Elements of Science - 6

1. Sources of Food

A. Tick (✓) the correct option:

1. (c) 2. (b) 3. (a) 4. (c) 5. (a) 6. (b) 7. (b) 8. (c) 9. (b) 10. (b)

B. Fill in the blanks:

1. Plants, animals 2. Spices 3. Sugarcane 4. animal 5. herbivores

C. State True or False:

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

D. Complete the following table:

1. Stem 2. Flower 3. Leaves 4. Seeds 5. Root

E. Answer the following questions in one or two words each:

1. Lemon 2. Mosquito 3. Queen bee 4. Horse, Cow and Zebra

F. Answer the following questions briefly (Short answer type questions):

1. We need food because it acts as fuel for all living organisms and helps them to do various day-to-day activities efficiently.
2. Edible parts are those parts of a plant which can be eaten, while non-edible parts cannot be eaten.
3. Different categories of food are: (i) Food from plants, (ii) Food from animals, and (iii) Food products from insects
4. (i) Stem (ii) Fruit (iii) Leaves (iv) Seeds
5. (i) Cow, Buffalo (ii) Lion, Tiger (iii) Bear, Human (iv) Flea, Leech

G. Answer the following questions in detail (Long answer type questions):

1. Human beings get their food from two main sources:
   (i) Plants, (ii) Animals
   Plants constitute an important part of the human food. Food that we get from plants are vegetables, fruits, cereals, pulses, sugar, oils and spices.
   Vegetables: Potato, onion, radish, carrot, spinach, tomato, methi, cauliflower, brinjal, etc. are the common vegetables. These are rich source of vitamins and minerals. They are also rich in water and roughage.
   Fruits: Mango, banana, apple, grapes, orange, litchi, etc. are some common fruits. These are rich sources of vitamins and minerals.
   Cereals: Cereals are the seeds of plants. They are the most important source of food. Wheat, rice, maize and bajra are the main cereals. They are rich source of carbohydrates. They provide us energy.
   Pulses: Pulses are also the seeds of some plants. Pea, gram, bean, rajma, etc. are the common pulses. They are rich source of proteins. They help in growth of the body.
   Oils: We obtain oil from the seeds of some plants. The common oil producing plants are mustard, groundnut, soyabean, sunflower etc. Oil helps in cooking our food.

Spices: Different parts of some plants are used as spices. Ginger (*Adrak*), coriander (*Dhaniya*), fennel (*Saunf*), thyme (*Ajwain*), cumin (*Jeera*), fenugreek (*Methi*), Nutmeg (*Jaiphal*) are commonly used spices. They provide flavour to our food.

Sugar: We get sugar from sugarcane and sugar beet. Sugarcane is a stem and sugar beet is a root. Sugar gives us energy to work.

2. Animals provide us food in the form of milk, meat, eggs, fish and honey.

   Milk: Milk is considered as a complete food. It usually contains all nutrients. We must take milk every day. Cows, buffaloes and goats are the main milk-yielding animals.

   Meat: Meat is a rich source of proteins. Goat, sheep, hen and duck are common animals used as a source of meat.

   Eggs: Birds which provide both meat and eggs are called poultry. Poultry animals include chicken, fowl and ducks. They provide meat and eggs. Eggs are rich in proteins.

   Fish: Fish is another major source of food in our country. It is rich in proteins. It is highly digestible. Some fish like cod and shark provide oil which is rich in vitamin D. Freshwater fish that are edible are catla, labeo, rohu, etc. Tuna and cod are examples of marine fish.

   Honey: Honeybees store their nectar in their hive in the form of honey. Honey contains water, sugar, minerals and enzymes. It is often used in medicines to cure cough. It is also used as an antiseptic.

3. The advantages of cooking food are given below:
   (i) It makes food edible.
   (ii) It makes food items soft and easily digestible.
   (iii) It makes food tastier.
   (iv) It kills the harmful germs present in raw food.

4. Food is consumed according to its availability in a region. Thus, the food habits of different regions are different.

   Eastern Region: In Bihar, West Bengal, Odisha and Assam, people predominantly eat rice and fish.

   Western Region: Gujarat, Maharashtra and Goa have enough of fish from sea and rivers and rice is the main crop because of abundant rainfall. They also like to have dhokla, pulses and groundnut products.

   Northern Region: People of Punjab, Rajasthan, Haryana and Himachal Pradesh eat bread (chapati), parathas, pulses and drink lassi.

   Southern Region: Food items of people of these areas are mainly sea animals, fish and rice. People also eat *idli*, *dosa*, sambhar and other preparations of rice, banana chips and coconut. They use coconut oil as a medium of cooking.

5. Herbivores: Animals that eat plants or plant products are called herbivores. Buffaloes, cows, deer and horses are herbivores or herbivorous animals. They have sharp, cutting teeth in front and flat, grinding teeth at the back.

   Carnivores: Animals that eat the flesh of other animals are called

carnivores. Lions, tigers, wolves, snakes, eagles and vultures are carnivores or carnivorous animals. These animals have long and sharp teeth or beaks to tear the flesh. Snakes have small teeth, which are used only to help in swallowing the prey as a whole.

HOTS

Following measures can be taken to avoid the wastage of food in a restaurant /hotel:

1. Avoid over-buying of the food stock.
2. Store the food material correctly so that it could not be rotten.
3. Use food preservation techniques.
4. Keep a check on the serving size.
5. Pack the food as and when it can be packed.

Find Out

Lions and tigers do not feed on the plants or plant products that their digestive mechanism is not fit for digesting vegetation. They cannot digest plants and plant products.

Science Olympiad

I. Butter Meat Milk Cabbage Orange Groundnut

II. 1. Beef 2. Milk 3. Apiculture 4. Leech 5. Capsaicin

2. Components of Food

A. Tick (✓) the correct options:

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

B. Fill in the blanks:

1. protein-rich 2. get oxidized, then 3. A 4. K
5. Vitamin D and calcium

C. State True or False:

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

D. Match the following columns:

1. (b) 2. (e) 3. (a) 4. (c) 5. (d)

E. Complete the following analogies:

1. Fluorine 2. Sodium 3. Carbohydrate

F. Encircle the odd ones out. Give reasons for your choices.

1. Rice, because others are pulses, which are sources of protein.
2. Peas, because others are fruits.
3. Eggs, because others are the sources of carbohydrates.
4. Coconut, because others are the sources of fats.

G. Answer the following questions briefly (Short answer type questions):

1. Food supplies substances which ensure that our bodies grow, have energy, and stay healthy.
2. Carbohydrates, Fats, Proteins, Vitamins and Minerals
3. Proteins help the body to grow and help to repair the damaged and worn-out parts of the body.
4. Minerals help in growth and strength of the body.
5. Malnutrition is a condition that develops when the body does not get the proper amounts of carbohydrates, proteins, vitamins, and other

nutrients that it needs to function properly.

6. Diseases caused due to deficiency of certain nutrients in our body are called deficiency diseases.

H. Answer the following questions in detail (Long answer type questions):

1. A diet, which contains all the nutrients in sufficient quantities, is called a balanced diet. A diet should contain carbohydrates, proteins, fats, vitamins, minerals, fibre and water in proper amounts. One should always take a balanced diet as it not only ensures proper growth of the body, but also protects against diseases.
2. (i) Carbohydrates are chemical compounds containing carbon, hydrogen, and oxygen. Carbohydrates present in certain food items provide energy to the body. This energy is used up for perpetuating various life processes. Carbohydrates form a major portion of our food. Food items rich in carbohydrates are obtained from plants such as rice, wheat, maize, potatoes, sweet potatoes, tapioca, bananas, and apples.

   (ii) Proteins help the body to grow and help to repair the damaged and worn-out parts of the body. They also form muscles, hair and nails. They form our blood and allow our brain to function properly. Proteins are, therefore, required in greater amounts when children are growing. The main sources of protein in the human diet are milk, meat, fish, eggs, and nuts.
3. Symptoms of Rickets: Rickets is a disease in which the bones become soft and twisted. A child with rickets can be identified by the presence of bone deformities like "bow legs" or "knock knees" and "pigeon chests". A rachitic child has weak muscles and is also prone to intestinal and respiratory tract infections.

   Cure: Daily diet should include milk and food items rich in vitamin D. Babies and children should be exposed to sunlight as vitamin D is made by the skin, when the body is exposed to sunlight. Calcium and Vitamin D supplements are also used to treat rickets.
4. Kwashiorkor is a protein deficiency disease in children. In this disease, the stomach becomes swollen, the legs become thin, and the skin shows ugly patches. If the disease is not treated in time, the mental and physical growth of the child slows down.

   Prevention: A protein rich-diet such as a combination of soyabean, gram, wheat, peanut, and jaggery or a diet with animal protein can cure the disease.
5. Causes of Anaemia: Anaemia is caused when the amount of haemoglobin in the blood falls. It is common in children whose intake of iron in the diet is not adequate to meet the demands of their rapid growth. Iron deficiency can occur due to reduced absorption of minerals from food. The conditions may be worsened by worm infections and malaria. Anaemia is very common in India.

   Prevention and Cure: Anaemia can be prevented by including iron-rich food items in the daily diet. Green leafy vegetables, pulses, cereals, meat, liver, and fish are rich in iron. The prevention of worm

infections is very important during the treatment of anaemia.

6. Diseases caused due to deficiency of certain nutrients in our body are called deficiency diseases.
   To prevent goitre, iodised salt should be made part of the diet. If sea fish is eaten at least once a week, it provides sufficient amount of iodine to prevent goitre.

HOTS

An athlete will need more carbohydrates in the diet as he needs high energy to play or perform in sports. On the hand, a person working in an office does very little physical activity and uses less energy. Hence, he needs less amount of energy-giving food (carbohydrates) in the daily diet.

Find Out

The given statement is not true as there are various other factors like smell from the person's sweat and bacteria present on the skin, which attract the mosquitoes towards the body.

Science Olympiad

I. 1. (c) 2. (d) 3. (b) 4. (a)

II. 1. Vitamin A 2. Iron 3. Goitre 4. Bowel 5. Sodium

3. Cleaning of Food

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. pure 2. Distillation, pure liquid, solution 3. chlorine
4. sedimentation 5. coagulation or loading 6. distillation

C. State True or False:

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

D. Complete the following analogies:

1. Separation of chaff 2. Fine particles

E. Match the following columns:

1. (d) 2. (c) 3. (b) 4. (a)

F. Answer the following questions in one or two words each.

1. Any substance which is made up of only one kind of particles (molecules or atoms) is called pure substance.
2. A mixture contains two or more kinds of particles of different substances in such a way that the particles can be separated by physical means.
3. Threshing is the process of beating out the grain from the chaff.
4. Winnowing is a method used by farmers to separate grains from husk after threshing.
5. Sieving is a method used for separating a mixture in which components are of different sizes.
6. Evaporation is the process by which we can separate soluble solids from a liquid-solid mixture. In this process, the liquid gets evaporated and solid is left behind.

G. Answer the following questions briefly (Short answer type questions).

1. Gold, silver, copper, oxygen, hydrogen and nitrogen
2. Following are the properties of mixtures.
   (i) In a mixture, components can be mixed in any desired ratio.
   (ii) They retain their individual properties because the constituent molecules do not change.
   (iii) They can be separated by simple methods.
   (iv) Energy exchange is not involved in the preparation of mixtures.
3. Seawater, Air, Wood, Rock salt
4.

Pure Substances	Mixtures
Pure substances consist of particles of one kind only.	A mixture consists of two or more types of particles.
Pure substances are homogeneous.	Mixtures are homogeneous as well as heterogeneous.
Pure substances have definite melting points, boiling points and density.	A mixture has no definite boiling point and melting point. They change as per the change in the constituent particles.

5. We can clean food (or food grains) by the following methods.
   a. Threshing b. Winnowing c. Hand picking d. Sieving
6. Sedimentation: Sedimentation is the process by which solids that sink in a liquid are allowed to settle down at the bottom of the container.
   Decantation: The process of removal of the clear liquid layer without disturbing the settled solids is called decantation.
7. Distillation is the process by which we can separate a pure liquid from a solution. The solution may contain some solids dissolved in the liquid.
8. We can follow the given method.
   Spread the mixture on a sheet of paper and roll a powerful horse-shoe magnet inside it. Remove the magnet from the mixture and scrape off iron filings from it. Repeat the procedure 10 times or more till no iron filings are left in the mixture.

H. Answer the following questions in detail (Long answer type questions):

1. The cleaning of food is necessary because of the following reasons.
   a. To prevent food spoilage from microbes.
   b. To make food more nutritive.
   c. To keep human body free from diseases.
   d. To improve the taste of food.
   e. To improve quality, which gives more returns to the farmers.
2. Sieves are tools used for separating a mixture in which components are of different sizes. They are very useful in post-harvest operations as they can separate out components of different sizes. For example, you must have seen your mother sieving wheat flour (*atta*) at home. The fine particles of *atta* pass through the sieve while the bigger

particles (wheat grain) remain on the sieve.

3. Sieving is more advantageous method than hand-picking because of the following reasons.
   a. Hand-picking is much tougher than sieving when a large amount of material has to be sorted.
   b. Since hand-picking a purely manual job, i.e. without the use of any tool, there are higher chances of mistakes.
   c. Sieving takes less time than hand-picking.
4. We use water for drinking, cooking, and other purposes. Many diseases are caused by unclean water. Therefore, it is necessary to clean water before drinking. Tap water supplied to our homes is first purified in the city's waterworks. The processes used are as follows:
   a. Sedimentation and decantation: Larger particles of solid impurities are first removed by sedimentation and decantation.
   b. Loading: Alum is then added to the water to separate the smaller particles by loading.
   c. Filtration: The water is filtered through sand filters.
   d. Chlorination: Germs are killed by adding chlorine to water.
5. We can obtain pure salt from a mixture of sand and salt by using the given method. Dissolve the mixture in 100 ml of water. The salt will dissolve but not the sand. Filter the mixture. The sand will remain on the filter paper. Collect the common salt solution as filtrate. Wash the sand with distilled water so as to remove any traces of salt. Dry the sand in the sun.

   Transfer the filtrate into a china-dish and heat it over the Bunsen flame. After a few minutes, water evaporates, leaving behind dry common salt.

I. Give reasons for the following.

1. Since farmers need to separate the husk from the wheat for their whole crop, it is very difficult or tough for them to do it by hand-picking. Hence, they do it by winnowing.
2. Filtration is a better method because in this method, a filter paper is used which does not allow even fine particles to pass through it. On the other hand, decantation is done without using any paper or tool. Hence, there are more chances that we have fine particles of impurities in our devastated water.
3. Since sugar gets completely dissolved in water and we get homogenous mixture, filtration cannot be used to separate them out.
4. Water is called as universal solvent because it dissolves a variety of substances than any other liquid.

HOTS

A fine muslin cloth is the best among the given options as it allows the milk to pass through it and the cream is left over it. A sheet of plain paper gets wet and it tears apart. On the other hand, a polythene sheet doesn't allow milk or cream to pass through it.

Find Out

Distilled water is deprived of some essential nutrients or minerals; hence it

is not suitable for drinking.

Science Olympiad

I. 1. Miscible 2. Immiscible 3. Immiscible
4. Miscible 5. Immiscible 6. Miscible

II. 1. Dirty 2. Clean 3. Dirty 4. Clean
5. Clean (considering other things to be clean)

4. Fibre to Fabric

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. seeds, stems 2. air 3. Linen 4. Flax fibre 5. Coir 6. Spinning

C. State True or False:

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

D. Complete the following analogies:

1. Natural fibre 2. Animal 3. Powerloom

E. Very short answer type questions.

1. Cotton, Wool
2. (i) They have the property of retaining our body's heat.
   (ii) Cotton clothes allow air to pass through them in hot and humid weather.
3. (i) They are easy to wash and maintain. (ii) They are strong.
4. Tropical climate
5. Removing the wool from sheep using special clippers is called shearing.
6. We should wear cotton clothes in kitchen because they do not catch fire easily and absorb sweat.

F. Short answer type questions:

1. We wear clothes to protect our body. They keep us safe from heat, cold, rain, wind, and insect bites. They also help us to show our culture.
2. Jute is a rainy season crop, grown best in warm, humid climates. Jute is used chiefly for making cloth for wrapping bales of raw cotton, and for making sacks and coarse cloth.
3. (i) These have the property of retaining our body's heat.
   (ii) Cotton clothes allow air to pass through them in hot and humid weather.
4. The major trade route between Europe and Asia was known as the silk route.
5. The rearing of the silkworm for the production of silk is known as sericulture.
6. Do it yourself.

G. Long answer type questions:

1. Natural fibres: Fibres that are obtained naturally from plants and animals are known as natural fibres.
   Synthetic fibres: Fibres that are made my humans using different

processes are known as synthetic fibres.

Advantages of natural fibres

(i). They have the property of retaining our body's heat.
(ii). The cotton fabrics absorb sweat and are comfortable to wear during summers.
(iii). Cotton clothes allow air to pass through them in hot and humid weather.

Disadvantages of natural fibres

(i). They are easily attacked by moths and moulds.
(ii). They do not retain their creases for long.
(iii). They may shrink on ordinary washing.
(iv). They do not dry rapidly.
(v). Natural silk is very expensive.

Advantages of synthetic fibres

(i). They are easy to wash and maintain.
(ii). They are strong.
(iii). They are crease resistant.
(iv). They are not attacked by moths and moulds.
(v). They dry up quickly.
(vi). They come in very attractive colours and prints.

Disadvantages of synthetic fibres

(i). They do not absorb sweat so well, but natural fibres do.
(ii). They do not allow air to pass through them and hence, they are not suitable for summers.
(iii). They may get damaged due to high temperature during ironing.
(iv). They catch fire more easily than cotton or wool.

2. Weaving is the process in which two sets of yarn are arranged together to make a fabric. Loom is a machine used in weaving fabrics from yarn or other fibres. A woven fabric produced on a loom is made by interlacing two sets of threads at right angles. The longitudinal thread is called the warp and transverse thread is called weft. The basic process of weaving consists of passing the weft threads alternatively over and under the warp threads.

   In order to prepare the loom for operation, the warp threads are installed in the loom and held under tension; they form a surface of closely spaced, and parallel threads. In order to begin the cyclic process that produces the fabric, first shedding occurs. Shedding raises some of the warp threads so that the weft thread can be correctly placed. In a plain weave—a simple weave in which each weft is alternately threaded above and below the warp threads—every other warp thread is raised. The space between the raised and unraised warp threads is called shed. Next, in the picking process, a device, called shuttle, pulls the weft thread through the shed. Then, on beating up, a device forces the weft thread against the previously placed weft threads to make the fabric compact.
3. Jute is a rainy season crop, grown best in warm, humid climates.

Harvesting of jute plants is done at the flowering stage. The harvested plants are immersed in water for a few days. The stems rot, thus emitting a bad odour. The fibres are separated by hand. Later, its fibres are converted into the yarns for making fabric or other uses.

4. Silk thread is obtained from the saliva of an insect, called silkworm. Its larva feeds on the leaves of mulberry trees. As it grows into adulthood, the caterpillar spins a cocoon around itself and changes into a pupa. At this stage, the cocoon is boiled in hot water. This kills the insect pupa and loosens the cocoon. It, then, becomes easy to separate the silk strand which is spun on to a reel.
5. Herbivores: Animals that eat plants or plant products are called herbivores. Buffaloes, cows, deer and horses are herbivores or herbivorous animals. They have sharp, cutting teeth in front and flat, grinding teeth at the back.
   Carnivores: Animals that eat the flesh of other animals are called carnivores. Lions, tigers, wolves, snakes, eagles and vultures are carnivores or carnivorous animals. These animals have long and sharp teeth or beaks to tear the flesh. Snakes have small teeth, which are used only to help in swallowing the prey as a whole.
6. There are two basic steps involved in the making of fabrics. These are: (i) Spinning; (ii) Making fabric from yarn
   (i) Spinning: Spinning is the process of making yarn from fibres.
   (ii) Making fabric from yarn: This is done by the following two processes.
   (a) Weaving: Weaving is the process in which two sets of yarn are arranged together to make a fabric.
   (b) Knitting: Knitting is one of the several ways of converting thread or yarn into cloth.

HOTS

1. We should wear cotton clothes while bursting crackers as they don't catch fire easily.
2. Retting is not used to separate cotton fibres from cotton balls as because of the process of retting, digestion of cellulose takes place.

Find Out

Merino sheep

Science Olympiad

I. (a) Sweater -- Wool (b) Saree -- Silk
   (c) Jacket -- Acrylic (d) Mat -- Coir

II. 1. Egypt 2. Tamil Nadu 3. Carry Bag 4. Silkworm 5. Knitting

5. Grouping of Materials

A. Tick (✓) the correct option:

1. (b) 2. (a) 3. (a) 4. (b) 5. (a) 6. (a) 7. (a) 8. (c)

B. Fill in the blanks:

1. lustre 2. conductor 3. insoluble 4. soluble 5. transparent
6. naturally, man-made 7. chromium coating 8. mercury

9. Talcum 10. generally opaque, generally transparent

C. State True or False:

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

D. Fill up the following analogies:

1. insulator 2. man-made substance 3. bad conductor of electricity

E. Write two examples of each one of the following:

1. Glass, water
2. Oiled paper, Mist
3. Wood, Metals
4. Chloroform, Alcohol

F. Write the names of three objects made from each one of the following materials.

1. Bowls, Windows, Food jars.
2. Napkins, Newspapers, Books.
3. Wires, Cooking pans, Screws
4. Bags, Belts, Shoes
5. Packing material, Trash bags, Kitchenware

G. Answer the following questions in one or two words each:

1. Material is the matter from which something can be made.
2. The materials that occur in nature are called naturally occurring materials.
3. The materials which do not occur in nature, but are made by man are called man-made materials.
4. The property of a substance to get dissolved in water is known as solubility.
5. Stones, Metals
6. Materials that conduct the heat are good conductors of heat. For example, all metals are good conductors of heat.
7. The property by which certain substances catch fire when heated in the presence of air is called combustibility.
8. The property of a substance due to which it can be beaten into thin sheet is called malleability.

H. Answer the following questions briefly (Short answer type questions).

1. Materials can be grouped on the basis of properties such as lustre, solubility in water, hardness, conduction of heat, heavier or lighter than water, transparency, magnetic properties, etc. This is known as grouping of materials.
2. The process of grouping things according to some common properties is called classification. Objects are classified on the basis of some similarities and dissimilarities.
3. Following are some important properties of a material.

   Appearance or Lustre, Hardness, Solubility in water, Floating or Sinking in water, Transparency, Conduction of heat, Combustibility, Attraction towards Magnet, Elasticity, Malleability, Plasticity, Ductility, Volatility.
4. We can know about the hardness of a given substance by pressing it. Or we can rub it against any other known substance. When the surfaces of these two different materials are rubbed against each

other, the surface which scratches the other surface is said to be harder.

5. Plastics are bad conductors of electricity. To prevent us from an electric shock, metal wires are covered with plastics.

I. Answer the following questions in detail (Long answer type questions):

1. We can check the solubility of water by doing the following activity and can prove that water is a good solvent.
   Take 3 test tubes. Fill each with 10 ml of water. Mark them as A, B, and C. Pour 30 ml of things available in your kitchen like vinegar, lime juice, and cooking oil in test tubes A, B, and C, respectively and stir carefully.
   You will notice that out of these three things, vinegar and lime juice mix well in water, whereas cooking oil does not. This proves that water is a good solvent. You can add and stir salt, sugar and other powered spices available in the kitchen and you will see that most of them get dissolved in water.
2. Good conductors of heat: Aluminium, Gold, Iron
   Bad conductors of heat: Plastic, Wood, Air, Water, Mercury

HOTS

1. Utensils are generally made of metals or metal alloys, which are good conductors of heat. Hence, the handles of utensils have plastic or wooden coverings, which are bad conductors of heat, so that the heated vessel could not hurt us.
2. This is so because the volume of water displaced by the ship is greater than its weight and the average density of the ship as a whole is less than the density of water. On the other hand, the weight of the water displaced by the iron nail is less than its weight and also, iron is denser than water. So, the iron nail sinks.

Find Out

Some materials are costlier than others because of their limited availability. For example, iron is present in abundance than gold, hence gold is costlier than iron. Moreover, the process of getting a pure material also decides its cost. More is the cost of the process; costlier the material is.

Science Olympiad

I. (a) Copper, Iron (b) Wax, Ice (c) Vinegar, Lime juice
(d) Diamond (e) Talcum

II. 1. (e) 2. (c) 3. (d) 4. (a) 5. (b)

6. Changes Around Us

A. Tick (✓) the correct option:

1. (c) 2. (a) 3. (b) 4. (b) 5. (b) 6. (c) 7. (c) 8. (a)

B. Fill in the blanks:

1. irreversible change 2. irreversible change 3. solute
4. solution 5. released 6. chemical change 7. reversible

C. State True or False:

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

D. Write the types of changes in the following cases.

1. Physical change 2. Irreversible change 3. Fast change
4. Chemical change

E. Complete the following analogies:

1. Undesirable change 2. Rusting of iron

F. Answer the following questions in one or two words each:

1. Become different 2. Occur slowly 3. Occur fast
4. Useful changes 5. Useless changes
6. Changes which can be reversed to their original forms.
7. Changes which cannot be reversed to their original forms.

G. Answer the following questions briefly (Short answer type questions).

1. (i) a. Water to ice b. Iron to magnet
   (ii) a. Digestion of food b. Growth of our body
   (iii) a. Melting of wax b. Formation of clouds and rain
   (iv) a. Cooking of food b. Ripening of fruits
2. Following points highlight the characteristics of a chemical change.
   (i) The chemical change is permanent in nature.
   (ii) The chemical change is irreversible.
   (iii) New substances are formed during a chemical change.
3.

Physical Change	Chemical Change
Most physical changes are temporary and can be reversed easily.	Chemical changes are permanent and cannot be reversed easily.
No new substances are formed.	New substances with different properties are formed.
Heat and light may or may not be used or produced.	Heat or light or both are often used or produced.
Examples: Melting of wax; Formation of clouds and rain.	Examples: Cooking of food; Ripening of fruits.

4. A solution, which cannot dissolve more of a solute at a given temperature, is called saturated solution at that temperature.
5. Solute: A substance which dissolves in a liquid (normally water) is called solute.
   Solvent: A liquid (generally water) which dissolves another substance in itself is called solvent.

H. Answer the following questions in detail (Long answer type questions):

1. We can classify the changes into following categories.
   (i). Slow and fast changes
   Slow changes: These changes occur very slowly. For example, growing of plant, changing of milk into curd.

Fast changes: These changes occur very fast. For example, melting of ice, burning of cooking gas.

(ii). Desirable and undesirable changes

Desirable changes: These are the changes which are useful to us. For example, cooking of food, ripening of fruits.

Undesirable changes: These are the changes which are useless or harmful to us. For example, overcooking of food, over ripening of fruits.

(iii). Reversible and irreversible changes

Reversible changes: These are the changes which can be reversed to their original forms. For example, ice to water, iron to magnet.

Irreversible changes: These are the changes which cannot be reversed to their original forms. For example, formation of curd from milk, boiling of rice.

(iv). Physical and chemical changes

Physical changes: These are the changes in which physical properties of matter like shape, size, temperature and state (solid, liquid or gas) are affected. For example, melting of wax, Formation of clouds and rain.

Chemical changes: These are the changes in which a new substance having different properties from reactants is produced. For example, rusting of iron, ripening of fruits.

2. Changes that cannot be reversed are known as irreversible changes. If you boil a potato, it turns soft. If rice is boiled, it gets cooked. If you boil an egg, it changes into a solid. All these changes cannot be reversed. They all are the examples of irreversible changes.

   Digestion of food and growth of our bodies are also examples of such changes. The breaking down of plant and animal remains into simple substances is a change that makes soil fertile. All these are irreversible changes, and they play very important roles in our day-to-day lives.

3. Chemical changes are those changes in which a new product having different properties from reactants is formed. We can see the following chemical changes around us.

   (i) When iron articles are kept exposed to moist air for a long time, a brown flaky substance, called rust is formed on their surface. This process is called rusting and it is an irreversible change. The properties of rust and iron are totally different from one another.

   (ii) On burning coal, carbon dioxide gas is produced along with a lot of ash. The compositions of coal, ash, and carbon dioxide gas are totally different from one another.

   (iii) When electric current is passed through water, it splits up into hydrogen and oxygen gases whose properties are completely

different from those of water.

4. A solution, which cannot dissolve more of a solute at a given temperature, is called saturated solution at that temperature.
   A saturated solution of sugar can be prepared by keep on adding and dissolving sugar to water at room temperature. A point will come when sugar stops dissolving in water at room temperature. At this point, the solution is known to be the saturated solution of sugar at room temperature.

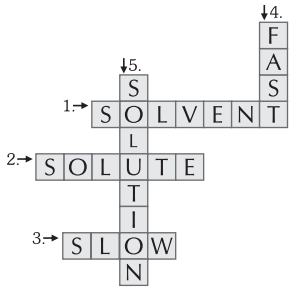
I. Write the reason:

1. This is done so because these gaps accommodate the expansion of rails during hot weather (summer), without damaging the tracks.
2. In order to fix the handle, the ring is first heated so that it expands and then, the handle is fitted into the ring. As the ring cools down, it contracts and fits tightly on to the handle. Hence, it involves both expansion and contraction.

HOTS

1. These two changes are not similar burning of wick is a chemical change, while melting of wax is a physical change.
2. This is done to adjust the linear expansion of metal wires; these metal wires expand during summers and contracts during winters.

Find Out



Science Olympiad

I. 1. R 2. I 3. I 4. I 5. R
6. I 7. I 8. R 9. R 10. R

II. Reversible: Cutting, Melting, Blowing, Magnetization, Deformation
Irreversible: Burning, Evaporating, Bursting, Rusting, Heating

7. Life Around Us

A. Tick (✓) the correct option:

A. 1. (c) 2. (c) 3. (b) 4. (a) 5. (c) 6. (b) 7. (a)

B. Fill in the blanks:

1. Cell 2. Respond 3. Phototropism 4. necessary

5. Biotic 6. 1−4 7. Geotropism 8. Micro−organisms
9. Owls, bats

C. State True or False:

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

D. Complete the following analogies:

1. 2−3 years 2. definite growth 3. Air

E. Answer the following questions in one or two words each:

1. 35 metres 2. Smallest particles 3. Amoeba, Paramecium
4. Addition of material on the outside 5. Stimulus
6. Response of a plant towards light.
7. Response of roots towards gravity. 8. Gills

F. Answer the following questions briefly (Short answer type questions).

1.

Living Things	Non−living Things
Living things are made up of cells.	Non−living things are made of molecules.
Living things can grow, respire, reproduce, take food, respond to stimuli, etc.	Non−living things cannot grow, respire, reproduce, take food, respond to stimuli, etc.
For example: Cat, Human, Dog, etc.	For example: Car, Air, Table, etc.

2. The tiny forms of life that can be seen with the help of microscope only are known as micro−organisms.
3. Habitat is the place where living organisms live.
4. Living components of the habitat are known as Biotic components. For example: Plants, Animals, etc.
   Non−living components of the habitat are known as Abiotic components. For example: Light, Air, Soil, etc.

G. Answer the following questions in detail (Long answer type questions):

1. The main characteristics of living things are:
   (i) Growth and development: Living things can grow by increasing their weight, size or volume. Growth in living things occurs due to the division of cells within the body.
   (ii) Movement: Living things can move their body as a whole or a part of the body. Animals move from place to place in search of food, water and shelter whereas plants move towards light and water.
   (iii) Nutrition: Living things need food for energy and performing the various life activities. Some make their food on their own like plants and some organisms depend on other organisms for their food.
   (iv) Respiration: Living things breathe in oxygen and respire to obtain energy.
   (v) Response: Living things respond to various stimuli. Like, removing of the hand instantly from hot utensil, mimosa plant

droops if something touches it, etc.

(vi) Reproduction: Living things give birth to next generation of their own kind.

(vii) Lifespan: All living things have a definite lifespan that means they die after a certain age.

2. Biotic components interact with abiotic components in various ways:

(i) Air is essential for the survival of living organisms. Plants and animals use oxygen from the air to respire. Plants use carbon dioxide from the air to perform photosynthesis.

(ii) Water is another essential condition for existence of life. Water also acts as a habitat for many living organisms.

(iii) Soil is the main source of nutrients and water for plants. It supports the plant life due to which other living organisms get their food from plants.

(iv) Sunlight is an important ingredient for plants to perform photosynthesis. Some animals live in light like butterflies, birds but some animals refer to live in dark like bats, owls, etc.

(v) Fire is a source of heat and light. It helps the human to cook their food. But sometimes fire becomes the source of destruction.

3. The soil is an important abiotic factor because:

(i) It provides plants with essential nutrients and minerals.

(ii) It holds water which is used by plants and also maintain the adequate aeration.

(iii) It provides air for exchange of gases among roots of the plants and atmosphere.

(iv) It holds the plants and protect it from destruction and erosion.

HOTS

1. Hair and finger nails are non–living parts of our body because they are made up of dead cells. The base of nails and roots of hair are made up of living cells that's the reason they grow otherwise they are non–living.
2. Dolphins and whales are mammals, not fishes. They breathe through the lungs and hence do not have gills.

Find Out

As human population increased, the rate of deforestation and urbanization are also increased. This became the main reason of extinction of many species of plants and animals during the past five or six decades.

Science Olympiad

I. Skin Gills Lungs Spiracles

II. 1. Wind 2. Aeroplane 3. Frog 4. Ant 5. Tiger

8. The Living Habitat

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. Adaptations 2. Xerophytes 3. Hydrophytes 4. Mesophytes
5. Air bladder

C. State True or False:

1. True 2. False 3. True 4. False

D. Complete the following analogies:

1. Air 2. Protective colouration

E. Match the following columns:

1. (d) 2. (c) 3. (b) 4. (e) 5. (a)

F. Answer the following questions briefly (Short answer type questions).

1. The Sharks have streamlined bodies, fins to swim and gills to breathe.
2. Mimicry is a protective adaptation in which individuals of an edible species resemble other inedible species, which are unpalatable to a predator.
3. The fishes have streamlined body without a neck which help them to swim. They have special body coverings like cuticles, scales, shells and waxy coatings which prevent rotting and decay. They have gills for breathing.
4. Camel conserves the water as follows:
   (i) It excretes very less water from the body as urine.
   (ii) It passes nearly dry dung.
   (iii) It does not perspire.
5. Man is the organism who is exploiting the resources of nature at large scale. In order to meet the demands of ever-increasing population, deforestation is occurring at large scale which may put the life of all living organisms in danger. So, Man should be responsible for all world habitats.

G. Answer the following questions in one or two words each:

1. A place where an organism lives, breeds and flourishes.
2. Process which makes an organism fit to survive in an environment.
3. The adaptive features xerophytes are: Very extensive root system which goes deep into the soil in search of water, numerous root hairs, small scale like leaves, leaves coated with cuticles, etc.
4. The adaptive features of plants that live in water are: Poorly developed root systems, root hairs and root caps are absent, thin and ribbon like leaves, cuticle and stomata are absent, etc.

H. Answer the following questions in detail (Long answer type questions):

1. The main factors that influence a habitat are:
   (i) Temperature: It is the measure of degree of hotness or coldness. Some organisms live in cold region like polar bears, penguins, etc. whereas some can tolerate high temperature of desert like camel, cactus, etc. and some lives in moderate temperature cow, mango tree, etc.
   (ii) Light: Green plants need light to survive to perform photosynthesis. Whereas some animals do not like light and prefer to live in dark like earthworms, bats, etc.
   (iii) Water: All living organisms need water for survival. Some animals adapted to live in water deficient area like camel, cactus, etc.

whereas some live in the water like fishes.

(iv) Air: All living organisms need oxygen to respire and they get oxygen from the air around them. Even plants need carbon dioxide from the air for photosynthesis.

(v) Soil: Soil is the main source of nutrients and water for plants. It supports the plant life due to which other living organisms get their food from plants.

2. Thorns and spines are useful to a plant in various ways:
   (i) Thorns in the plants help them to protect them from the grazing animals.
   (ii) Thorns and spines help the desert plants to reduce the water loss from the pores of leaves.
3. Skin helps animals for protection in various ways:
   (i) It protects the animals from various climatic conditions.
   (ii) It prevents the loss of too much water from the body, thus protecting it from dryness.
   (iii) Animals that live in cold regions have thick fur on their skins to keep their body warm.
   (iv) Animals like lizards and snakes have scales on their skin to protect their body from dehydration.
   (v) Birds have feathers on their skin which help them to fly and protect their body from dehydration.

I. Coral reefs along our coastlines are the most fascinating habitats on the planet and are home to countless animal species. Name a few animals found in this habitat.

Sponges, Eels, Clown fish, Jelly fish, Crabs, Parrot fish, Sea stars, etc.

HOTS

At day time, animals stay deep underground in the burrows as the sand is much cooler there which helps them to avoid the high temperature of desert at day time. At night, after the sun goes down and sand cools off, animals come out for search of the food.

Find Out

In ancient India, Cheetahs were taken from the wild and being tamed for a sport. Cheetahs are not known to be bred in captivity, which lead to their extinction as most of the cubs are taken from the wild and being trained in captivity for the entertainment of maharajas.

Science Olympiad

I. 1. Camel 2. Frog 3. Sahara 4. Volants 5. Gills 6. lotus

II.

Cactus	Duranta	Apple	Lizard
Xerophyte	Mesophyte	Mesophyte	Terrestrial

9. Plants: Forms and Functions

A. Tick (✓) the correct option:

1. (b) 2. (b) 3. (a) 4. (a) 5. (a) 6. (c) 7. (a) 8. (b)

B. Fill in the blanks:

1. months 2. Stamen, pistil 3. Pistil 4. seeds 5. Ovary 6. nectar

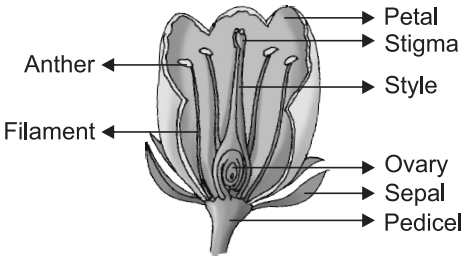
C. State True or False:

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

D. Complete the following analogies:

1. Fibrous root 2. Rose plant

E. Label the different parts of the given flower.



F. Tick (✓) the correct and cross (×) out the incorrect statements. Write the correct statements for the incorrect ones.

1. Incorrect
   In some plants, roots arise from the branches of plants, called prop roots.
2. Correct 3. Correct 4. Correct
5. Incorrect
   Clove is a dried flower bud.
6. Incorrect
   Cotton is a bisexual flower.

G. Give one word for each one of the following:

1. Style 2. Veiniest 3. Petiole 4. Anther

H. Select the odd one out giving reason:

1. Node 2. Onion 3. Stamen 4. Sugarcane

I. Answer the following questions briefly (Short answer type questions).

1. Three main functions of a root are:
   (i) It fixes the plant firmly in the soil.
   (ii) The root hair help in the absorption of water and minerals from the soil.
   (iii) It prevents soil erosion.
2. The main functions of a stem are:
   (i) It supports branches, leaves, flowers, buds and fruits.
   (ii) It acts as a storehouse of food material.
   (iii) The green stem can make food for the plant.
   (iv) It helps in transportation of water and mineral salts absorbed by the roots of plant.
3. Fertilization is the process of fusion of male cell and female cell in an ovule.
4. Reproduction is the main function of flower. Through reproduction, plants bear fruits and seeds.
5. Dispersal of seeds means spread of seeds away from the parent plant.

6. The main functions of a fruit are:
   (i) It protects the seed from against injury and other unfavourable climatic conditions.
   (ii) It helps in the dispersal of seeds.
   (iii) It stores food.

J. Answer the following questions in detail (Long answer type questions):

1. There are two types of root system:
   (i) Taproot System: It consists of a single main primary root with lateral branches arising from it. The primary root is longer than its branches. Plants having taproots are pea, gram, bean, etc.
   (ii) Fibrous root System: In this root system, the primary root is short lived and is replaced by cluster of thin fibre like roots. Plants having fibrous roots are wheat, maize, rice, etc.
2. The modifications of stems are:
   (i) Storage of food: The stems of some plants remain underground. They appear like roots but they are stem having nodes, leaves and buds. They become thick and fleshy due to the storage of food. For example: Potato, Ginger, etc.
   (ii) Mechanical support: Some plants have weak stems which are modified into thin, wiry, coiled and leafless structures known as tendrils. For example: grape vine, gourd, etc.
   (iii) Food Manufacturing: In some plants, stems are green which perform all the functions of leaves. They carry out the process of photosynthesis. For example: Cactus.
3. The functions of stems are:
   (i) Support: It supports branches, leaves, flowers, buds and fruits.
   (ii) Transportation: It helps in transportation of water and mineral salts absorbed by the roots of plant.
   (iii) Food storage: It acts as a storehouse of food material. For example: potato, ginger, etc.
   (iv) Food Manufacturing: The green stem performs the process of photosynthesis and make food for the plant.
   (v) Perennation: Some underground stems like potato, garlic help the plant to tide over the unfavourable climatic conditions.
   (vi) Climbing: Some plants have weak stems which are modified into thin, wiry, coiled and leafless structures known as tendrils. For example: grape vine, gourd, etc. This helps the plants to climb.
4. A leaf is a flattened, thin, green and lateral structure borne on the stem.
   The role of leaf in the life of a plant:
   (i) Manufacturing of Food: The main function of leaf is to make food for the plant by the process of photosynthesis.
   (ii) Transpiration: It is the process through which excess water is lost through the stomata present in lower surface of a leaf.
   (iii) Gaseous Exchange: Gases are exchanged during respiration and photosynthesis. Stomata present in the leaves help in the exchange of gases.

(iv) Storage of food: In some plants, leaves are modified to store food. For example: Onion.

(v) Vegetative propagation: Leaves of some plants bear buds in the marginal notches from which new plants can grow. For example: Bryophyllum.

5. A flower possesses male and female reproductive organs. The male sex cells are in the pollen grains found in the anther and the female sex cells are contained in the ovules found in the ovaries. Pollen grains are transferred from anther to the stigma by the process of pollination. Then fertilization takes place in which male sex cell and female sex cell fuses in an ovule. The fertilised ovules grow into seeds and ovary is converted into fruit.

HOTS

1. Spines are the modified leaves of cactus. It helps to imagine the cactus as stem and spines as leaves. Spines protect cactus from their predators. It also helps to reduce the water loss through leaves or spines.
2. Green leaves of croton turned into blue–black with iodine solution due to the presence of chlorophyll.

Find Out

Some plants close their leaves or flowers at night in response to light and dark. Such plants are called nyctinastics.

Science Olympiad

I. Tap root Stem Adventitious roots Corolla Stigma

II. (a) (ii) (b) (v) (c) (iv) (d) (iii) (e) (i)

10. Body Movements

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. ball and socket 2. pivot joint 3. Bones 4. ribs
5. voluntary muscles

C. Tick (✓) the correct and cross (×) out incorrect statements.

1. Correct 2. Correct 3. Incorrect 4. Incorrect 5. Correct

D. Complete the following analogies:

1. Hind limbs 2. Fish

E. Match the following columns:

1. (e) 2. (f) 3. (b) 4. (a) 5. (c) 6. (d)

F. Define the following terms:

1. Joint: It is the place where two or more bones meet.
2. Skeleton: It is the system of bones and joints in a body.
3. Girdles: Girdles are the bony rings at the anterior and posterior ends of vertebrate trunk which supports the arms and legs. There are two pair of girdles: a pair of shoulder girdles and a pair of hip girdles.
4. Voluntary muscles: The muscles whose movements are under our control are called voluntary muscles.
5. Involuntary muscles: The muscles whose movements are beyond our control are called involuntary muscles.

6. Tendon: Tendons are the tough bonds which attach muscles to bones.
7. Shell: It is the outer skeleton of animal which protects it from physical harms.
8. Ligament: They are the strong, stretchy bands that keep the bones together at the joints.

G. Answer the following questions in one or two words each.

1. a pair of shoulder girdles and a pair of hip girdles.
2. 12 3. Shoulder and hip−girdles. 4. Synovial joints
5. 33 bones 6. Hinge joints
7. Locomotion is the ability to move from one place to another.
8. A streamlined body is a body shape which is narrow at the ends and broad in the middle. It helps the fish to swim by reducing the friction in water.

H. Answer the following questions briefly (Short answer type questions).

1. Pivot joints are the joints where one bone moves like a door on the hinges. This joint is found between the head and the neck.
2. (a)

Vertebrates	Invertebrates
The organisms which have backbone are known as vertebrates.	The organisms which do not have backbone are known as invertebrates.
For example: humans, birds, etc.	For example: Insects, flatworms, etc.

(b)

Ligament	Tendon
Ligaments are the strong, stretchy bands that keep the bones together at the joints.	Tendons are the tough bonds which attach muscles to bones.

(c)

Voluntary Muscles	Involuntary Muscles
The muscles whose movements are under our control are called voluntary muscles.	The muscles whose movements are beyond our control are called involuntary muscles.
For example: Muscles of hands and legs	For example: Muscles of heart, eyes, etc.

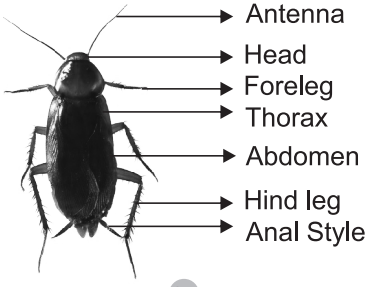
3. Our elbow has hinge joint which can move only in one direction. Whereas our shoulder has ball and socket joint which can move in any direction.
4. The functions of skeletal system are:
   (i) It gives shape to the body.
   (ii) It protects our internal organs like heart, lungs, stomach, etc.
   (iii) It makes red blood cells.
   (iv) It serves as a storehouse to various minerals such as calcium.
5. Muscles always work in pairs. When one muscle contracts, the other muscle relaxes and this enable bones to move.

6. The earthworm does not have bones. It moves with the help of muscles. The earthworm extends the front part of its body keeping the rear part of the body fixed to the ground. Then it fixes the front part and release the rear part. It then shortens its body and pulls the rear end forward. It repeats this process of muscle expansion and contraction several times to move.
7. The shell of the snail has a small opening from which its head and muscular foot comes out. The foot produces a wavy motion which is very slow and help the snail to move slowly.
8. A fish moves with the help of its fins and tail. The powerful muscles of its tail help it to push the water backward. Fins help the fish to keep the balance. The streamlined body of the fish helps to reduce the friction of water and thus fish can easily move.

I. Answer the following questions in detail (Long answer type questions):

1. The place where two body parts seem to be joined together are called joints. Different kind of joints in human body are:
   (i) Ball and socket joints: These type of joints are present in the shoulders and hip-girdles.
   (ii) Hinge joints: These type of joints are present at elbows, knees, fingers and toes.
   (iii) Pivot joints: These type of joints are present in the head and the neck.
   (iv) Gliding joints: These type of joints are present in the wrists and ankles.
2. A cockroach can walk, climb as well as fly in the air. It has three pairs of jointed legs. These help in walking. Its outer skeleton also helps in movement. IT has two pair of wings attached to the breast, which enables it to fly. It has distinct muscles near the legs, which helps him to walk.
3. Muscles are attached to the bones. They always work in pairs. When one muscle contracts other stretches. In arms, the triceps stretches and biceps contracts to bend the arm. And to stretch the arm, triceps contracts and biceps stretches.
4. Birds have light and hollow bones. They have strong hearts that can supply blood and oxygen to every part of the body. Most of the birds have sharp vision to see on the ground from great heights.

J. Label the different parts of a cockroach.



HOTS

1. When muscle joints are pulled apart there forms a tiny cavity filled with gas which then collapses, creating a popping noise.
2. A snake cannot move in a smooth surface easily Because their scales grab onto dirt and grass and stuff like that. Using their scales to grab onto the surface is how they move around. If there isn't anything to grab onto then they have a hard time moving across that surface.

Find Out

Giraffe has the average height of 4−6 m. It has long legs. So, when it falls on the ground, its very difficult for it to stand back up with this so long body. That's the reason once it falls, it becomes an easy meal for predators.

Science Olympiad

I. Bone Earthworm Joint Spine

II. 1. Joint 2. Hinge 3. Cartilage 4. Wings 5. Back
6. Skeleton 7. Streamlined 8. Ribs 9. Loops

11. Motion and Measurement of Distance

A. Tick (✓) the correct option:

1. (a) 2. (a) 3. (a) 4. (c) 5. (b) 6. (a) 7. (b) 8. (b)

B. Fill in the blanks:

1. periodic motion 2. translatory motion 3. rotatory motion
4. random motion 5. non-periodic motion 6. periodic motion
7. translatory motion 8. random motion

C. State True or False.

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

D. Complete the following analogies:

1. kilogram 2. oscillatory motion 3. random motion

E. Answer the following questions in one or two words each.

1. The desire of the man to fly in the sky led to the invention of the aeroplane.
2. A body is said to be at rest (or in state of rest) when it does not change its position with respect to its surrounding objects.
3. The continuous change of position of a body with respect to another is called motion.
4. When an object covers equal distances in equal intervals of time, then the motion of the object is said to be uniform motion.
5. Example of periodic motion: Rotation of earth, Motion of hands of a clock
   Examples of non-periodic motion: Football player running in the field, motion of a bicycle
6. We will be in the state of motion with respect to the ground, if we are sitting in a moving car.
7. Metre (m) is the SI unit of length.

F. Answer the following questions briefly (Short answer type questions).

1. Rest: A body is said to be at rest (or in state of rest) when it does not change its position with respect to its surrounding objects.

Motion: A body is said to be in motion (or in state of motion) when it constantly changes its position with respect to its surrounding objects.

2. The continuous change of position of a body with respect to another is called motion. Generally, there are two types of motion.
   Uniform motion: When an object covers equal distances in equal intervals of time, then the motion of the object is said to be uniform motion.
   Non-uniform motion: If an object covers unequal distances in equal intervals of time or vice versa, then the motion of the object is said to be non-uniform motion.
3. Periodic motion: The motion which repeat themselves after a certain fixed period of time is called periodic motion.
   Non-periodic motion: The motion which is repetitive in nature but is not regular are called non-periodic motion.
4. It is essential to have standard system of units for uniformity and convenience. It remains the same under all conditions.
5. It is necessary to use multiples and sub-multiples of a standard unit so that we can measure very small and very large quantities conveniently.
6. First keep the measuring tape on the object. Then line up the zero mark of the measuring tape with one end of the object and measure till the end of the object.
7. 3 km 260 m or 3.260 km
8. 30.4 cm

G. Answer the following questions in detail (Long answer type questions):

1. The early man moved only on foot. Then, animals were domesticated, and they carried men and goods from one place to another. For travelling on water, wooden logs were used; they had hollow cavities to stay afloat. Gradually, man learnt to join logs to make rafts.
   The invention of wheel made land transport easier. Now, vehicles began to be made which could be pulled by animals.
   In Nineteenth century, the steam engine was invented and it brought about a big change in the way people travelled. Carriages, rails, and boats could all be driven by steam engines. This made travel very fast.
2. When an object covers equal distances in equal intervals of time, then the motion of the object is said to be uniform motion.
   Let us understand uniform motion with the help of an example. Suppose a car travels 10 m in 1 s, 10 m in next 1 s and again 10 m in the subsequent second. Here, the car is covering equal distances in equal intervals of time. So, car is said to be in a uniform motion.
3. (i) The hands of a wall clock exhibit periodic motion as it takes the same intervals of time to complete one round.
   (ii) A moving ceiling fan exhibits rotatory or circulatory motion as it moves about a fixed axis without changing its position.
   (iii) The march past on the sports day exhibit translatory motion as all the students there move through the same distance in the same time.

4. Rotatory Motion: Rotatory or circulatory motion is that in which a body moves about a fixed axis without changing its position. A potter's wheel, a spinning top and a merry-go-round are some examples of this type of motion.
   Oscillatory motion: Oscillatory motion is the motion in which a body moves to and fro about its mean position. The pendulum of a clock exhibits oscillatory motion.
5. The process of comparison of an unknown quantity with a known quantity is called measurement. For taking any measurement, we need a unit and then find how many times the unit chosen is contained in the given quantity.
   For uniformity and convenience, a common unit is necessary for the measurement of a physical quantity. For accurate measurement, we need some standard representation of every physical quantity; such a chosen standard is called standard unit.
6. First of all, make a knot at one end of the thread. Put the knot at the starting point of the line. Now, put the thread exactly along the curved line, keeping it pressed with thumb of your one hand, and laying it along the line in a taut position with your other hand. This process should be continued till the other end of the curved line is reached. Mark the thread at that point which touches the end of the line. Now, stretch out thread along a metre-scale, and measure the length of the curved line.
7. Following are the precautions to be taken while measuring length using a ruler.
   (i) The measurement should ideally be started from the edge/zero mark of the ruler. If the edge is worn out, the measurement can be started from any other fully clear mark. The final length can be calculated by using the difference between the end mark and the start mark of the ruler.
   (ii) The ruler should be carefully kept along the length of the object.
   (iii) Our eyes should directly above the point where the measurement is to be taken.

HOTS

The sun appears to rise in the east and set in the west because of the periodic motion of the earth, i.e. rotation of the earth on its axis.

(a) ampere (b) mole (c) candela (d) kelvin

Find Out

1st Baron Kelvin or William Thomson was an Irish-Scottish mathematical physicist and engineer who was born in Belfast in 1824. Thermodynamic temperatures are measured in units of kelvin in his honour.

James Prescott Joule was an English physicist, mathematician and brewer, born in Salford, Lancashire. The standard unit of energy, Joule, is named after him.

Science Olympiad

I. (a) 1 m 25 cm (b) 42 km 478 m (c) 19600 m

II. 1. Oscillatory motion
2. Translatory motion
3. Random/Non-periodic motion
4. Rest
5. Non-periodic motion
6. Periodic motion

12. Electric Current and Circuits

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. two 2. ampere 3. closed path 4. conductors, insulators 5. fused

C. State True or False for the following.

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

D. Match the following columns:

1. (b) 2. (c) 3. (a) 4. (f) 5. (d) 6. (e)

E. Complete the following analogies:

1. Insulator 2. Wrist watch

F. Answer the following questions in ones or two words each.

1. An electric torch is a device which converts the chemical energy of the cell to light energy.
2. Iron 3. Switch 4. Terminals are the ends of a cell/battery.
5. There are two terminals: positive terminal and negative terminal.

G. Give reasons for the following:

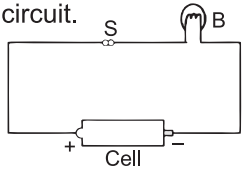
1. Electric wires are insulated so that one could not get electric shock while touching them.
   These insulators also help in preventing electric fires.
2. Copper is very good conductor of electricity; hence copper wires are used in electric circuits.

H. Answer the following questions briefly (Short answer type questions).

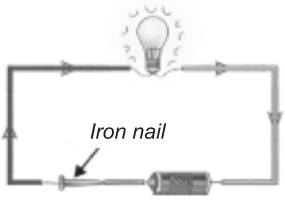
1. There are two terminals in a bulb.
2. The filament of a bulb is made of tungsten.
3. The flow of charge from one place to another place produces electricity.
4. The closed path in which the electric current flows is known as electric circuit.
5. The object which does not allow electricity to pass through it is called an insulator.
6. We use metallic wires because they are good conductors of electricity.

I. Answer the following questions in detail (Long answer type questions):

1. In order to operate an electric appliance, electricity has to flow from its source to the electric appliance through a definite path which is a circuit of metallic wires. If the path is proper, then the electric appliance connected to the path works. Such a path is called electric circuit. The following diagram shows an electric circuit. Here a bulb 'B' is attached with a cell through metallic wires. A switch 'S' is also there. When the switch 'S' will in the ON state, the bulb 'B' will glow, otherwise not.



2. Set up a circuit as shown in the figure below. We call it a tester. Place an iron nail in between the two ends of the wires. Touch both the wires with the iron nail. What do you see? You will see that the bulb glows. This indicates that the current is passing through the iron nail. So, the iron nails are conductors of electricity. Repeat the experiment by replacing iron nail with a piece of chalk. You will find that this time the bulb does not glow. This means chalk is an insulator.



3. Conductors: Materials which allow electric current to pass through them are called conductors of electricity. For example, iron, gold, copper, silver, aluminium are conductors.
   Insulators: Materials which do not allow electric current to pass through them are called insulators. For example, cotton, wool, plastics, paper, glass are insulators.
4. An electric switch is a device that is used for opening or closing an electric circuit. When we open an electric circuit, the flow of electric current stops, and when we close a circuit, an electric current flows through the circuit. When the switch is ON, an electric current is allowed to flow through the circuit, and the appliance start working bulb, which is a part, of the circuit glows. When the switch is OFF the supply of the current is cut off and the bulb gets turned off.

HOTS

1. The man should not touch any electrical appliances or wire with bare feet. He should wear an insulator like a rubber sandals so that he could not get an electric shock.
2. We should be more careful while working an experiment with electricity because we may get an electric shock if we don't handle the things carefully. Since an experiment involves different things to be attached in the electric circuit, we should always take care that the circuit is not attached to the power source unless we attach everything as we desire.

Find Out

1. A bird sitting on an electric wire doesn't complete the electric circuit. Hence, the electricity doesn't flow through its body and keeps flowing through the wire.
2. J. J. Thomson 3. New York

Science Olympiad

I. Circuit B will work because it is a circuit. Circuit A will not work as the switch is OFF in that circuit, while in circuit C, cells are attached oppositely.

II. 1. (a) 2. (c) 3. (b)

13. Magnets

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. repel 2. north-south 3. Attraction or repulsion 4. Iron bars

C. State True or False.

1. True 2. False 3. True 4. True

D. Complete the following analogies.

1. Non-magnetic 2. Non-magnetic material

E. Answer the following questions briefly (Short answer type questions).

1. A magnet is an object which has the property of attracting iron objects.
2. Magnetisation is a process of making magnets from iron pieces.
3. Poles of a magnet are basically the two ends of a magnet. Every magnet has two poles—south pole and north pole.
4. No, the magnetic poles of a magnet cannot be separated.
5. A compass is an apparatus which is used form knowing the direction. It contains magnet.
6. Man-made magnets are artificial magnets which are made by several processes.

F. Answer the following questions in detail (Long answer type questions):

1. Magnetic materials: These are the materials which get attracted towards a magnet. Iron, nickel and cobalt are examples of magnetic materials.
   Non-magnetic materials: These are the materials which do not get attracted towards a magnet. Paper, plastics, wood and leather are examples of non-magnetic materials.
2. No, the strength of the magnets is not the same in all cases. Let us find this by an activity.
   Take two magnets—a small magnet and a large magnet. Now, take some iron pins of the same size and try to pick up the bunch of iron pins using those magnets one by one. You will notice that the large magnet will hold a greater number of iron pins and hence, the bunch of pins would be larger in this case as compared to the small magnet. It is so because a large magnet attracts the iron pins with greater magnetic force as compared to the small magnet.
3. The poles of a permanent magnet cannot be separated just by cutting a magnet into pieces. If a magnet is cut into pieces, each piece becomes a separate permanent magnet, and each has a North and South pole. No matter how small the pieces of the magnet become, each piece will have a North pole and a South pole.
4. We can turn an iron strip to a magnet by single touch method. In this method, we place the iron strip with its one end on the S-pole and the other on the N-pole of two bar magnets and then stroke it with one

pole of a third magnet. This pole must be opposite to that lying under the 'starting end' of the iron strip. We must stroke the iron strip about 30 times with the same pole in one direction only. We can test this by lifting some iron clips or pins with its help.

5. Following are the uses of a magnet:
   (i) A magnetic compass is used for knowing the direction. Since a magnet points to a North-South direction, it is especially helpful to sailors and explorers to travel, where there are no known landmarks.
   (ii) Magnets are used in toys, magnetic levitation, system, telephones, door bells, computers, and refrigerators.
   (iii) In large waste dumps and industries dealing with metal products, metal (iron, steel, cobalt and nickel) objects are separated from waste by using a large electromagnet attached to a crane. The scrap, thus separated is used to make a new metal object. These huge machines are called magnetic separators.

HOTS

1. The poles of the bar magnet can be found by the following method.
   One method is to set the magnet near a compass. The needle on the compass that normally points toward the north pole of the Earth will move toward the magnet's south pole. Mark this end as the south pole of the bar magnet; the other one would north.
2. Suspend both the rods freely using a thread. The one, which always direct towards the north-south direction of the earth when it becomes stable, will be the magnet.

Science Olympiad

Out of the given things, bullet train, computer, mobile phones and door bell have magnetic properties.

14. Rain and Water Cycle

Test Yourself- 1

1. Frozen milk 2. 0°C 3. Liquid 4. Liquid
5. Solid (Snow/Hails), Liquid (Rain) and Gas (Clouds/Fog)

Test Yourself- 2

1. Coolest air 2. Clouds, Snow 3. Both 4. July 26
5. Rubbing od charged particles

Exercises

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. liquid 2. water 3. condensation 4. Natural/continuous 5. drought

C. State True or False.

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

D. Complete the following analogies.

1. ice to water 2. water vapour to water

E. What will happen and when?

1. When water is boiled, it changes into water vapour.
2. When a plate is kept on the boiling water, the water vapour get condensed at the plate's surface.
3. When water is kept in a freezer, it changes into ice.
4. Water will remain in the liquid form at the room temperature.
5. Ice will turn into water if left open at the room temperature.

F. Answer the following questions briefly (Short answer type questions).

1. When the water vapour reaches a certain height in the atmosphere, it gets cooled and condenses to form tiny drops of water, called droplets. It is these tiny droplets that float in the air, and appear to us as clouds.
2. The water cycle in nature causes rain. When clouds become big enough, they fall on the earth in the form of rain.
3. Condensation is the process in which vapour or gas changes into liquid.
4. When air passes through a very cold region like high hills, the water vapour condenses directly into ice crystals. These ice crystals fall on the earth as snow.
5. On winter mornings, when air touches dust particles just above the ground, the water vapour condenses to form clouds, called fog.
6. A drought is a condition in which a region remains deprived of rainfall and the land dries up without water.

G. Answer the following questions in detail (Long answer type questions):

1. Water exists in all the three states—solid, liquid, and gas at different temperatures.
   -- Below 0°C as ice in a solid state.
   -- Between 0°C and 100°C as a liquid.
   -- Above 100°C as steam, in a gaseous state.
   Water can be changed from one form to another. Ice (solid) on heating changes to water (liquid) and water (liquid) on heating changes to steam (gas).
2. When it rains, two charged clouds can rub against each other. If they are oppositely charged, say positive and negative, the electric short circuit causes a brought light to shine on the surfaces of contact or two clouds. This is called lighting. It also provides a big-bang noise because electrons are flowing. That sound is called thunder.
   Lightning happens due to the process of cloud charging.
   Since lightning is a phenomenon of electric discharge, wherein the electricity is panned in the surrounding air making particles in air gets vibrating. It causes a thundering sound to be heard.

HOTS

1. Sea water is salty because of the salt content present on the surface of the rocks and land inside and around the sea.
2. It is so because the speed of the light is more than the speed of the

sound. So, we see lighting first and then the sound of thunder is heard.

Find Out

Smog is a type of fog in which smoke or pollutants are present in very high concentration. Smog is very harmful for living beings. It causes many respiratory diseases.

Science Olympiad

A. Dew, Water cycle, Drought, Snow, Rain, Transpiration

B. 1. It is done so because the underground water table has already degraded at many places due to excessive drawing of water from the earth.
2. Due to the global warming, the pattern is shifted.
3. Rain water finally goes to the sea, seeps into ground or get evaporated at various places.

15. Light

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. energy 2. artificial 3. shadow 4. black 5. full

C. State True or False.

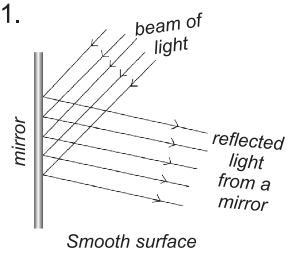
1. True 2. True 3. True 4. True 5. True

D. Complete the following analogies.

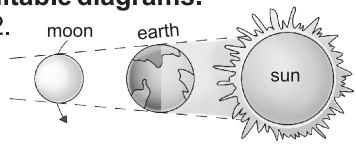
1. non-luminous 2. sun

E. Explain the following with suitable diagrams.

1.



2.



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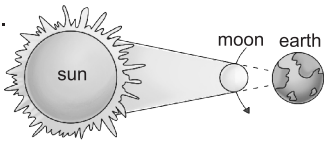


F. Answer the following questions briefly (Short answer type questions).

1. Objects that produce light are called luminous objects.
2. Light is a form of energy. It enables us to see things.
3. A beam of light is made up of several rays of light.
4. An object that allows some rays of light to pass through it is called a translucent object.
5. When the path of the light is blocked by an opaque object, a shadow is formed.
6. Solar eclipse occurs when moon comes in between the sun and the earth.

G. Answer the following questions in detail (Long answer type questions):

1. We can perform the given experiment to prove that light travels in a straight path.

Take three cardboard pieces of the same size. Place them together and make a hole on all the three pieces with a sharp object. Now, arrange the three pieces parallelly. Fix a candle at one end and light it. Switch off the lights in the room. Observe the candle through the three holes. The candle light is visible from one end because light from the candle travels in the straight path through the holes in the cardboard.

2. At certain times, the Earth comes in between the sun and the moon. This happens on certain full moon nights when the sun, earth, and moon are in a line in space. On such occasions, the shadow of the Earth falls on the moon. We cannot see the moon. This is known as lunar eclipse. On such nights, the part of the moon, which is in the shadow of the Earth, appears reddish brown.
3. Sometimes, the moon, which is also an opaque heavenly body, comes in between the sun and the Earth. This happens on certain new moon days when the sun, moon and the earth are in a straight line in space. On such days, the shadow of the moon falls on the earth. This is called solar eclipse. During a solar eclipse, from certain places on the Earth, the moon appears to block the entire sun. This is where the shadow of the moon falls. The sun appears as a dark patch in the sky, as shown in the figure. This is known as total solar eclipse.
4. Principle: A pinhole camera is a device which forms a photograph-like image of a bright object on a screen. It is based on the principle of rectilinear propagation of the light.
   Construction: We can make a pinhole camera by using an empty tin or a rectangular card box and a tracing paper.
   Take the tin (or box) and remove its lid (or one side). Cover it with a piece of tracing or waxed paper and secure it in position by using a rubber band or some thread or some suitable tape. Make a small pinhole near the centre of the other side of the tin (or box). Our pinhole camera is now ready for use.
   Working: In order to get an image with this camera, we point the pinhole towards the object. The image formed here is turned upside down because light travels in straight lines. Light from the upper point A of the object passes through the pinhole and strikes at point A on the screen of the tracing paper. Similarly, light from the lower point B of the object strikes the screen at point B. The image formed is, therefore, upside down.

HOTS

1. This is so because sound waves can penetrate through a solid medium, i.e. the wall, but the light rays cannot go through an opaque object (wall). Hence, the candle is not visible in this case.
2. (a) The left portion of the body looks at the left in the image and vice versa.
   (b) It looks like left hand of the image is raised.
   (c) (i) The image formed is at the same distance from the mirror as the distance of the object from the mirror.
   (ii) The image formed is laterally inverted.

Find Out

1. It is so because it may be harmful for the eyes if we see the sun directly from the naked eyes.
2. Shadow is formed when the path of light is blocked by an opaque object, while an image is formed when the rays of light gets reflected from a mirror or refracted from a lens.

Science Olympiad

I. Images 2 and 5 show the natural sources of light.

II. 1. It can be done by applying wax or oil at the surface of the glass.

16. Importance and Conservation of Water

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. essential 2. germination 3. generation of 4. disrupt
5. Groundwater 6. harvesting

C. Match the following columns:

1. (c) 2. (d) 3. (b) 4. (a)

D. State True or False.

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

E. Complete the following analogies.

1. germination 2. freshwater

F. Answer the following questions briefly (Short answer type questions).

1. Water is essential for the survival of living beings.
2. Two-third of the earth is covered with water.
3. It is so because the ocean water has many salts dissolved in it.
4. We need water to drink, to cook, to wash and for many other purposes.
5. Rainwater harvesting
6. Rainwater harvesting is a simple process of collecting and storing rainwater for future use.

G. Answer the following questions in detail (Long answer type questions):

1. Water is used in homes, industries, and agriculture. Human also uses it to produce electricity, and for recreation in water parks.
   Homes: Water is used for various purposes in our day-to-day life. It is used for cooking, drinking, watering the plants, bathing, washing clothes, and flushing the toilets.
   Agriculture: A large quantity of water is used to irrigate crops.
   Industries: Water is used in processing and manufacturing cars, plastics, paints, fertilizers, chemicals, leather, cement and fabrics.
   Electricity: Flowing water is a source of energy. This energy is converted into electricity in hydroelectric power stations.
   Recreation: Nowadays, lakes, rivers and streams are used for fishing, swimming and boating activities. Several water amusement parks have also sprung up in big cities.
2. Water, like air, is the most abundantly available substance on the earth. It fills the seas, rivers and lakes which cover more than three-

fourths of the earth's surface. It also exists as snow and ice on mountains. Water is also found within the earth's crust. In the atmosphere, water is present in small quantities as vapour or clouds. But the largest amount of water about 97% of total available water on the earth is present in seas and oceans which is salty. About 2% of water is freshwater which we can use.

3. Water is a natural resource so long as man does not disrupt the water cycle. Urbanization and industrialization are polluting water continuously. Most of water, being supplied in cities is unfit for drinking. The day is not away, when potable water will be difficult to obtain. We must take special precautions to consume and preserve water. It should be conserved and used wisely.
4. Check dams are structures built to stop rainwater from flowing away. These are not huge dams but are barricades built in the path of a natural stream. When rainwater is prevented from flowing away, it collects at a place and slowly seeps into the ground. The water that seeps into the ground supplies freshwater to the lakes, ponds and wells into the region. The water can then be used for drinking and irrigating farms.
5. (i) Do not let taps drip. (ii) Do not install bath tubs in home.
   (iii) Do not keep the tap open when brushing your teeth or washing your face.
   (iv) Do not throw away water that has been used to wash vegetables, rice or dal, instead use it to water plants.
   (v) Use a bucket instead of a hose to clean cars, driveways and sidewalks.

HOTS

1. The water which present below the surface of the earth is known as underground water. Northern plains and coastal regions are the areas where there is abundance of groundwater.
2. The industrialization has badly affected the quality of river water. The dirty water containing various chemicals is being disposed off in the rivers without any treatment. This is not only making the river water unfit for human consumption, but also hazardous for the aquatic life.
3. Everything starts with one. If each of us pledge to conserve the water as much as we can, it would be environment-friendly step towards the conservation of water.

Find Out

It is said so because the freshwater resources are being depleted day by day. We would not be left with usable freshwater if we don't conserve the water.

Science Olympiad

I. (a) He can use many advance systems of irrigation like sprinkling water system, drip water system etc.
   (b) One should use water for any cleaning purposes by using bucket and mug. This would save the water.
   (c) We can use a good filter paper and then some chlorine tablets in the water to purify water reasonably well.

17. Air Around Us

A. Tick (✓) the correct option:

1. (a) 2. (b) 3. (b) 4. (a) 5. (a) 6. (a) 7. (c) 8. (a)

B. Fill in the blanks:

1. 1% 2. atmosphere 3. 78% 4. Compressed
5. wind 6. lungs 7. gills 8. living things

C. State True or False.

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

D. Match the following columns:

1. (c) 2. (a) 3. (d) 4. (b)

E. Each one of these figures describes an phenomenon that helps in knowing a certain fact about air. Write a phrase in each case to explain what each phenomenon illustrates.

Figures are missing.

F. Answer the following questions briefly (Short answer type questions).

1. Nitrogen, oxygen and other gases
2. Nitrogen, oxygen, carbon dioxide, argon, helium, water vapour, dust particles
3. The envelope of air that surrounds the earth is called atmosphere.
4. Plants need oxygen for the process of respiration.
5. The process of converting nitrogen from the air into nitrates is called nitrogen fixation.
6. Animals living in the water respire through their gills.
7. Wind air is a source of energy as it can rotate the blades of windmill, which further can be used according to the requirements.

G. Answer the following questions in detail (Long answer type questions):

1. We can do the following activity to prove that air occupies space.
   Take a glass and push it upside down into a tub of water. You will notice that you cannot fill the glass with the water. That is because the glass is already filled with the air. Now, fill the glass so that air could escape. Again, try to push it into the tub. This time the water enters the glass. This is because the air, which had escaped from the glass, gives space for water. This shows that air occupies space.
2. Oxygen in the air is continuously being used by animals during respiration, and carbon dioxide is being added to the air. Green plants take in carbondioxide from the air during the process of photosynthesis and release oxygen into the air. Thus, the balance of oxygen and carbondioxide in the atmosphere is maintained through respiration in animals, and by the photosynthesis in plants. This also shows the interdependence of plants and animals.
3. We can perform the following activity to prove that air has mass.
   Inflate two balloons of the same size with air. Suspend them with a string from either end of a wooden scale. Tie a knot in the middle of the scale and suspend the scale in such a way that it remains horizontal. Now burst one of the balloons with a needle. The end of the scale with the burst balloon goes up. This shows that air has mass.

4. Air is important to us because of the following reasons.
   (i) The envelope of air (atmosphere) protects all living beings from the effects of harmful ultraviolet radiations coming from the sun.
   (ii) Air can be compressed easily. This compressed air is filled in the tyres of our vehicles such as scooters, cars, trucks, aeroplanes, etc. The air-filledtyres make our transport smoother and easier.
   (iii) Oxygen is used in hospitals for artificial respiration. Nitrogen is used for making fertilizers needed for agriculture.
   (iv) Fast moving air, that is wind, is used for running wind mills. The windmills are used for drawing underground water, running flour mills, and generating electricity.
5. Most living things use oxygen from the air to live. Plants also use oxygen. Most land animals obtain oxygen directly from the air mainly with the help of lungs. The air we breathe in comes into the lungs. The oxygen from the air in the lungs is absorbed by the blood, and is supplied to the whole body. Fish, frog, and many other animals that live in water breathe oxygen that is dissolved in water. Oxygen is also used to burn things.
6. When different pollutants like smoke, fine particles of cement, coal and metals are added to air and spoil its quality, the air is said to be polluted. There are many reasons behind air pollution.
   Human activities add many harmful gases, fine particles, and other harmful materials into the air. These harmful substances are released into the air mainly by industries and automobiles. Industries also add harmful chemicals to the air. Some of the harmful gases produced by industries and motor vehicles that pollute the air are carbon monoxide, nitrogen dioxide, and sulphur dioxide.

HOTS

1. We should not sleep under a tree at night because the process of photosynthesis doesn't take place at night, only respiration takes place and hence, plants or trees take in oxygen and release carbon dioxide.
2. Living things which breathe in oxygen will not survive in the case if the ratio of oxygen and carbon dioxide compositions is reversed. Thus, the life on the planet affect badly as the impact of this reversed ration of oxygen and carbon dioxide.

Find Out

It is so because the air pollution is increasing day by day due to industrialization, and the air is becoming hazardous for human body to inhale. Hence, the people are suffering from many respiratory diseases.

Science Olympiad

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

II. 1. (c) 2. (d) 3. (a) 4. (e) 5. (b)

18. Waste Management

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. biodegradable 2. soil 3. organic wastes

C. State True or False.

1. False 2. True 3. True 4. False

D. Complete the following analogies.

1. non-biodegradable 2. vermiculture

E. Answer the following questions briefly (Short answer type questions).

1. Any material which cannot be used in the form in which it is produced is called waste.
2. Household activities, Industries, Agricultural activities, Hospitals and laboratories, Vehicles and automobiles, Natural processes
3. Recycling is a method of using waste materials for making the same or new products.
4. Land filling is a process of placing waste underground and covering it with soil.

F. Answer the following questions in detail (Long answer type questions):

1. Biodegradable wastes: Wastes that decay and mix with soil are called biodegradable wastes. All wastes derived from living matter biodegradable. This includes food wastes, paper, clothes, wood, etc. Such waste is also called organic waste.
   Non-biodegradable wastes: Non-biodegradable wastes do not rot and mix with the soil and become the major source of soil pollution. It includes plastic bags, plastic packaging material, metal scrap, glass bottles, broken glass pieces; and bulbs.
2. Benefits of biogas are given below.
   (i) The process of making biogas kills many disease-causing microorganisms that are found in the waste.
   (ii) The use of waste to produce biogas lessens the need to creating landfill sites.
   (iii) Biogas burns without producing smoke and, therefore, does not pollute air like other fuels.
   (iv) Biogas is a cheap and clean source of fuel.
3. A very simple process is used to recycle the metal waste. Metal waste is separated and heated to a high temperature. The melted metal is then used for making new products. Hence, metal waste from home should not be thrown in the garbage. It must be kept separately, and given to metal scrap dealers.
4. Following are the ways to reduce the use of poly bags.
   (i) Say 'No' to bags. Use poly bags only when it is very necessary.
   (ii) Bring your own reusable bag to the shop.
   (iii) Try to reuse the poly bags which are there with you.
   (iv) Educate others about the harmful effects of using poly bags.

HOTS

1. Reuse: Glass jars or containers, Newspapers, Plastic bags, Clothes
   Reduce: Plastic bottles (refillable water bottles can be used), Waste, Single time packaging materials, Plastic furniture
   Recycle: Paper, Organic waste, Aluminium cans, Glass containers

Find Out

It is so because biogas is mainly produced from cow and buffalo dung. Garbage and crop remains are also used to obtain biogas. As the availability of these substances is very poor in big cities like Delhi and Mumbai, it is very difficult to set up a biogas plant there.

Science Olympiad

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

II. 1. A landfill should not be there nearby a city area. Landfill site is generally covered with soil, and it produces methane gas. Methane can be burnt easily. It is the main component of natural gas. This gas slowly seeps through the earth, and disperses into the atmosphere. Since the process of methane emission from a landfill site is a slow one, it becomes a long-term source of air pollution and a possible irritant for the local population.

2. If animal excreta and other biodegradable material are not used up in biogas plant and left as it is, then the surface of the soil would become filthy and the area becomes full of foul smell.

Model Test Paper -1

A. Answer the following questions in one sentence each.

1. Smallest particles
2. Gills
3. Fertilization is the process of fusion of male cell and female cell in an ovule.
4. Locomotion is the ability to move from one place to another.
5. 12

B. Answer the following questions in brief.

1. Herbivores are animals that feed only on plants or plant products. For example: cows, goats buffaloes, etc.
2. Different categories of food are: (i) Food from plants, (ii) Food from animals, and (iii) Food products from insects.
3. Food supplies substances which ensure that our bodies grow, have energy, and stay healthy.
4. Removing the wool from sheep using special clippers is called shearing.
5. A solution, which cannot dissolve more of a solute at a given temperature, is called saturated solution at that temperature.
6. The tiny forms of life that can be seen with the help of microscope only are known as micro−organisms.

C. Answer the following questions in detail.

1. The soil is an important abiotic factor because:
   (i) It provides plants with essential nutrients and minerals.
   (ii) It holds water which is used by plants and also maintain the adequate aeration.
   (iii) It provides air for exchange of gases among roots of the plants and atmosphere.

(iv) It holds the plants and protect it from destruction and erosion.

2. The main factors that influence a habitat are:
   (i) Temperature: It is the measure of degree of hotness or coldness. Some organisms live in cold region like polar bears, penguins, etc. whereas some can tolerate high temperature of desert like camel, cactus, etc. and some lives in moderate temperature cow, mango tree, etc.
   (ii) Light: Green plants need light to survive to perform photosynthesis. Whereas some animals do not like light and prefer to live in dark like earthworms, bats, etc.
   (iii) Water: All living organisms need water for survival. Some animals adapted to live in water deficient area like camel, cactus, etc.whereas some live in the water like fishes.
   (iv) Air: All living organisms need oxygen to respire and they get oxygen from the air around them. Even plants need carbon dioxide from the air for photosynthesis.
   (v) Soil: Soil is the main source of nutrients and water for plants. It supports the plant life due to which other living organisms get their food from plants.
3. Chemical changes are those changes in which a new product having different properties from reactants is formed. We can see the following chemical changes around us.
   (i) When iron articles are kept exposed to moist air for a long time, a brown flaky substance, called rust is formed on their surface. This process is called rusting and it is an irreversible change. The properties of rust and iron are totally different from one another.
   (ii) On burning coal, carbon dioxide gas is produced along with a lot of ash. The compositions of coal, ash, and carbon dioxide gas are totally different from one another.
   (iii) When electric current is passed through water, it splits up into hydrogen and oxygen gases whose properties are completely different from those of water.
4. Silk thread is obtained from the saliva of an insect, called silkworm. Its larva feeds on the leaves of mulberry trees. As it grows into adulthood, the caterpillar spins a cocoon around itself and changes into a pupa. At this stage, the cocoon is boiled in hot water. This kills the insect pupa and loosens the cocoon. It, then, becomes easy to separate the silk strand which is spun on to a reel.
5. We can clean food (or food grains) by the following methods.
   a. Threshing b. Winnowing c. Hand picking d. Sieving

D. Fill in the blanks.

1. protein-rich 2. K 3. chlorine 4. Linen 5. Spinning

E. State 'True' or 'False'.

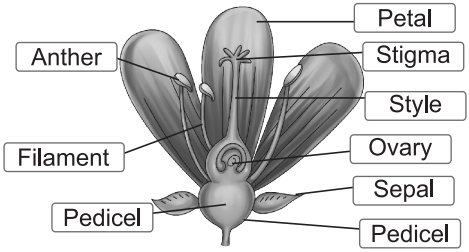
1. False 2. False 3. False 4. False 5. True

F. Define the following.

1. **Prop roots:** Additional roots which grow and hang down from the branches, and give support to trees for standing erect.

2. **Tendrils:** Thread-like outgrowths from the stem or leaves to support the plants with a weak stem.

G. Label the different parts of the given flower.



H. Match the following.

1. (e) 2. (f) 3. (b) 4. (a) 5. (c) 6. (d)

I. Tick (✓) the correct options.

1. b 2. b 3. c 4. b 5. b

J. Write the names of three objects made from each of the following materials.

(i) Bowls, Windows, Food jars. (ii) Napkins, Newspapers, Books.
(iii) Wires, Cooking pans, Screws (iv) Bags, Belts, Shoes

Model Test Paper -2

A. Answer the following questions in one sentence each.

1. A body is said to be at rest (or in state of rest) when it does not change its position with respect to its surrounding objects.
2. Metre (m) is the SI unit of length.
3. The envelope of air that surrounds the earth is called atmosphere.
4. The process of converting nitrogen from the air into nitrates is called nitrogen fixation.
5. Land filling is a process of placing waste underground and covering it with soil.

B. Answer the following questions in brief.

1. Recycling is a method of using waste materials for making the same or new products.
2. Plants need oxygen for the process of respiration.
3. Water is essential for the survival of living beings.
4. When the path of the light is blocked by an opaque object, a shadow is formed.
5. On winter mornings, when air touches dust particles just above the ground, the water vapour condenses to form clouds, called fog.

C. Answer the following questions in detail.

1. The circulation of water between atmosphere and water bodies on the Earth's is known as the water cycle. The water maintains the supply of water on land. During the process of the water cycle between the earth and the atmosphere, water changes into three states of matter – solid, liquid and gas.

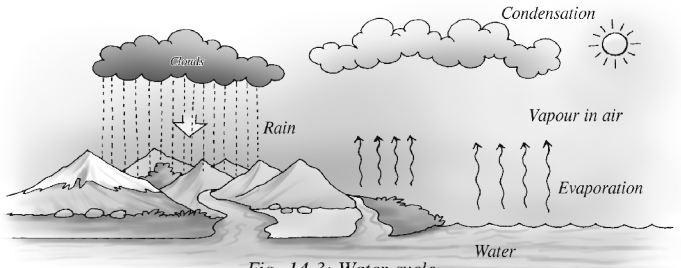


Fig. 14.3: Water cycle

2. No, the strength of the magnets is not the same in all cases. Let us find this by an activity. Take two magnets—a small magnet and a large magnet. Now, take some iron pins of the same size and try to pick up the bunch of iron pins using those magnets one by one. You will notice that the large magnet will hold a greater number of iron pins and hence, the bunch of pins would be larger in this case as compared to the small magnet. It is so because a large magnet attracts the iron pins with greater magnetic force as compared to the small magnet.
3. When an object covers equal distances in equal intervals of time, then the motion of the object is said to be uniform motion. Let us understand uniform motion with the help of an example. Suppose a car travels 10 m in 1 s, 10 m in next 1 s and again 10 m in the subsequent second. Here, the car is covering equal distances in equal intervals of time. So, car is said to be in a uniform motion.
4. (i) Do not let taps drip.
   (ii) Do not install bath tubs in home.
   (iii) Do not keep the tap open when brushing your teeth or washing your face.
   (iv) Do not throw away water that has been used to wash vegetables, rice or dal, instead use it to water plants.
   (v) Use a bucket instead of a hose to clean cars, driveways and sidewalks.

D. Define the following.

1. When different pollutants like smoke, fine particles of cement, coal and metals are added to air and spoil its quality, the air is said to be polluted.
2. Rainwater harvesting: Collecting and storing rainwater for future use.
3. A drought is a condition in which a region remains deprived of rainfall and the land dries up without water.
4. Motion: State in which a given object keeps on changing its position with time, and with respect to its surroundings.

E. Fill in the blanks.

1. non-periodic motion 2. two 3. conductors, insulators
4. repel 5. Attraction or repulsion

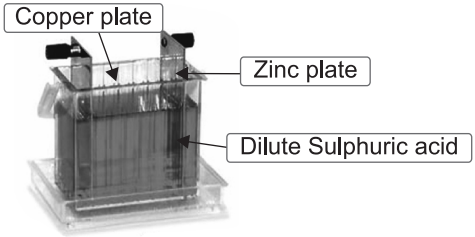
F. State 'True' or 'False'.

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

G. Tick (✓) the correct answers.

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

H. Label the following diagram of a voltaic cell.



I. What will happen and when?

1. When water is boiled, it changes into water vapour.
2. When water is kept in a freezer, it changes into ice.
3. Ice will turn into water if left open at the room temperature.