cycle takes place every 28 to 30 days. During this period, one ovum is released by either of the ovaries during one menstrual cycle. In the absence of fertilization, ovum and the thickened uterine walls are disrupted and are shredded off as menstrual flow or bleeding. Bleeding continues for 3 to 8 days. The menstrual cycle involves maturation of ovum, release of ovum, thickening of uterine wall and menstruation. At the age of 45 to 50 years, the menstrual cycle stops. The stoppage of menstrual flow and the other associated events in the body of a female is called menopause.

4. **Difference of secondary sexual characters in male and female :**

S. No	Male	Female
1.	Hair grows on face (moustache, beard) and other parts of body like chest, armpits and in public area (genital area) between the thighs.	Hair grows in public region (genital area) and extra hair in armpits.
2.	Feeling and sexual drives associated with adulthood begin to develop.	Feelings and sexual drives associated with adulthood begin to develop.
3.	The body becomes more muscular due to the development of muscles.	Menstruation starts and ovaries start to release eggs.
4.	The penis and testes become larger and testes start to produce sperms.	The region below the abdomen becomes wider and breasts develop in girls.

5. Each human cell has a nucleus which contains chromosomes. Every healthy human being has 23 pairs of chromosomes. 22 pairs of chromosomes are similar in all aspects but the 23rd pair is different and called sex chromosome. In male, it consists of X and Y (XY) chromosomes. Thus the sex of the baby depends on the kind of sperm by which an egg is fertilized, i.e. when a sperm carrying X chromosomes fertilizes an egg (that contains only X chromosomes), the resulting zygote (XX condition) develops into a female baby.When a sperm carrying Y chromosomes fertilizes an egg (that contains only X chromosomes) the resulting zygote (XY condition) develops into a male baby.

6. Drug are not good for health. Dugs are chemical substances that affect the physical, mental and emotional being of a person or an individual. Drugs are addictive if taken

once, one would like to have them again and again. Use of any drug for purpose other than medicinal use is known as drug abuse. It is a common problem among teenagers all over the world. Thus in the long run drugs or alcohol harm the body and ruin health and happiness.

The full name of AIDS is Acquired Immuno Deficiency Syndrome. It is caused by the HIV virus. This disease can be passed on from an infected person to another by sharing the syringes used for injecting drugs, blood transfusion from infected mother to a child and through sexual contact with a person infected with HIV. This virus destroys the defence mechanism of the body.

H. Discussion in group :
Do yourself

I. Do yourself

Chapter 11 : Force and Pressure

(A) Multiple Choice Question (MCQ) :
Tick (✓) the correct answer :

1. (b) **2.** (c) **3.** (c) **4.** (a) **5.** (b) **6.** (a)

(B) Fill in the blanks with suitable words :

1. atmospheric pressure **2.** applying **3.** contact **4.** gravitational force
5. direction **6.** pressure guage

(C) State the following statements are True or False :

1. False **2.** True **3.** False **4.** False **5.** False **6.** False

(D) Match the following :

1. Measure liquid pressure **2.** Measures atmospheric pressure **3.** Unit of force
4. Unit of pressure

(E) Answer the following question in very short :

1. Newton is the SI unit of force and Pascal is the SI unit of pressure

2. There are two types of force. (i) Contact force (ii) Non- Contact force

3. Force is a push or a pull acting on a body which changes its state of rest or motion.

4. Pressure is the combined effect of force and area on which it acts can be described by a quantity

5. Pressure gaugean instrument used to measure liquid pressure. The simplest form of a pressure gauge is a manometer.

(F) Answer the following question in short :

1. A contact force is a force between two objects that are in contact with each other directly or indirectly. The contact can also be with connectors like a stick, a piece of rope, etc.

The non-contact force which can act even without any actual or physical contact between the two objects.

2. Electrostatic force is the force exerted by a charged body on another charged or uncharged body. It is also known as the Coulomb force or Coulomb interaction.

3. Friction or frictional force is also an example of contact which opposes the motion of one body over the other. Friction is the force that brings an object to rest. For example, a ball rolled on the ground stops after covering a short distance.

4. The direction of the force applied is the same as the direction of the motion of the object, the direction of the object will not change, but the speed of object will increase.

5. Air is the mixture of many gases. Our earth is surrounded by a layer of air called the atmosphere, which is about 300 km thick. This air has a lot of weight which pushes down on the earth's surface due to gravity. This atmosphere exerts pressure on all objects. The pressure exerted by the weight of the air at any point on the earth is called the atmospheric pressure at that point.

(G) Answer the following question in long :

1. **Gravitational Force :** The force of attraction between any two objects possessing mass is called force of gravitation or gravitational force. For example, when we throw a ball up in the air. It does not remain in the air. It comes down after going up to a certain distance. It is due to the reason that the earth has a huge mass and it attracts every object towards its centre. Gravitational force exists everywhere in the universe. Issac Newton was the great scientist who discovered gravitation when an apple fell on his head. He realized fell that the apple down because some kind of force is exerted by the earth that made the apple fall towards it.

2. **Magdeburg Hemispheres :** Magdeburg took two hemispheres, each being of 51 cm in diameter. He placed them in contact. When there is air inside the hemispheres they can be easily separated. The air inside the hemispheres was removed by an air pump. Now, even a very large force if applied cannot separate them. In the original experiment with perfect vacuum inside the hemispheres, even sixteen horses, eight horses on each side, could not separate the two hemispheres. Otto Van Guericke was performed this experiment in the year 1640. An equation in which the number of atoms of each element is the same on both sides is called a balanced chemical equation.

3. The application of pressure in our daily life are :

(i) Some handbags have a thin strap. The thin strap in contact with the shoulder produces higher pressure which causes our shoulder feel pain. The smaller the surface area of the handbag strap, the higher is the pressure produced.Some bag straps are made broad to increase the surface area. When the surface area increases the pressure applied becomes less. Hence the bags can be carried without much pain on the shoulders.

(ii) The nail is pointed at one end and blunt on the other side. The pointed end of the nail exerts more pressure, hence it can easily get fixed on the wall when force is applied.

(iii) Massage is one type of application of pressure. By doing this it relaxes the feet, hands, ears and their referral areas within zone related areas which correspond to every part, gland and organ of the body. This is because while giving pressure it pushes the nerves and we don't get any pain later.

(iv) The atmospheric pressure helps us to draw blood from the veins with the help of a syringe.

4. Difference between mechanical and magnetic force :

Mechanical Force	Magnetic Force
The force produced by a machine is called mechanical force. Machine does not produce force on its own. It works only with the help of energy supplied by external sources like petrol, diesel, electricity etc. The engine of a vehicle runs with the help of fuel and makes move.	The force exerted by a magnet is called magnetic force. For example, when you bring an iron nail near a magnet, it gets stuck to the magnet. This happens due to the magnetic force exerted by the magnet.

(H) Define the following :

1. **Force :** The force as a pull or push acting on a body which tends to change its state of rest or of motion. A force may give energy to an object and cause it to start moving, stop moving or change its motion.
2. **Muscular Force :** Muscular force is the force exerted by the muscles of the body The human beings use the muscular force during walking, running, kicking, lifting etc. Some objects and the animals exert muscular force to do heavy works such as pulling a cart, ploughing, carrying heavy loads etc.
3. **Contact Force :** A contact force is a force between two objects that are in contact with each other directly or indirectly. The contact can also be with connectors like a stick, a piece of rope, etc.
4. **Pressure :** The combined effect of force and area on which it acts can be described by a quantity known as pressure. In other words, pressure is defined as the force acting on a unit area of a surface.

I. Discussion in group :

Do yourself

J. Do yourself

Chapter 12 : Friction

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (a) **3.** (a)

(B) Fill in the blanks with suitable words :

1. frictional **2.** liquid, gases **3.** opposite **4.** reduce **5.** steamlined.

(C) State the following statements are True or False :

1. True **2.** False **3.** False **4.** True **5.** False

(D) Answer the following question in very short :

1. Heat energy is the form of energy that friction always produce.
2. Force is measured by spring balance.
3. The shape of aeroplane, rocket, and the fish is Steamlined.
4. Roller skets an the example of rolling friction.

(E) Answer the following question in short :

1. The equation for sliding force includes the coefficient of sliding friction times the normal force.

$$Fs = \mu s Fn$$

Fs = Force of sliding friction

μs = Coefficient of sliding friction

Fn = Normal force

2. The advantage of friction are—

(i) Friction between the pen and the paper enables us to write on the paper.

(ii) Friction between the surface of the road and tyres of our vehicles allows the vehicles to move without slipping.

3. The two disadvantages of friction are -**(i).** The friction causes damage to machines because the heat generated by friction raises the temperature of the machine and damages it.

(ii) The friction caused between the floor and the surface of the shoes while walking or running wear out the soles.

4. The friction is reduced by sprinkling a soft, slippery fine powder on the Surfaces. A small quantity of powder on a wooden surface or floor etc. reduces friction. Graphite powder is used in machine to reduce friction.

5. A rolling friction is opposing force that comes into play when one object actually rolls over the surface of another object. For example, roller skates have wheels that help in moving very fast.

(F) Answer the following question in long :

1. Friction is a force that opposes the relative motion between two surfaces of objects in contact. The force of friction always act in a direction opposite to that of the applied force. For example, when you rub your hands together to warm them in winter, friction caused by rubbing your hands together produces heat. Friction exists between two surfaces due to irregularities on the surfaces of objects in contact, interlocking of micro-level irregularities of the two surfaces and ploughing of harder surface into smoother surfaces.

2. **Static friction :** When you begin to push a box along the floor, there is static friction. In other words, static friction is the frictional force that exists between two bodies so long as they are relatively at rest, even though an external force is acting upon them. Static friction is also known as starting friction. The maximum force of friction when the block is just starting to move is called the limiting value of the static friction or limiting friction.

Sliding Friction : The force of friction acting between two bodies when they slide on each other with a uniform speed is called sliding friction. It is also known as kinetic friction. Sliding friction depends on two factors : the weight of the object that is moving and the type of surface that object slides across. For example : A person sliding down a slide.

3. **Fluid Friction :** All liquids and gases are the fluids. For example : Water, oil and air. The frictional force exerted by fluid (liquid and gases) is also called the drag. The frictional force exerted by gases and liquids depends upon the shape, material and

speed of the object moving through them. The symmetrical shape of the objects which offers least resistance due to friction is called streamlined shape. The bodies of ship, aeroplanes, automobile are made up in shape streamlined to minimize the force of friction so as to reduce drag in the air and the steam lined shape of a fish enables it to move easily in water by minimizing fluid friction.

4. Friction is necessary for us, therefore many time friction is increased to accomplish a task. Friction can be increased in the following ways :

(i) Roughen the surface : Treaded tyres of vehicles have designs and patterns with grooves on their surface to increase resistance with the road. This prevents skidding. The soles of shoes are also made with grooves to give a good grip on the ground.

(ii) Dry the surface : To dry the surface is another way to increas friction. Sand and gravel is thrown on slippery road during the rainy season to increase friction. Gymnast often rub some coarse substance to have a better grip. A coarse substance increases friction.

(iii) Use brake pads : We increase friction by using brake pads in the brake system.

(G) Define the following :

1. **Sliding Friction:** The force of friction acting between two bodies when they slide on each other with a uniform speed is called sliding friction. It is also known as kinetic friction.

2. Fluid: All liquids and gases are the fluids. For example : Water, oil and air. **3. Drag:** The frictional force exerted by fluid (liquid and gases) is also called the drag. **4. Rolling Friction :** A rolling friction is opposing force that comes into play when one object actually rolls over the surface of another object. For example, roller skates have wheels that help in moving very fast.

(H) Discussion in Group :

Do yourself

(I) Do yourself

Chapter 13 : Sound

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (c) **3.** (a)

(B) Fill in the blanks with suitable words :

1. vaccum **2.** vibrating **3**.tuning fork **4.** trains, loudspeker **5.** density

(C) State the following statements are True or False :

1. True **2.** True **3.** False **4.** True **5.** True

(D) Answer the following question in very short :

1. Hertz is the unit of frequency of sound.

2. A vibration is defined as a rapid to and fro or back and forth motion about a mean position. Sound is a vibration that can be heard. .

3. There are two types of sound are Audible Soundand Inaudible Sound

4. The to and fro motion of the body on the same path from its mean position in the middle is called oscillatory motion.
5. A human can hear the frequency sound of 20Hz to 20KHz.

(E) Answer the following question in short :

1. Sound is a form of energy produced by vibrating bodies and which makes us to hear. For example : Barking of dogs, birds chirping, moving vehicles, your mother calling you, people talking in the bus, musical notes from various instruments like shenai, flute etc. In human sound is produced by the voice box or the larynx.
2. A tuning fork is a U-shaped single metal piece with a handle (called stem). The two arms in the U-shaped section arc called prongs. Tuning fork is used to produce sound of certain fixed frequency in the laboratory.
3. The number of the vibrations per second is called the frequency. The SI units of frequency is hertz (Hz). Frequency is the measure of pitch.

$$\text{Frequency} = \frac{\text{Number of oscillations or nubers}}{\text{Time}}$$

4. The sound which can be heard by the human ear is called the audible sound. The audible range of sound for humans is from 20 Hz to 20 kHz (20,000 Hz) and is called the sonic sound.
5. The frequencies less than 20Hz and higher than 20,000 Hz are not audible to the humans and are called inaudible sound. The sound of frequencies greater than 20,000 Hz is called ultrasonic sound and the sound of frequencies lower than 20 Hz is called subsonic or infrasonic sound.

(F) Answer the following question in long :

1 **The characteristic of vibrations are:** (i)Vibration is a mechanical phenomenon whereby oscillations occur about an equilibrium point. (ii) The studies the movement of body from one extreme position to the other and back is called oscillation. (iii)The to and fro motion of the body on the same path from its mean position in the middle is called oscillatory motion.

2. **The characteristics of sound are follows :**
   - **(i) Loudness :** The loudness of a sound depends on the amplitude of the vibration producing that sound. The greater is the amplitude of vibration, the louder is the sound produced by it.
   - (ii) **Pitch :** It is the second characteristics of sound. Pitch of sound depends on its frequency. If the frequency is more, then the pitch and shrillness is more. The pitch of a woman's voice is more and it is shriller than a man's voice.
   - (iii) **Quality or tone:** The quality of sound is that characteristic which enables us to distinguish between musical notes emitted by different musical instruments or voices even though they have the same pitch and loudness. Quality of a sound is also called its tone.

3. Ears are the sense organs. Our ears help us to hear. The ear is divided into three main parts. These are
   - **(i) The outer ear:** The outer part of the ear is called Pinna. It is made up of skin and cartilage. At the end of the ear canal, there is a very delicate circular membrane called ear-drum.

(ii) **Middle Ear:** Middle ear consists of three very small and interlocked bones called hammer, anvil and stirrup. The middle ear receives the vibration from ear drum and transfers to the hammer and the hammer transfers the vibrations to the anvil, which in turn transfers it to strirup. These bones make the vibration larger.

(iii) **Inner Ear:** The inner ear consists of a coiled canal like structure called cochlea and filled with a liquid. It is linked to the stirrup. It contains many hair like cells and are linked to the auditory nerves and react to the vibrations from a wide variety of sound and range of loudness. Nerve impulses beginning in the cochlea are carried by the auditory nerves to the brain, where they are interpreted.

4. Noise pollution is the disturbance produced in the environment by undesirable loud and harsh sounds from various sources. For examples : Noise pollution is caused by construction sites, industries, trains, motors, aeroplanes, radio, television, loudspeakers and the road traffic etc.

5. In human beings, the sound or voice is produced by the sense organ called larynx or voice box. The voice box is situated at the upper end of the wind pipe and two vocal cords are stretched across the laryn (voice box) in such a way that there is a narrow slit between them for the passage of air. When the air is pushed by the lungs through the slit, the vocal cords vibrate and produce the sound. Muscles are attached to the vocal cords that can make the vocal cords tight or thin. The vocal cord of the woman is 5 mm shorter than the mans vocal cord. The vocal cord of a man is about 20 mm.

6. **Ways to Reduce Noise Pollution :** (i). We should use noisy appliances like amplifiers or loud-speakers far away from the residential area and hospital and play in low volume.

(ii) The people who work in the noisy factories should wear ear plugs and muffs.

(iii) Automobiles should be fitted with silencers.

(iv) Factories and airports should be made away from the residential areas to reduce the noise created by aeroplanes and machines in the factories.

(G) Group Discussion

Do yourself

(H) Do yourself

Chapter 14 : Electric Current and Chemical Effects

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (b) **3.** (a) **4.** (a)

(B) Fill in the blanks with suitable words :

1. energy **2.** conductors **3.** electricity **4.** liquids **5.** coated

(C) State the following statements are True or False :

1. False **2.** True **3.** False **4.** True **5.** True

(D) Match the following :

1. Metal **2.** Positive **3.** Sulphuric acid **4.** Glass **5.** Ions

(E) Answer the following question in very short :

1. Sodium hydroxide and Sulphuric acid are the two example of electrolyte.

2. Metals is a conductor and Rubber is an Insulator.
3. Pure water is a poor conductor of the electicity. Kerosene, Petrol, and oil is an other example of poor conductor of electricity.
4. Positively charged electrode is known as anode.
5. Negatively charged electrode is known as cathode.

(F) Answer the following question in short :

1. Conductors are that materials which allow the electric current to easily flow through them. For example : All metals, alloys of metals, electrolytes, graphite, water etc. are the good conductors of electricity.
2. Insulators are the materials which do not allow the electric current to flow through them. For example : Plastic, wood, rubber, glass etc. They are also known as poor conductors.
3. Electric shock is the injury caused by electric current passing through the (human) body. It occurs upon contact of a (human) body part with any source of electricity that causes a sufficient current through the skin, muscles, or hair. Water is the good conductor of electricity so the water shocks human when the current passed through water.
4. $\text{Water} \xrightarrow[\text{acidulated}]{\textit{electicity}} \text{Hydrogen} + \text{Oxygen}$
5. Electricity contains the two types of charges. These charges are Positive (+) Charge and the Negative (–) Charge. Positive charge is called the protons and the negative charge is called electrons.

(G) Answer the following question in long :

1. **Electrolyte:** The liquids which conduct electricity and at the same time undergo decomposition is called an electrolyte. For example : Sodium chloride (common salt), sulphuric acid and sodium hydroxide are some examples of electrolytes.

   Electrolysis : The process of decomposition of an electrolyte on passing electricity is called electrolysis. For example, when the electricity is passed through acidified water, it decomposes into hydrogen and oxygen gas

   $$\text{Water} \xrightarrow[\text{acidulated}]{\textit{electicity}} \text{Hydrogen} + \text{Oxygen}$$

2. The uses of eletrolysis are :
   (i) It is used for production of oxygen for spacecraft and nuclear submarines.
   (ii) It is used for the refining of metals like zinc, copper and silver.
   (iii) It is used for manufacturing of chemicals like chlorine gas, hydrogen gas, etc. which are used in industries on a large scale.
   (iv) It is used for the extraction of metals from their ores.
3. Electrodes are the two metal plates through which electric current either enters or leaves in electrolytic solution. Electrodes are the two types of charged plates. Positively charged electrode is called the anode and negatively charged electrode is called the cathode. In electric cell, anode is the positive electrode and the cathode is negative electrode.
4. It is the common application of electroplating. The process of decompositing a thin layer of any superior metal over an object of a cheaper metal with the help of electric current is called electroplating. The articles of cheap metals are coated with precious

metals like gold and silver to make them look more attractive. The article to be electroplated is made the cathode and the metal to be deposited is made the anode.

The uses of electroplating :

(i) Iron objects rust on coming in contact with air and moisture. This is prevented by electroplating them with chromium, nickel and zinc.

(ii) Metals are coated with a layer of another metal to make them look beautiful. For example, a coating of gold is done over other metals to make them look like gold ornaments.

(iii) The objects made from cheaper metals are electroplated with chromium as chromium has a shiny appearance and resists scratches.

(H) Discussion in Group : Do yourself

(I) Do yourself

Chapter 15 : Natural Phenomena

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (a) **3.** (b) **4.** (a)

(B) Fill in the blanks with suitable words :

1. electric **2.** American **3.** static **4.** metal **5.** crust

(C) State the following statements are True or False :

1. True **2.**True **3.** False **4.** True **5.** False

(D) Answer the following question in very short :

1. There are two types of electric charges are Positive charges and Negative charges

2. Coulomb is the SI unit of charge.

3. The inner part of the mantle is partly liquid and is called magma.

4. The point vertically above the seismic focus is called epicentre.

5. The outer core contains iron and nickel in molten state.

(E) Answer the following question in short :

1. A positive charge occurs when an atom has more protons than electrons. Protons have the positive charge. The positive charge is indicated by the plus symbol (+).

2. The static electricity can be produced by rubbing. In other words, there is a friction between two bodies when they are rubbed against each other. This produces an equal and opposite charge in both the bodies. Thus we can say that friction is a method of charging a body.

3. Electroscope consists of two thin metal strips, it also called as leaves. The leaves are connected to the knob through a metal rod. When the knob is touched with a charged object, the metal leaves spread apart. This is because the charge from the object is conducted from the metal rod to the leaves. Since they are receiving the same type of charge, they repel each other.

4. Mantle is under the crust and extends up to the depth of 2900 km. It is the thick layer above the core and lies just below the crust. It is made of dense and hot rocks. The

inner part of the mantle is partly liquid and is called magma. When the magma comes out of the earth, it is called lava.

5. Above the short answer no. 3

(F) Answer the following question in long :

1. Earthquake is a natural phenomena. It is also known as quake tremor. You must have heard about the massive destruction caused to life and property due to earthquakes in various parts of the earth. The shaking of the ground i.e. sudden movement in earth's crust is called an earthquake. The relative movement of different parts of the lithosphere producing high intensity shock waves is also known as earthquake.

2. The magnitude of an earthquake can be measured on a scale called Richter Scale. It was developed by the seismologist Charles Francis Richter, in 1935. The Richter Scale is known as the best scale for measuring the magnitude of earthquakes. The scale has marking from 0 to 9.

3. Tsunami is a Japanese word which means the huge wave. Under the ocean or sea, the earthquakes sometimes generate a series of high waves is called Tsunamis. They come ashore at intervals of 10-45 minutes and speed upto about 1000 km/h and may be 30 metre or more high. Tsunamis occur quite frequently in the pacific ocean.

4. The protection against earthqukes are :

(i) In highly seismic areas, light materials like timber or mud should be used for construction. The roofs should be as light as possible.

(ii) Do not construct buildings on landfills or reclaimed areas as they may be weak to support a building in case of an earthquake.

(iii) Cupboards and shelves should be forced to the walls, so that they do not fall.

(iv) There should be proper fire fighting arrangement in the houses.

(v) firmly object like ceiling fans, air-conditioners, air coolers, water heaters etc. so that they do not fall during an earthquake.

(vi) Doors installed in building should open outwards to ensure that they open easily.

(G) Discussion in group:

Do yourself

Chapter 16 : Light

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (e) **3.** (c) **4.** (a) **5.** (c)

(B) Fill in the blanks with suitable words :

1. Electrons **2.** rays **3.** parallel **4.** vibgyor **5.** spectrum

(C) State the following statements are True or False :

1. False **2.** True **3.** True **4.** True **5.** False

(D) Answer the following question in very short :

1. Light is a form of energy which gives us the sensation of seeing.

2. The bouncing back of light rays from of any object or surface is called the reflection of light.

3. If the rays of light coming from different directions meet a point is called the convergent beam.

4. The seven colours are presented by VIBGYOR. That means :

V	I	B	G	Y	O	R
Violet	Indigo	Blue	Green	Yellow	Orange	Red

5. Vitamin A is best for eye sight. Hence, include it in your daily diet. Food items such as spinach, milk, butter, carrot, papaya, mango, etc. are rich in vitamin A. Defiency of vitaminA leads to night- blindness.

(E) Answer the following question in short :

1. There are two laws of reflection for a plane mirror i.e. :
   (i) The angle of incidence is always equal to the angle of reflection.
   $$\angle i = \angle r$$
   (ii) The incident ray, reflected ray and the normal to the mirror at the point of incidence all lie in the same plane.

2. If the beam of light reflected is parallel and in one direction, it is called regular reflection. It is also known as specular reflection. In regular reflection the image formed is clear. It is the reflection from polished surface. For example : water plane mirror, unused stainless utensils etc.

3. When the beam of light strikes a rough reflecting surface, it does reflect, but the beam of light reflected travels in all directions is called the irregular reflection. It is also known as diffused reflection. For example : rippling water, scratched mirrors etc.

4. Periscope is a device which is used for seeing objects which are not in direct line of sight, such as to see ships on the surface of water from a submarine. This is based on the principle of reflection by plane mirrors.

5. The image formed on the retina persists for 1/16th of a second after we have stopped looking at the object. The ability of the eye to retain the image of the object for 1/16th of a second after we have stopped looking at the object is called persistence of vision.

6. Multiple reflection is the phenomenon in which we get multiple images. The object because the image formed by one mirror act as an object for the second mirror.

(F) Answer the following question in long :

1. **Human Eye:** The eye is the most important sense organ that helps us see the objects around us in the world. It is one of the most precious gifts to mankind by the God. The weight of human eye is 7 g and is approximately 2·4 in cm. Our eyelids and our eyelashes protect our eyes from injury. The eye consists of an eye ball having nearly spherical shape. The various parts of human eye are -
   (i) Cornea : Cornea is the thin transparent layer of tissue that covers the front of the eye. It helps to focus the light coming into the eye.
   (ii) Iris : The coloured part of the eye behind the cornea is called iris. It helps in controlling the amount of light automatically and increase and decrease of the size of the pupil to control the amount of light entering the eye.
   (iii) Pupil : Pupil is the round structure in the centre of the iris. It allows light to enter the eye.
   (iv) Lens : It lies behind the pupil and the iris. The eye lens is a convex lens made up of a transparent jelly like material.

(v) **Retina:** It is a thin lining just behind the eye ball and it is sensitive to light. It has light receptors called cones and rods.

(vi) **Sclera :** It is the visible white part of the eye filled with watery fluid. It protects the internal parts of the eye.

(vii) **Blind Spot:** There are no rods and cones. It is a portion on the retina where the optic nerve enters the eyeball. Images forming on this spot are not visible. As a result, the object is not seen. This part of retina is therefore called the blind spot of the eye.

2. The word 'dispersion' means scattering or splitting. Sir Issac Newton was the first to obtain the spectrum of sunlight by passing the sunlight through a prism. The band of seven colours formed on the paper screen due to dispersion of white light is called spectrum of white light and the phenomenon of splitting of white light into seven colours is called dispersion of light. These seven colours are presented by VIBGYOR. That means :

V	I	B	G	Y	O	R
Violet	Indigo	Blue	Green	Yellow	Orange	Red

The red light travels the fastest, and the violet light the slowest of all the seven colours.

3. A kaleidoscope has a Greek origin. It means, "I see the beautiful image". It is an optical instrument. Sir Eoin Cussen was the first Canadian inventor who invented the Keleidoscope. It consists of mirrors inclined to each other to form multiple images of the object in front of it. Three rectangular mirrors of same size are arranged in an equilateral triangle, rays of light from an object from multiple images due to reflection from the mirrors. The equilateral triangles formed by the mirrors has three equal angles of 60° degree and sides have equal length. Magicians also use the property of reflection of light by mirrors to create their magic.

4. Certain people have difficulty in seeing the objects. Nutritional deficiencies, wrong reading habits, age and genetic factors can sometimes cause defects of vision.

The most commonly observed defects of vision are :

(i) **Myopia or Short sightedness :** In this defect, some people can see the near by objects clearly but the far away objects appear blurred. Because the image of far away objects forms in front of retina. It can be corrected by wearing spectacles with concave lenses which help to focus the image on the retina.

(ii) **Hypermetropia or Long sightedness:** In this defect, some people are not able to see the near by by objects clearly but far objects can be seen easily. Because the image is formed behind the retina rather than on it. It can be corrected by wearing spectacles with convex lens.

5. The braille system is used by the people who are blind and visually challenged people. This type of people are those whose vision is extremely poor or they are blind. They are unable to see because either their cornea, eye nerve, retina or optic nerve fails to perform its function properly. Braille system was developed by Frenchman Louis Braille, in 1821. Braille is an approach that enables the blind to read and write and involves the use of special symbols representing the alphabets and their combinations.

In this method, the text is printed on thick sheet of paper using symbols. These symbols consist of up to six dots, two vertical rows of three dots each in a rectangular array. The dots are embossed, that is raised slightly above the surface of the paper. Such a rectangular array of raised dots is called Braille Cell. A letter "A" is written with only 1 dot. When all six dots are used, the character is called a full cell. A visually challenged person can recognize these raised dots as letters with the touch of fingers. Braille printing is done in special presses. These days such presses use computers to give an error free Braille text.

(G) Define the following :

1. **Reflection :** The bouncing back of light rays from of any object or surface is called the reflection.
2. **Hypermetropia :** In this defect, some people are not able to see the near by by objects clearly but far objects can be seen easily. Because the image is formed behind the retina rather than on it. It can be corrected by wearing spectacles with convex lens.
3. **Dispersion :** The word 'dispersion' means scattering or splitting. Sir Issac Newton was the first to obtain the spectrum of sunlight by passing the sunlight through a prism. The band of seven colours formed on the paper screen due to dispersion of white light is called spectrum of white light.
4. **Multiple reflection :** When you go to saloon for getting cut the hair and when you sit on the chair in front of the mirror, you will be able to see infinite images of yourself. That means multiple reflection is the phenomenon in which we get multiple images.
5. **Myopia :** n this defect, some people can see the near by objects clearly but the far away objects appear blurred. Because the image of far away objects forms in front of retina. It can be corrected by wearing spectacles with concave lenses which help to focus the image on the retina.
6. **Lateral inversion :** Lateral inversion is an illusion because, in a plane mirror, the image inverts on an axis perpendicular to the surface of the plane. This means that the mirror image, also known as a virtual image, is the front-to-back invert of the object.

(H) Science Puzzle :

(i) MYOPIA (ii) PERSISTANCE (iii) KALEIDOSCOPE
(iv) SPECULAR (v) DISPERSION

(I) Lable the figure :

Do yourself

(J) Discussion in Group :

Do yourself

(K) Do yourself

Chapter 17 : Stars and Solar System

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (a) **3.** (c) **4.** (b) **5.** (b)

(B) Fill in the blanks with suitable words :

1. satellite **2.** atmosphere **3.** pluto **4.** telescope **5.** 28

(C) State the following statements are True or False :

1. False **2.** False **3.** False **4.** True **5.** True

D. Answer the following question in very short :

1. The distance travelled by light in a year is called a light year.

One light year = $9{\cdot}46 \times 10^{15}$ metres

2. Mercury and Venus are two inner plants.

3. Jupiter and Uranus are two outer planets.

4. Mercury is the nearest planet to the sun.

5. Jupiter is the biggest planet to the sun.

6. Spuntnik,Aryabhatta, EDUSAT, INSAT, IRS, Bhaskara, Rohini are some Indian artificial satellites.

(E) Answer the following question in short :

1. The four innermost planets to the sun Mercury, Venus, Earth and Mars are called terrestrial planets. They are made up of rock and are smaller than the outer planets only the earth and mars have moons.

2. The four planets Jupiter, Saturn, Uranus and Neptune are outer planets. These are called jovian planets and are mostly gaseous. They each have a ring system and a family of moons.

3. The time taken by planet to complete one rotation is called the period of rotation. The period of revolution increases as the distance of the planet increases the sun.

4. The time taken by a planet to complete one revolution around the sun is known as its period of revolution

5. It is also known as big dipper and great bear. Ursa major constellation consists of seven bright stars. It can be clearly seen in the sky. It appears as a big ladle or question mark. The pole star (Dhruv Tara) remains at a fixed position in line with two stars of ursa major.

6. Artificial Satellites are used for transmission of television and radio signals, telecommunication, whether forecasting, navigation of ships and air planes, mapping natural resources and for defence purposes.

7. Comets are heavenly bodies that revolve around the sun in very large orbits and made up of gas and dust. Comets are visible only when they come very close to the Sun. A comet appears as a bright light with a long tail. As a comet approaches the sun, its tail grows.

(F) Answer the following question in detail :

1. The solar system was formed 46 billion years ago from the gravitational collapse of a giant interstellar molecular cloud. It consists of the sun, the planets that revolve around it, their satellites, asteroids, meteors and comets. The sun is the start which provides all the heat and light we need to live. It is called Surya in Hindi. sun is the ultimate source of energy for the solar system. The sun is the huge ball of gases. It mainly consists of hydrogen which gets converted into helium due to the continuous nuclear reaction taking place in the sun. A planet is the spherical object made up of rock or gas that orbits a star. At present there are eight planets in our solar system. These are Mercury, Earth, Mars, Jupiter, Saturn, Uranus, Venus and Neptune. The planets form two distinct groups : the inner and the outer planets separated by the asteroid belt, which contains billions of smaller space rocks.

2. The earth is the only planet in the solar system on which life is known to exist. It is the third planet from the Sun. The shape of the Earth is like a sphere. This shape is also unique and the Greeks called it geoid or Earth like shape. The earth is the only planet with water, oxygen and other chemical substances needed for life to exist. The earth appears blue-green from the space due to the reflection of light from water and land mass. Thus, it is called the blue planet. Three-fourths of the Earth's surface is covered with water.The earth is surrounded by a blanket of air called the atmosphere. This atmosphere contains ample amount of oxygen required by all living beings to survive. It has an ozone layer that traps the ultraviolet rays coming from the Sun. Hence, it prevents u.v. rays it from reaching the surface of the earth. The earth rotates on its own axis which is tilted at an angle 23·5°. This tilting always remains in the same direction and is responsible for change in seasons. The earth completes one revolution around the sun in 365 ¼ days. The Earth is also known as Prithvi**.**

3. The word 'planet' in fact means, "wanderer" as they do not remain fixed in the same position. All the planets revolve around the sun in a definite path. A planet is the spherical object made up of rock or gas that orbits a star. At present there are eight planets in our solar system. These are Mercury, Earth, Mars, Jupiter, Saturn, Uranus, Venus and Neptune. The planets form two distinct groups : the inner and the outer planets separated by the asteroid belt, which contains billions of smaller space rocks.

4. The moon is the natural satellite of the earth. It is one-fourth the size of the earth. The moon shines in the night sky. The moon has no light of its own, it shines because it reflects the light of the Sun. The moon is the Earth's only satellite and it circles around it once a month. Its surface has rocks, mountains and craters. Craters were formed when meteorites hit it. There is no air or water on the moon, hence, life does not exist on it and sound does not travel on it. During the day, the temperature goes as high as the boiling point of water, that is 100°C and during night it becomes as low as—150°C. The moon rotates on its own axis and also revolves around the earth. Sometimes we see the moon in the sky. Sometimes we see only a thin crescent shape of the moon and sometimes we do not see the moon at all because of the reason of phases of the moon.

5. The difference between stars and constellations are :

Stars : When you look up at the sky on a clear night, you see thousands twinkling stars in all directions. They give out their own light and are made of mainly hydrogen. Some of them are bright, whereas some are dim (faint). Stars are huge heavenly bodies which are extremely hot. The temperature at the centre of star ranges from 2 to 5 million degree celsius. Due to this high temperature results in melting and combining of hydrogen atoms to form a heavier gas called helium. During this process huge amount of heat evolves and they start shining and emit their own light. The light emitted by the stars makes them visible or shine.

Constellations: The certain groups of stars seem to form a recognizable pattern in the night sky. These are known as constellations. Some ancient star-gazers named the constellations after the names of animals, people and other familiar objects. In Indian terminology, constellations are called nakshatras. So far, 88 constellations have been recognized and named. Some important constellations are mentioned here.

(G) Match the following:

1. Buddha 2. Prithvi 3. Shukra 4. Indra 5. Shani 6. Brahaspati 7. Mangal 8. Varun

(H) Define the following :

1. **Constellations :** The certain groups of stars seem to form a recognizable pattern in the night sky. These are known as constellations. Some ancient star-gazers named the constellations after the names of animals, people and other familiar objects. In Indian terminology, constellations are called nakshatras.
2. **Planets :** The word 'planet' in fact means, "wanderer" as they do not remain fixed in the same position. All the planets revolve around the sun in a definite path. A planet is the spherical object made up of rock or gas that orbits a star. At present there are eight planets in our solar system. These are Mercury, Earth, Mars, Jupiter, Saturn, Uranus, Venus and Neptune.
3. **Artificial satellites :** A man-made object (space craft) is launched into space from the Earth. This space craft revolves around the earth in a fixed orbit. This is called artificial satellite.
4. **Meteors and Meteorits :** Meteoroids are smaller than comets. Meteoroids are chunks of rocks or particles of debris in our solar system. When meteoroids enter the Earth's atmosphere they are called meteors.

(I) Science puzzle:

1. SATELITE 2. CONSTELLATION 3. URANUS
4. MERCURY 5. ASTEROIDS

(J Discussion in Group :

Do yourself

(K) Project Work :

Do yourself

Chapter 18 : Pollution : Air and Water

(A) Multiple Choice Question (MCQ) :

Tick (✓) the correct answer :

1. (a) **2.** (c) **3.** (b) **4.** (a) **5.** (a)

(B) Fill in the blanks with suitable words :

1. everywhere **2.** burning **3.** CFCc **4.** sulphide **5.** filters

(C) State the following statements are True or False :

1. False **2.** True **3.** True **4.** False **5.** False

(D) Answer the following question in very short :

1. Sulphuric dioxide gas is produced by burning of coal.
2. There are many Natural and Manmade sources of air pollution.
3. Chlorine and bleaching powder are two chemicals used for purifying the water.
4. 78% Nitrogen and 21 % Oxygen are present in the air.
5. Potable water is a water which is suitable for drinking process.

E. Answer the following question in short :

1. The harmful gases or compounds that are pollutants of the air are sulphur dioxide, carbon monoxide, smoke, chlorofluoro carbons, nitrogen oxide dust and aerosol are the sources of air pollution.

2. Statues and structures made up of marble and limestone are slowly corroded as the rain water containing the acids (acid rain) fall on them. Both sulphuric acid and nitric acid dissolve marble to form salts. The corrosion of the Taj Mahal due to acid rain is called Marble Cancer.

3. There are many man-made causes of air pollution. Some of the man-made sources of air pollution are

(i) Burning of Fuels : Air pollution is caused by burning of soil fuels, like coal and petroleum, in the industries, power plants and vehicles and by burning of fire-wood and dung cakes.

(ii) Chlorofluoro Carbons : It is also known as (CFCs). There are the chemical substances used in air conditioners, refrigerators and sprays release harmful gases that damage the ozone layer of the atmosphere.

(iii) Deforestation : The trees absorb substantial amount of carbon dioxide from the atmosphere. Hence, cutting of trees pollutes the environment by increasing the amount of carbon dioxide in the atmosphere.

4. Chlorofluoro Carbons : It is also known as (CFCs). There are the chemical substances used in air conditioners, refrigerators and sprays release harmful gases that damage the ozone layer of the atmosphere. Ozone layer protects us from the harmful ultraviolet rays of the sun. CFCs reduce the thickness of ozone layer and make holes at different places. These are called the ozone holes.

5. Deforestation : The trees absorb substantial amount of carbon dioxide from the atmosphere. Hence, cutting of trees pollutes the environment by increasing the amount of carbon dioxide in the atmosphere.

6. Boiled water is usually kept in filters. Filters are the electrical devices that help in purifying the water by carrying out osmosis. Filters can be non-electrical devices as well with a candle which filters all the minute impurities present in water.

(F) Answer the following question in detail :

1. Air is present everywhere. It is the mixture of many gases. It consists of 78·08%, nitrogen 21%, oxygen 0·97% of other gases. The presence of chemicals in the air in large quantities harmful to human health and the environment is known as air pollution. It may cause diseases, allergies or death in humans; it may also cause harm to other living organisms such as animals and food crops, and may damage the natural or built environment. Human activity and natural processes can both generate air pollution.

2. Water is most important for living organisms like human, animals and plants. Water is called the elixir of life. It is also an essential requirement for navigation, agriculture and industry. The earth is known as watery planet, oceans cover about 70 percent of its surface and about 97 percent of all the water on our earth is in oceans. It is not able to be drunk because this is salt water. Water that is suitable for drinking is called potable water. Our drinking water resources are wells, rivers, lakes, streams etc. The

contamination of water with unwanted and harmful substances is called water pollution. Some of water pollutants are domestic garbage, sewage, effluents from factories, pesticides and fertilizers. Every waste is being dumped into water bodies.

3. **The conservation of water are :** Water can be conserved by the following methods :
   (i) Use the water from washing clothes to clean and mop the floors.
   (ii) After washing the vegetables and pulses, use the water to watering the plants.
   (iii) Adopting water harvesting technique to replenish the ground water.
   (iv) Do not let the tap run when washing your hands or brushing your teeth.
   (v) Get a leaking tap or pipe repaired.

4. **The effect of water pollution are** :
   (i) Consumption of polluted water is a major cause of ill health. Polluted water causes some of the deadly diseases like cholera, dysentery, diarrhoea, tuberculosis, jaundice, etc.
   (ii) Contaminated water destroy aquatic life and reduces its reproductive ability. Water pollution deasticallly reduces the quantity of dissolved oxygen in water, which result in the death of aquatic organisms.
   (iii) Pollutes water is not suitable for drinking, recreation, agriculture and industry.

   The Effect of air pollution are :
   (i) Hydrogen sulphide gas has a strong smell of rotten eggs. It is poisonous cattle, pigs, dgs, chicken are badly affected by hydrogen sulphide. If inhaled in large quantity, it causes headache in human beings.
   (ii) Suspended particulate matter present in the air can cause irritation in eye, nose and throat. It can also cause respiratory problrms like asthma, bronchitis and lung cancer.

5. **The prevention and control of water pollution :** Water pollution can be prevented or reduced by the following suggestions:
   (i) Stop throwing the solid wastes into your house drains that empty into the rivers and lakes.
   (ii) Sewage should be treated in sewage treatment plants before releasing into water bodies.
   (iii) Industrial effluents should be treated and cleaned before discharging into water bodies.
   (iv) Limited use of fertilizers and pesticides can also control pollution of water body to a great extent. Moreover, use of eco-friendly fertilizers and biodegradable pesticides can prevent water pollution caused due to run-off and leaching.

6. **The Prevention and control air pollution are :**
   (i) Use LPG as a domestic fuel instead of wood, coal and kerosene. Coal should be made free of sulphue before using them to generate heat in factories and thermal power plants.
   (ii) We should use alternative sources of energy like solar enenrgy, hydropower, tidal energy, nuclear energy etc.

(iii) The automobiles engines working on CNG have significantly lowered toxic contaminantsin exhust.

(iv) The factories and the power plants should instakl smoke precipitatoes which remove the solid particles nd harmful gases and smoke. Smoke an also be wasted with water to remove sulphur oxides and nitrogen oxides.

(G) Discussion in Group :

Do yourself

(H) Project Work :

Do yourself

❑