1. Crop Production

A. Tick (✓) the correct option:

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

B. Fill in the blanks:

1. air, 2, manure, 3. cold storage, 4. rainwater, 5. pisciculture

C. Differentiate between the following :

1.

Tilling	Leveling
(i) It is a process to loosen the soil with the help of a plough or a tractor.	It is a process to level the soil after tilling a field.
(ii) It uproots all the unwanted plants called weeds.	By leveling the field gets covered with softened soil.

2.

Weeding	Harvesting
(i) This is a process to unwanted plants from a crop. The farmers use several methods for weeding.	The removal of crop from the field when the produce is ready is called harvesting.

3.

Pisciculture	Apiculture
(i) The rearing of fish in tanks and ponds is known as pisciculture.	The rearing of bees artificially is known as apiculture.
(ii) It is a profitable occupation.	Honey produced by bees is a valuable source of food.

D. Write the reason.

1. The farmers should take great care in selection of seeds to get a good produce and protect their crops from weeds.
2. The farmer should use drip irrigation to conserve water sources.
3. Farmer should use proper manure or compost over chemical fertilizers become chemicals pollute the soil and water.

E. Very short answer type questions.

1. Tilling
2. It means the steps involved in growing crops from sowing to harvesting or cultivation.
3. Seed drill

4. Weeds are unwanted plants in a crop siniazine is a weedare.
5. Milk and fish.
6. Wheat and gram.
7. Agriculture and animal husbandry.
8. Sprinkler and drip irrigation.

F. Short answer type questions.

1. Tilling is a process by which the soil is prepared to sow seeds in it.
2. Seed drill is a medicine with same narrow pipes to a funned at the top. Farmers are this machine to sow seeds in their fields.
3. Irrigation is necessary to provide moisture for germination of seeds and for proper growth of plants in a field.
4. Manures are organic substances obtained from plants and animal wastes. They are rich in important nutrients like nitrogen, phosphorus, potassium, etc.
5. The root nodules are special types of structures in plants of the from family such as peas, gram, etc. The bacteria lived in root modules convert nitrogen into nitrates.
6. The weeds should be removal from the fields because they harm the plants of a crop. The uncontrolled growth of weeds in a field depletes nutrients and reduces crop field.
7. The branch of agriculture which deals with the management, breeding, feeding and care of domestic animals is called animal husbandry.

G. Long answer type questions.

1. The levelling is done with the help of a wooden plank pulled by the bullocks. The plank is kept pressed to the ground. Levelling can also be done by a heavy wooden plank attached to a tractor. By levelling the field gets covered with softened soil. This reduces the loss of moisture from the soil.
2. Drip irrigation is an efficient system of watering plants. It supplies water to the plants with the help of pipes. The supply of water can be regulated and supplied only when the plant need it. Since water is supplied drop by drop near the roots. Most of the water is absorbed. The main advantages are as follows:
   (i) It saves about 50% of water.
   (ii) Plants gets right amount of water at a proper time.
   (iii) Plants grow faster and produce bitter field.
3. The fertility of soil can be maintained by using manure and fertilizers. Manure are organic substances obtained from dead animals and plants waste. Green manure consists of green plants which are dug up and put back into the soil. Animal manure consists of animal

waste. Compost is also a good manure. It is obtained by the decomposition of the dead plants and animal waste. The fertilizers are inorganic chemical substances prepared in the factories. They supply important nutrients into the soil.

4. Nitrogen Cycle:

   Plant and animal tissue and animal waste contain nitrogen in the form of nitrogenous compounds. When such organic material mixes with soil, the decomposers, mainly soil fungi and bacteria, break down the organic matter and convert it into nitrate molecules. The process is known as nitrification.

   Nitrates are easily soluble in water and are absorbed by the roots along with water. Some of the nitrate is converted into nitrogen gas or nitrous oxide (N_2O) gas and returned to the atmosphere. This process is carried out by another type of bacteria and is known as denitrification.

5. The pests are animals that damage crops. They damage the plants by eating the leaves, horing the stems or roots sucking plant juices or damaging fruits. The main method to control pests is spray. Pesticides are sprayed directly on plants before they flower.

   We should avoid using chemical pesticides and insecticides because they are harmful for our environment and affect our wealth.

6. Some important components of animal husbandry are as follows:
   (i) Proper feeding and clean drinking water.
   (ii) Clean and vantilated shelter.
   (iii) Prevention of animal diseases from spreading.
   (iv) Proper breeding of animals.

7. We should take proper care for the following things in poultry farming.
   (i) The birds should be kept in clean and ventilated sheds.
   (ii) There should be a separate enclosure for chicks.
   (iii) The birds should be provided with clean drinking water and nutrious food.
   (iv) The birds should be vaccinated to protect them from certain common diseases. Sick birds must be quickly separated from the healthy birds.

HOTS

1. He will select the seeds which are sanked because they are healthy seeds.
2. This problem can be solved by growing different crops in this field.

Find Out

M. S. Swaminathan is called the father of green revolution.

Science Olympiad

1. It is recommended to use manure instead of chemical fertizliers because

they are harmful for environment, water and soil.

2. The leguminous plants do not require nitrogenous fertilizers because they can absorb nitrogen gas from atmosphere and convert it into nitrogen compounds called nitrates.
3. Agriculture means growing crops in fields, whereas plantation means an area of land where trees or shrubs are grown for commercial benefits.

2. Micro Organisms

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. One cell, ball, 2. Some, 3. preservation, 4. asexually, 5. plants and animals.

C. Match the following.

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

D. Support these statements with reasons.

1. Algae are plant like while protozoans are animal like microorganisms because algae contain chlorophyll and are capable of carrying out photosynthesis like plants.
2. Dry food items like biscuits do not spoil easily, because they do not have moisture to grow bacteria.
3. Microscopic algae sustain like on the earth because this algae make huge amount of oxygen into the atmosphere every day.
4. Viruses are unique living organisms because they have some characteristics of the living and some of the non-living matter.
5. Food preservation can minimize wastage of food because it keeps the food items fresh for a long period of time.

E. Very short answer type questions.

1. Lactobacillus.
2. Pasterization.
3. Microscope in an instrument that can be used to observe small objects, even cells.
4. Nitrogen ficatin is a process by which blue-green algae fix free nitrogen and increase soil fertility.
5. Two harmful efforts of microorganisms are as follows :
   (i) They cause sexual fatal diseases.
   (ii) They cause food spoilage.
6. The pasteurization of milk is done through a technique of preserving food specially milk.
7. Microorganisms spoil food by contamination.

8. Two food stuffs which are preserved by dehydration are fish and meat.

F. Short answer type questions.

1. Microorganisms are tiny organisms that cannot be seen with the naked eyes.
2. The study of microorganisms is called microbiology.
3. The four different groups of bacteria are rod-shaped bacilli, ball-shaped cocci, spiral, corkscrew-shaped spirilla, etc.
4. Binary fission is a process by which protozoans reproduce asexually.
5. Pasteurization is a technique of preserving food specially milk. It involves heating milk to a temperature of between 72°C and 75°C for a period of 30 seconds before being cooled down immediately.
6. Algae are simple plant like organisms that have cell-walls and chlorophyll with in the cells. They make their own food by photosynthesis.

G. Long type answer questions.

1.

Aerobic bacteria	Anaerobic Bacteria
These are the bacteria which require oxygen for their growth and are called aerobes.	These are the bacteria which can live in the presence of oxygen. They are called anaerobes, meaning without air.

2. The importance of bacteria in food industry is as follows:
   (i) some food products like curd, cheeze are made by bacterial fermentation.
   (ii) Bacteria are used in the production of tea, coffee, cocoo, etc.
   (iii) Wine and vinegar are prepared with the help of bacteria. The bacteria act on fruit juices to produce wines and vinegar.
   (iv) Bacteria help in making meat tender by breaking down tough muscle fibres.
3. Some red algae yield algae-ager which is used in the laboratory for growing microorganisms. Brown algae are an important source of sodium, iodine and potassium. help, a large brown algae is an important source of iodine-shells of diatoms are rich in silica and are used in making glass, porcelain, toothpowder and metal polish.
4. (i) Some certain fungi cause serious skin and lung infection in humans as well as animals.
   (ii) Food spoilage occurs due to fungi.
   (iii) A fungus, aspergillus fiavus produces several dangerous poisons when it grows on stock feed like groundnuts. One of the poisons called aflatoxin when eaten causes illness and sometime death.

5. Amoeba is the simplest form of protozoan. It is found in sea, soil and pond water. Through a microscope, it looks like a shapeless mass of jelly. It moves by changing its shape. It sends out false feet called pseudopodia to get food. It surrounds food such at algae or bacteria with it pseudopodia. The food is then taken into a food vacuole. The food is digested inside this vacuole.
6. Some preventive measures of malaria are as follows :
   (i) Do not allow water to collect around homes, gardens, schools, offices, etc. & mosquitoes lay eggs in water.
   (ii) Use mosquito net to sleep in.
   (iii) Use mosquito repellent carroms to keep mosquitoes away.
   (iv) If malaria common, ask your doctor to prescribe preventive medicines. Take preventive medicines regularly.

Hots

Because they act as a vector for various Bacteria and Viruses and cause disease such as Malaria, Dengue, many more other.

Find Out

Ross discovered the cause of malaria.

Science Olympiad

1. We should always wash our hands before handling food and after going to toilet to remove germs present on our hands.
2. Probiotic yoghurt and drinks contain useful and healthy micro-organisms that help in improving digestion and that is the reason it is consumed by many people.
3. Micro-organsims need warm and moisture to grow. So the milk already hold moisture in it and we have only to give it warmth, therefore in summer it can be prepared in temperature.

3. Synthetic Fibres and Plastic

A. Tick (✓) the correct option.

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

B. Match the following :

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

C. Write 'True' or 'False' :

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

D. Write the reasons.

1. Rayon resembles silk in appearance and hence, the name artificial silk.
2. Electrical plugs and sockets are made of thermosets because it is harder than other plastics and is good electrical insulator.

E. Differentiate between the following :

1.

man-made materials	natural materials
The materials which are made by man are called man-made materials such as plastics, artificial fibres, etc.	The materials which we get from nature are called natural materials such as cotton, minerals, etc.

2.

Natural Fibres	Synthetic Fibres
The fibres which we get from plants and animals are called natural fibres such as cotton, silk, wool, etc.	Some types of fibres are made by man in factories with the help of chemicals. There are called synthetic fibres such as nylon, rayon, terylene, etc.

3.

Monomer	Polymer
Monomer is a smaller basic molecule in a polymer.	A long chain of molecules containing thousands of smaller monomers is called polymer.

4.

Thermoplastic	Thermoset
(i) There are the plastics which are soften and they melt on heating.	There are the plastics which are hard and do not melt on heating.
(ii) They can be moulded into any shape one wants, a number of times.	They can be shaped only once.

F. Very short answer type questions.

1. (a) Nylon (b) Rayon
2. Bakelite
3. Rayon is called artificial silk because it resembles silk in appearance.
4. Nylon.
5. Orion

G. Short answer type questions.

1. A material or a substance that is make from natural or artificial sources is known as fibre.
2. The names of two synthetic fibres are rayon and nylon.
3. The two uses of rayon are as follows:
   (i) It is used in the manufacturing of fabrics like Srees.
   (ii) it is used for making type cord.

4. The nylon is a man-made fibre. It is a polymer material made of polymide chains.
5. The properties of nylon are as follows:
   (i) It absorbs very little water, so clothes dry out quickly.
   (ii) It is strong and wrinkle resistant.
   (iii) It retains creases.

H. Long answer type questions.

1. Some properties of synthetic fibres are as follows:
   (i) Nylon fibre is strong and has high electricity.
   (ii) It is resistant to acids and bases and does not absorb water.
   (iii) The synthetic fibres are extremely strong and durable.
   (iv) The fabrics made by these fibres dry out quickly.
   (v) Most of the synthetic materials are light yet strong, absorb specific dyes, dry easily and require no or light ironing.
2. The viscose rayon is made from cellulose by the viscose process. The various chemicals required for the preparation of viscose rayon are given below:
   (i) Cellulose ($C_6H_{10}O_5$)
   (ii) Sodium hydroxide (NaOH)
   (iii) carbon disulphide (CS_2)
   (iv) sulphuric acid (H_2SO_4)

   To prepare rayon, cellulose in the form of wood pulp is treated with NaOH solution and then with CS_2. Cellulose dissolves in NaOH and CS_2 to form a pale yellow syrup like liquid called viscose.
3. Some important we of rayon are as follows :
   (i) It is used in the manufacturing of fabrics like sarees.
   (ii) It is used for making dresses, aprons and caps, when mixed with cotton.
   (iii) It is used for making tyre cord.
   (iv) It is used for making carpets when mixed with wool.
4. Some important uses of nylon are as follows :
   (i) It is used for making fishing nets, tyre cards, climbing ropes, parachute fabrics, bristles for toothbrushes, etc.
   (ii) It is used to production of textiles like sarees, shirts, neck-ties, socks and other garments.
5. Plastics are wonderful materials. Some commonly used man-made plastics are thermoplastic, thermosetting, etc.

   Some major uses of plastics are as follows :
   (i) The sheets of polythene are used to pack liquids such as milk.
   (ii) Polythene pipes are used to transport liquids such as oil or water.

(iii) PVC or polyvinyl chloride is used as a covering over electric wires and used to make shoes, bandages, etc.

(iv) Perspex is used a substitute for glass and for making windows of aeroplanes.

(v) Bakelite is used for making buttons, plugs, switches and other electrical fitings.

HOTS

It is advisable to wear cotton and not synthetic clothes while bursting crackers because the clothes made from synthetic fibres catch fire easily.

Find Out

The synthetic fibres do not absorb water because they are made from chemicals.

Science Olympiad

1. The electric plugs do not melt even if the wires inside them get overhead because they are made from backlite a kind of plastic which is harder than other plastics.
2. It is advisable to wear cotton and not synthetic clothes while working in kitchen because they catch fire easily.

4. Metals and Non-metals

A. Tick (✓) the correct option.

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

B. Tick (✓) the correct and cross (✗) the wrong :

1. ✓, 2. ✗, 3. ✗, 4. ✓, 5. ✗, 6. ✗, 7. ✓, 8. ✓, 9. ✗, 10. ✓

C. Complete the following chemical equations.

1. Iron oxide (salt)
2. Copper oxide
3. Sulphuric oxide
4. Salts and hydrogen gas
5. Non-metallic oxides

D. Differentiate between the following.

1.

Metals	Non-metals
A metal is an element that readily forms positive ions and has metallic bonds they are good conductor of heat, lustrous.	Substances which are soft and dull, i.e., non-lustrous, non sororous, non-ductile and poor conductor of heat and electricity are called non-metals.

2.

Malleability	Ductility
Malleability of a metal to be beaten into sheets.	Ductility is the property of a metal by which metal can be drawn into wires.

E. Very short answer type questions.

1. Four metals are iron, copper, silver and aluminium.
2. The two ways to prevent rusting of iron are as follows :
   (i) The surface of iron can be coated with paint or with plastics.
   (ii) the oil or greese can also be applied on iron to prevent rusting.
3. Names of two gasous non-metals are oxygen and nitrogen.
4. Sodium.
5. Copper
6. Copper and zinc.
7. Magnesium oxide is formed.
8. Bismuth and tungsten

F. Short answer type questions.

1. The examples of four metals are iron, copper, silver and aluminium.
2. The elements which exhibit the properties of metals as well as non-metals are called metalloids.
3. the rocks from which metals are extracted are known as ores.
4. The series of processed carried out to extract pure metals from their ores is called metallurgy.
5. When metals react with oxygen they form oxides. When metal objects are exposed to air a dull layer of oxide is formed on the surface and metal loses its lustre.
6. Some metals react with oxygen, moisture and pollutants in the atmosphere and form compounds on their surface. This is known as corrosion.
7. Chemical reactions where are element displaces another because it is more reactive is called a displacement reaction.
8. Graphite is a non-metal which is used in making electrodes in dry cells and electric ores. It is also used as a lubricant.
9. Silica is the second most abundant element in the earth's crust.
10. Alloys are homogenous mixture of a metal with both metal and non-metal

G. Long answer type questions.

1. Mostly, the metals occur in nature in a combined state but sometimes they can also found in free state. The process of procuring metals from ores is called metallurgy and these naturally occuring compounds of metals are known as minerals. Metals are usually extracted from the earth by mixing.

2. The four physical properties of metals are as follows :
   (i) The metals are solid at room temperature, except mercury, which is liquid at room temperature.
   (ii) Most of the metals are hard and strong like iron, aluminium, etc.
   (iii) The metals have high melting and boiling points, with few exception such as sodium, etc.
   (iv) They have characteristic metallic lustre, especially when freshly cut.
3. The reaction of metals with oxygen, water and acids shows that metals have different reactivities. Potassium and sodium are the most reactive, whereas silver and gold are the least reactive. We can average the common metals in order of decreasing reactivity.

   Such an arrangement of metals in decreasing order or reactivity is called the reactivity series of metals.
4. The iron is coated with zinc or magnesium to protect it rusting. Magnesium and zinc are more reactive than iron. They react faster with oxygen than iron. That's why they are coated in iron objects to prevent it from rusting.
5. (i) Iron is a very important metal in the earth. It is used for many purposes. Pig iron is a hard and bristle form of iron with a high carbon content. It is used to make pipes, sinks, storage tanks, railings, cylinders, etc. by the process of castings.
   (ii) Copper is widely used to make electric wires and cables. Copper coils are used in electrical appliances, so copper is also an important metal.
6. The physical properties of non-metals are as follows:
   (i) They can be in the form of solids, liquids or gases at room temperature.
   (ii) Solid non-metals are soft materials.
   (iii) They cannot be hammered or beaten into thin sheets.
   (iv) They cannot be melted and drown into thin wires.
7. The two uses of non-metals are as follows:
   (i) Sulphur is used in the manufacture of sulphuric acid, which is used in several industrial processes.
   (ii) Phosphorus is used in making match-boxes and in the fireworks industries.
8. (i) Graphite is an important non-metal which is used in making electrode as in dry cells and electric arcs. It is also used as a lubricant. It is used to make the leaf of penail.
   (ii) Sulphur is a non-metal which keeps a great importance for manufacturing units. It is used in the manufacture of sulphuric acid, which is used in several industrial processes. It is also

used in the vulcanization of rubber, which makes rubber hard enough to be used in tyre.

9. Non-metals like carbon and phosphorus are important elements for living beings. Phosphorus is indispensable to all living organisms. It is in present in bones. Compounds of phosphorus convert energy stored in food into energy required by cells for performing various tasks. Phosphorus also forms an important part in the genetic material in the cells.
10. Some common methods to prevent corrosion are as follows:
    (i) Painting: The surface of iron can be coated with point are with plastics. This keeps air and water away from the metal surface.
    (ii) Coating of oil or grease: A coating of oil or grease also protect objects from corrosion.
    (iii) Glavanization: It is also a way to protect iron from corrosion. An iron object coated with thin layer of zinc is called glumised iron, it prevents the iron surface from being rusted.

HOTS

Tough silver is a very good conductor of electricity but still that is not used in electric wiring primarily due to its cost. It is very expensive.

Find Out

Iron - Odisha, Chattisgarh Syilver - Rajasthan, karnataka

Copper - Madhya Pradesh Zinc - Rajasthan

Science Olympiad

1. The screw driver used by an electrician has a plastic wooden handle because they are good insulator.
2. Do it yourself.
3. Non-metal.

5. Combustion and Fuels

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. rapid
2. LPG
3. Ignition temperature
4. Water
5. Carbondioxide

C. Match the following.

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

D. Write the reasons.

1. Fire should be kept away from highly inflammable objects because they have low ignition temperature.

2. Anthracite is called the best quality of coal due to the highest carbon content.
3. Petrol is considered as the best fuel because it has high energy density.
4. Biofuels should be promoted because they are renewable sources of energy.

E. Very short answer type questions.

1. Carbonmonoxide
2. Coal gas.
3. Petrol and diesel
4. Kilo joules
5. An inflable is an object that can be inflated with a gas, usually with air.
6. it will stop burning.
7. Non-combustible substances.

F. Short answer type questions.

1. Combustion is a process of producing heat and light on burning. In other words, burning of a substance is called combustion.
2. The different zones of a candle flame are yellow zone, dark zone and outer blue zone.
3. Producer gas is a mixture or nitrogen and carbon monoxide. It is prepared by passing air over red hot coke.
4. The three advantages of LPG are as follows:
   (i) It is used in kitchen to cook food.
   (ii) It is a smoke less gas, as it does not pollute environment.
   (iii) It does not produce any poisonous gas on burning.
5. The calorific value of a fuel in the amount of heat produced by burning one gram of fuel completely.
6. A fuel is a substance that can be used to produce heat at a reasonable cost. Fuels contain potential energy that is locked with in chemical hands of their constituent molecules.

   The types of fuels are solid, liquid and gaseous fuels.
7. The petroleum which we obtain from the oil wells is known 0 crude oil.

G. Long answer type questions.

1. Combustion produces heat through a chemical reaction. In other words we can say that combustion is a chemical reaction in which oxygen reacts with a combustible substance and produce heat. All combustible substances produce heat when they burn.
2. Different zones of a candle are as follows:
   (i) Inner dark zone: The temperature in this zone is not sufficient to ignite the wax. So, the wax vapour in this region does not burn. This is the least hot region of a candle.

(ii) The yellow zone: Here is temperature is higher and the wax vapour begins to burn. The flame appears yellowish because the vapour is partially burnt. This the luminous region of the candle.

(iii) The outer blue zone: The wax vapour in this region receives enough oxygen from the air and so burns completely. The flame appears blue because of complete combustion.

3. LPG or Liquified Petroleum Gas is mainly mixture of two hydrocarbons, butane and isobutane, which are liquified by compressing. Thus, the domestic cooking gas cylinders contain mainly liquified butane and isobutane under pressure.

   A strong smelling substance called ethyl mercaptan is added to this gas cylinders to help in detection of gas leakage.

4. Coal tar is thick black oily liquid obtained by the destructive distillation of coal. It is a mixture of several carbon compounds. On further fractional compounds it yeilds many important organic compounds such as benzone, toluene, napthalene, phenol, etc. These compounds are used to make pesticides, explosives, fertilizers, etc.

5. Petroleum is a mixture of several important organic compounds like petrol, diesel, kerosene, LPG, lubricant oils, paraffin wax, etc.

   It is refined by a fractionating tower. The process of obtaining various fractions or components of petroleum is known as refining. The technique used for refining of petroleum is called fractional distillation.

6. The fuel with a high calorific value, low ignition temperature, easy to store and transport is called an ideal fuel.

HOTS

A hydrogen is combustible and has a storage problem transportation is also a problem for hydrogen gas. Therefore though hydrogen gas has the highest calorific value, it cannot be used as a fuel.

Find Out

There is an acute shortage of electricity in many states of India because of water shortage and problems of distribution of electricity.

Science Olympiad

1. Do it yourself.
2. We should do it to check the supply of oxygen inside the building.

6. Conservation of Biodiversity

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. exists, 2. biodiversity, 3. pests, 4. WCU, 5. 1986

C. Very short answer type questions.

1. Tiger and pandas
2. International Union for conservation of nature and natural resources.
3. Red Book
4. Four national parks located in India are Bandipur National Park, Corbett National Park, Desert National Park and Kunba National Park.
5. Jim Corbett National Park is located in Nainital district of Uttarakhand, India.

D. Short answer type questions.

1. Biodiversity can be defined as the variety and variability of all organisms like plants, animals and microorganisms.
2. Different kinds of industrial products are obtained from fruits, such as oil, lubricants, perfumes, fragrance, fibres, etc. Animals too provide a wide variety of products such as wood, silk, lac, fur, honey, etc.
3. A national park is an area which is strictly several for the betterment of wildlife and where forestry, grazing and cultivation are not permitted.
4. Wildlife refers to any wild animals or plant living in natural habitat.
5. IUCN or International Union for Conservation of Nature and Natural Resources is on international body to learn and assess the global conservation states of both flora and fauna.

E. Long answer type questions.

1. The biodiversity is very important for us, because
   (i) it is a source of food. We consume several species of edible plants and obtained meat, eggs, milk, etc. from animals.
   (ii) We obtain a large number of medicines from the plants.
   (iii) Several industrial products are obtained from it, such as oil, lubricants, perfumes fragrance, etc.
   (iv) It supports are tourism and recreation in several national parks— wildlife sanctuaries, etc.
   (v) It plays a vital role in keeping ecological balance.
2. Forest management is a way to conserve forests. Conservation of trees depends on replacing trees that are cut regularly. A forest so planned will field trees for cutting regularly, operates on a sustained yield basis.

   Block cutting is another kind of lumbering where trees of about the same age are cut as a complete block. This exposed land is reseeded or replanted with timber.
3. The forest fire can be prevented by the following methods.
   (i) Fire lines, which resemble roads, are made in a forest or regular intervals, and provide gaps at which fire can be stopped.
   (ii) Fire extinguishing solutions are sprayed from airplanes to put out the fire.

(iii) Firefighters equipped with trucks, water tanks and chemical fire extinguishers can often bring a fire under control before it becomes extensive.

4. To answer wildlife the rare species of plants and animals has been categarised. There are thousands of species of animals and plants in the list of threatened.

   Several national parks and wildlife sanctuaries, zoos, etc. are established by the government to conserve forest and animals living in them. Several laws are made by government which help to protect wildlife. Some major animal conservation programmes like project Tigers, Project Elephant, etc. are also established by our Indian government.

5. Several steps have been taken to conserve wildlife. Some major steps are as follows:
   (i) National parks are set up to protect forest plants and animals. In these areas, forestry and cultivation are not permitted. No private ownership right is allowed.
   (ii) In different states several zoos are established.
   (iii) Wildlife sanctuaries are also established to give protection wild animals.
   (iv) Some other programmes like Project Tigers, Project Elphant are also set up by government to protect or sonserve wildlife.

HOTS

Deforestation is the main cause of decertification as well as floods because trees in forests check floods and conserve the soil in that area. They also help in bringing rains.

Science Olympiad

1. Yes, because they play a vital role in keeping balance in nature.
2. Because the home diverse from 'kiwi', a native flightless bird, which is a national symbol of Newzealand.

7. Cell Structure and Functions

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. cell, 2. cytoplasm, 3. chlorophyll, 4. unicellular organism, plants, 5. vacuole, 6. cytoplasm, 7. organ

C. Match the following.

1. (i), 2. (c), 3. (f), 4. (b), 5. (h), 6. (j), 7. (d), 8. (e), 9. (g), 10. (a)

D. Write True or False.

1. True, 2. False, 3. True, 4. False, 5. True, 6. False, 7. True, 8. True

E. Differentiate between the following.

1.

Unicellular	Multicellular
Some animals are made up of one cell these are called unicellular.	Plant and animals we can see around us with waxed eyes are made up of many cells and are called multicellular. For example- man, cow, etc.

2.

Cell organelles	Vacuoles
Inside the cells, there are small structures, these are called organelles.	Cells contain many kinds of sac- like structures, these are called vacuoles.

3.

Cell Wall	Chloroplast
In some unicellular organisms and all kinds of plants, the outermost boundary of the cell is called the cell wall.	Most plant cells passes sac-like organelles, these are called chloroplasts.

4.

RBCs	WBCs
RBCs mean Red Blood Cells.	WBCs mean white Blood Cells.

5.

Animal Cell	Plant Cell
(i) The outermost layer is the thin, flexible cell membrane. (ii) Small vacuoles there in the cytoplasm.	The outermost layer is the cell wall, it is made up of cellulose. Most plants have a large central vacuole in the cytoplasm

F. Very short answer type questions.

1. Tissue
2. largest-egg of an ostrich and smallest cell is sperm.
3. Amoeba and paramecium
4. Cell wall
5. It synthesises proteins.
6. Micrometre (4m)
7. Microscope
8. Microtubules

G. Short answer type questions.

1. A cell is called the functional unit of life because they are the structural and functional units of the body of all living organisms.
2. A cell is filled with a living material called the protoplasm.

3. the full form of DNA is a Deoxyribonucleic acid
4. Mitochondria is called the power house of the cell because cellular respiration occurs in it.
5. Hair-like structures are found in cells which are called flagella.
6. The endoplasmic reticulum is responsible for the production of proteins and liquid components in the cell.
7. In the centre of the cell, is a large cavity called the central vacuole. It is filled with cell sap a watery fluid.

H. Long answer type questions.

1. The cell theory states that living things are composed of one or more cells, that the cell is the basic unit of life and cells arise from existing cells.
2. No, all the cells are not similar, some cells are smaller while the others are very big. The differences observed in the size of various organisms are due the number of cells, the greater the size of the organisms. It is noticed that in different types of cells are found in different organisms.
3. In some unicellular organisms and all kinds of plants, the outermost boundary of the cell is cell wall. It is formed of a non-living materials, mainly made up of cellulose in plants. The cell wall is a tough and rigid layer that provides strength and protection to the cell. The cell wall is porous and allows water, oxygen and carbon dioxide to enter and leave the cell.
4. Do it yourself.
5. See answer of question-3.
6. Do it yourself.

HOTS

1. The answer has been given in previous lessons.
2. We can make a solution of the salt and water. If a blue litmus proper turns red, it's and acidic salt and if the red litmus paper turns blue it is a basic salt.

Find Out

Because Mucus covers the stomach wall with a protective coating, together with bicarbonate this ensure that stomach wall itself is not damage by hydrochloric acid.

Science Olympiad

1. The cell wall surrounds plasma membrane of plant cells and provides tensile strength against mechanical and osmotic stress. It also allows cell to develop turger pressure which is the pressure of the cell contents against the cell wall.
2. the multicellular organisms is more efficient than unicellular organisms because multicellular organism has division of labour which enable it to do different work.

8. Reproduction in Animals

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. sexual, 2. Amoeba, culena, 3. fertilization, 4. sperm cells, alkaline, 5. egg, uterus

C. Differentiate between.

1.

Sexual Reproduction	Asexual Reproduction
Sexual reproduction is a reproduction which involves formation and fusion of male and female gametes.	Asexual reproduction is a separation which occurs without any gamete formation.

2.

External Fertilization	Internal Fertilization
When the fusion of male gametes and female gametes take place outside the body of female the fertilization is called external fertilization.	When the fusion of the gametes of the male and female takes place inside the body of the female partner, the fertilization is called internal fertilization.

3.

Oviparous animals	Viviparous animals
The animals which lay eggs are called oviparous animals. These fertilized eggs develop into the young ones.	Organisms which directly give birth the young ones are called viviporous animals. The fertilized egg develops into a young baby inside the body of the female partner.

4.

Endocrine glands	Exocrine glands
These are the glands which secrete hormones to regulate many bodily functions.	These are the glands that secrete substances onto an epithelial surface by way of a duct.

D. Very short answer type questions.

1. Sperm
2. Egg or ovum
3. Zygote is the cell formed after fusion of male and female gametes.
4. Embryo is a developed zygotes whereas foetus is a developed embryo.
5. Seminal vesicles.

E. Short answer type questions.

1. The production of new individuals from parents are called reproduction.
2. Asexual reproduction is a reproduction which occurs without any gamete formation.
3. Sexual reproduction is a reproduction which involves formation and fusion of male and female gametes.
4. The male reproductive system include a pair of testes. The testes are located in the scrotal sacs. They produce male gametes or sperm cells.
5. The process of fusion of the male gamete (sperm) and female gamete (ovum) is called fertilization.
6. the process in which the zygote undergoes a number of stages before developing into a young one that looks like a adult is known as metamorphosis.

F. Long answer type questions.

1. The method of reproduction in which both the parents (male and female) are needed to produce individuals of the same kind is called sexual production. Sexual reproduction involves the formation and fusion of gametes. The make parent produces male gametes or sperm and female parent produces female gametes are ovum.
2. The male reproductive system includes a pair of testes. They are located in the scrotal sac. They produce male gamete or sperm. The sperm mix with a fluid and are carried to the urethrea. The fluid that mixes with the sperms is produced by the seminal vesicles. The urethra conducts the fluid, rich in sperm through the penis.
3. When sperm comes in contact with an egg released from the away, it penetrates the egg and fertilization occur. The fertilization of the human egg cell by a sperm mostly takes place in the fallopian tube. The fertilizers egg cell is known as zygote. When it fertilized enter the uterus, it develops continually with the time period and it takes about 36-40 weeks or nine months for a human child to fully develop in the mother's womb.
4. The names of the glands which form the endocrine system are as follows:
   (i) pituitary gland.
   (ii) Hypothalamus
   (iii) Thyroid gland
   (iv) Parathyroid gland
   (v) adrenal gland
   (vi) Pineal gland
5. The sex of a child is determined by the chromosomes. The human

body is made up of different types of cells. All these cells except the mature red blood cells have a nucleus. In the nucleus, there are 23 pairs of chromosomes. Being a male or a female is dependant on a particular pair of chromosomes. This pair is known asa sex chromosomes.

HOTS

1. Dog release many eggs at a time and they are fertilizers by sperms which produces multiple puppies.
2. Do it yourself.

Find Out

6 inches or 15 cm.

Science Olympiad

1. Hormone is Adrenaline and gland is adrenal.
2. It is because of genetic traits from parents to their children.

9. Force, Friction and Pressure

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. force, 2. roughness, 3. gravitation, 4. manometer, 5. atmosphere, 6. 760 mm

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

1. ✗, 2. ✓, 3. ✓, 4. ✗, 5. ✓, 6. ✓

E. Write the reasons.

1. The tyres have grooves on their surface to create friction between tyres and road.
2. Aeroplanes and ships have streamlived body because this shape makes these air— resistant.
3. heavy tanks have broad chains to move to increase the area of contact. Because of this tank can earn cross ground which is sinking as the pressure exerted on the ground is comparatively.

F. Short answer type questions.

1. When an object is an rest.
2. Zero
3. Because a concrete road provides a good surface fac friction.
4. Contacting surface and surface area.
5. the gravitational force of the earth.
6. Friction.

G. Short answer type questions.

1. Force is a push and a pull that can be used to change the speed, direction or shape of a body.

2. different types of forces are frictional force, gravitational force, magnetic force and electrostatic force.
3. The two disadvantages of friction are as follows:
   (i) It causes wastage of energy.
   (ii) It generates heat, sometimes this can be harmful.
4. The force of attraction between all masses in the universe, especially the attraction of the earth's mass for bodies near its surface is called gravitational force.
5. A spring balance is a device used to measure the weight of an object. It can also be used for the measurement of forces.
6. Magnetic force is a force with which a magnet pulls objects made of certain metals, for example, iron towards itself.
7. Pressure is the force acting per unit area.
8. Barometer is used to measure atmospheric pressure.

H. Long answer type questions.

1. Some effects of force are as follows:
   (i) A force can change the position of rest of an object. To make a football at rest, someone must kick it.
   (ii) A force can change the state of a motion of a body. By applying force, the speed of an object can be increased or decreased.
   (iii) A force can change the shape and size of an object.
2. We can minimize the friction through the following ways:
   (i) Polishing a rough surface smoothens it and reduces friction.
   (ii) Friction is decreased by lubricating with oil, grease and graphite.
   (iii) A streamlined shape is narrow in front and back and broader at the middle. The bodies of aeroplanes, missiles, cars, etc. are streamlined to reduce friction with air.
3. The three methods to increase friction are as follows:
   (i) The friction can be increased by making the surface rough.
   (ii) tyres have designs and patterns with groves on the surface to increase resistance with the road. This prevent slipping of tyres on a wet road.
   (iii) Sand and gravel is straw in slippery ground during the rainy season to increase friction.
   (iv) Spikes are provides in the sales of shows used by players and athletes to increase friction so that they get a firm grip on the ground.
4. Some uses of magnetic force are asa follows:
   (i) Rotating magnetic fields are used in both electric motors and generators.

(ii) The interaction of magnetic fields in electric devices such as transformers in conceptualized and investigated is magnetic circuits, grease or graphite.

(iii) A streamlined shaped is narrow in front and back and broader at the middle. The bodies of aeroplanes, missiles, cars, etc. are streamlined to reduce friction with air.

3. The three methods to increase friction are as follows:
   (i) the friction can be increased by making the surface rough.
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4. Some uses of magnetic force are as follows:
   (i) Rotating magnetic fields are used in both electric motors and generators.
   (ii) The interaction of magnetic fields in electric devices such as transformers in conceptualized and investigated as magnetic circuits.
   (iii) Magnetic forces give information in a material through the Hall effect.
5. When you rub a comb with your dry hair for some time. The comb requires a property called electrostatic change. This comb when brought near the lits of paper, exert an electrostatic force on them. Because of this force, these bits of paper move towards the comb. The force exerted by the electrostatic charges is called electrostatic force.
6. The earth is surrounded by a layer of air called the atmosphere. We live at the bottom of this layer. The air above presses down on us with a force equal to that exerted by a mass of 1 kg on every square centimetre. This is called the atmospheric pressure. We can measure atmospheric pressure with the help of a barometer.
7. The liquid pressure varies with depth as we notice that the difference in the liquid level remains the same.

   The pressure at the bottom of the sea is much greater than near the surface. Deep sea divers have to wear special suits to prevent their bodies from being crushed.
8. The atmospheric pressure reduces as we go at higher altitude. Since, the air becomes less dense with increasing height the air pressure also reduces and the pressure exerts by the blood in our body is much higher than the outside pressure.

This can cause the blood vessels to burst which can lead to problems like bleeding from the nose.

HOTS

1. Inorder to evaluate the force acting on surface to measure and describe the effect of force acting on surface we need both force applied and area.
2. The friction plays a vital role in this, because they start burning because of friction with air.

Find Out

1. While driving a car, friction between the tyres and road is necessary.
2. Friction between your shoes and the floor helps to walk.
3. Friction between a piece of chalk and blackboard aids in writing on it.
4. Friction helps you to grip the sting of a kite while flying it.
5. Any object moving forward in the air', a drag force, which opposes the forward motion of object.

Science Olympiad

1. it is because of bedsheet as the bedsheet causes the decreasing the friction between the box and the earth.
2. Gravitational force.
3. Do it yourself.

10. Sound

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. water, 2. medium, 3. waves, 4. hertz, 5. amplitude, 6. source, 7. echo, 8. noise

C. Write True or False.

1. False, 2. True, 3. False, 4. True, 5. True, 6. True, 7. False, 8. False, 9. True

D. Define the following terms.

1. Amplitude— The maximum displacement of a vibrating body from its mean position.
2. Frequency— The number of vibrations produced per second.
3. Time period— The time taken by a body to complete one vibration.
4. Echo— The sound herd after reflection from a surface.

E. Short answer type questions.

1. Hertz
2. Unwanted sound
3. Decibal (db)
4. Frequences
5. Vibration
6. (i) It causes damage of each drum.
   (ii) It causes high blood pressure.
7. (i) Sound travels faster in a denser medium.

(ii) It travels faster at higher temperature.

8. 20 Hz

F. Short answer type questions.

1. Sound is the form of energy that we hear as a result of vibration of a body.
2. Sound needs a medium to travel. The medium can be air, water or a solid such as a metal wire.
3. Vitthala temple, has fifty six pillars, each of which produces a different musical tone when tapped.
4. Five types of musical instruments are stringed, wind, percussion, instruments, etc.
5. Modern technology has also gained from the science of reflected sound. Sonar is an example of it, which is used to locate objects underwater.
6. Sonography is a safe method of studying the internal parts of the body including the well-being of a body developing in the mother's womb.
7. Echo is the sound heard after reflection from a surface. It has many useful applications.
8. Unpleasant sound is called noise. Noise is produced by irregular and loud vibration.

G. Long answer type questions.

1. Sound is produced by many thing through many ways. For example— the buzzing sound of a bee area mosquito is produced by the vibrations of their wings. The sound of a drum or tabla is produced by the vibrations of its skin enclosed in the flute tubs.
2. Sound needs a medium to travel. We can prove it through the following activity.

   Take two paper crops. Connect them with a long piece of thread. Ask your friend to hold one end of the thread while you hold the other end.

   Ensure that the threat is tightly stretched. Let your friend whisper through the cup while you try to hear the sound. Can you hear the sound? This proves that even materials such as cotton thread works as a medium for sound to travel.
3. There is a deep rotation between frequency and time period as time period plays an important role in measuring frequency. To understand this see the this example- If the frequency of a tuning fork is 256 Hz, it means it is producing 256 vibration in one second.
4. Loudness refers to how loud or soft a sound seems to a listener. The loudness of sound is determined in term, by the intensity or amount of energy in sound waves. The unit of intensity is the decided (16). As decibel levels get higher, sound waves have greater intensively and sounds are louder.

5. The pitch of sound is the characteristic of the sound that depends upon the frequency of the vibrating body. The loudness of a sound depends on the amplitude of a sound wave. Frequency determines the pitch of sound. Besides being loud or soft sound has one more characteristic. It has pitch or shrillness. Every sound has a pitch. A high pitched voice produces a shrill sound. A low-pitched voice produces a deep tone.
6. Time taken is given kg : $T = 2d/v = 2\times12/349=24/340 \times 0.1$ seconds, so the person will not be able to here the echo. This is because the sensation of the sound persists in our ears for about 0.1 second after the existing stimulus causes to act.
7. Do it yourself.
8. We should do the following things to control noise pollution.
   (i) Avoid using loudspeakers during celebrations.
   (ii) Do not play loud music.
   (iii) Use horn only when necessary.
   (iv) Avoid bursting fireworks that make loud noise.
   (v) Plants trees in your so surroundings as they act as a sound absorbers.

HOTS

Astronauts are not able to talk with each other on the moon because there is no air on the moon to travel sound.

Find Out

The bat produces a high pitched sound, this sound bounces off the prey it hits and returns to the bat as an echo. By listening to how long it takes for echo to bounce back, the bat is able to correctly judge the prey, distance and direction of the prey.

Science Olympiad

1. Given 600 oscillations are made in 1 sec.

$$\therefore \text{Frequency} = 600\ \text{HZ, Time period} = \frac{1}{\text{frequency}} = \frac{1}{600}$$
$$= 0.00166666667\times10.3$$
$$= 1.66666667\text{ms}.$$

2. If a ringing bicycle bell is hold tightly by hand, it stops producing sound because it stops to generate vibration.
3. The sound travel faster in the pipe filled with air as sound travels slower in water.

11. Some Natural Phenomena

A. Tick (✓) the correct option.

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

B. Match the following.

1. (g), 2. (h), 3. (a), 4. (e), 5. (c), 6. (d), 7. (b), 8. (f)

C. Fill in the blanks.

1. vibration, 2. current, 3. contact, 4. induction, 5. conductor

D. Define the following.

1. Electric change— an electric energy produced on a body.
2. Current electricity— the flowing charges of electricity.
3. Conduction-charging a neutral body by bringing it in contact with another body.
4. Induction-charging, body by bringing it near another charged body.

E. Very short answer type questions.

1. Lightning conductor
2. Current electricity
3. Insulator
4. (i) It causes a great loss of lives.
   (ii) It causes of destruction of buildings and other structures.
   (iii) It causes floods.
5. A comb rubbed on hair attract pieces of paper because it is positively charged.

F. Short answer type questions.

1. the outer crust or lithosphere of the earth is made up of a number of separate plates of rock called tectonic plates. These plates fit together like pieces of a jigsaw puzzle.
2. The magnitude of an earthquake is measured by a device called seismograph.
3. Charging a body by bringing it near another charged body is known as induction. A body gets charged when it comes near the another charged body.
4. The electroscope is a simple device used to detect and measure electric charges as a body.
5. The substances which allow electric charges to pass through them, are called conductors of electricity.

G. Long answer type questions.

1. Where soft soil are accompanied by a high water table, earthquake shaking may trigger soil liquefaction flooding the area with sand and ground water rejected to the surface. Large landslides can also fill river valleys creating an unstable dam that can flood large areas upstream of the obstruction.
2. Till the end of the 19th century, it was though that atoms were the smallest particles present in matter. In the beginning of 20th century, some scientists like J.J. Thomson, Rutherford, Bohr and Sommerfield studied the structure of the atom in detain. Their studies showed that an atom has a nucleus in the centre containing neutrons and protons. revolving around the nucleus are electrons, protons carry positive charge, electrons carry negative charge and neutrons

are neutral carrying neither positive nor negative charge.

Under normal circumstances, the number of electrons and protons in an atom are equal and so the atom is neutral within the atom, electrons are capable of moving and neutrons and protons are not.

3. The below given way can be used to make a gold leaf electroscope.

   it consists of a brass rod with a brass disc at its top and two gold leaves (strips cut from a sheet of gold foil or any other metal foil) at the other end. The rod is inserted through a rubber or a plastic stopper into a glass container. The tin foil inside and the wooden base of the container make the electroscope more effective.

4. The following precautions should be followed in case of lightning.
   (i) During lightning and thunderstorm, no open place is safe.
   (ii) Do not take shelter under a tree, not only there is danger of being struck by lightning, it could catch fire and cause great harm to you.
   (iii) After hearing the last thunder, wait for at last 30 minutes before coming out.
   (iv) you can take shelter inside a car or a bigger vehicle like a truck, but with windows and dears of the vehicle shut.

HOTS

1. One should take cover under the heavy tindle because it can protect him from getting hurt.
2. I would prefer to come down by the staircase as it is more safe than the light.

Find Out

Lowering the ambient temperature causes chemical reactions to proceed more slowly. So a battery used at a low temperature produces less current than at a higher temperature. As cold batteries run down they quickly reach the point where they cannot deliver enough current to keep up with the demand.

Science Olympiad

1. Sometimes a crackling sound is heard while taking off sweater during cold winters because when sweater is taken off it gets charged because of rubbing. Due to this we get heard a crackling sound.
2. In this condition, the tree of least height would be more prome to lightning.

12. Chemical Effects of Electric Currents

A. Tick (✓) the correct option.

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

B. Fill in the blanks.

1. poor, 2. negative, 3. insulator, 4. conductor, 5. voltameter

C. Very short answer type question.

1. Anode
2. Electroplating
3. False I am not agree
4. No, because it is always made cathode.
5. Ammeter

D. Short answer type questions.

1. An electric current is a stream of charged particles, such as electrons or ions, moving through an electrical conductor or space.
2. Compounds whose molecules ionise into positively and negatively charged ions in a solution are called electrolytes.
3. A caution is a positively charged ion, with fewer electrons than protons while an anion is negatively charged with more electrons than protons. Because of their opposite electric charges cation and anions attract each other and readily form ionic compounds.
4. The electrode connected with the negative terminal is cathode or negative electrode.
5. When current is passed through the solution of NaCl bubbles are formed because of chlorine gas which release from it.
6. Electrolysis is the process of decomposition of an electrolyte with the help of electricity.

E. Long answer type questions.

1. Pure water is not good conductor of electricity. However most often water contains dissolved salts. Water that has dissolved salts conducts electricity. Touching a switch or an electrical applicance that is connected to the power mains with wet hands could result in flow of electricity through the body.
2. Chemical effects of electric current. The passage of electric current through an electrolyte herts the solution. It also causes chemical changes. The chemicals changes induced by the passage of electric current through an electrolyte is known a electrolysis. The gases come from water electric current breaks up water into its constituent gases, hydrogen and oxygen. This observation, therefore should that electric current has a chemical effect on water.
3. Strong electrolytes: Strong electrolytes are compounds that when dissolved in water ionise completely. Strong acids, strong bases and salts are strong electrolytes, they are good conductors of electricity.

   Weak electrolytes: A weak electrolyte is a compound that when dissolved in under only partially ionised. Weak electrolytes conduct electricity weekly.
4. The metal object which is to be electroplated is made the cathode. A piece of pure metal that is to be coated is made the anode. The

chamber is then filled with an electrolyte which is generally the salt of the metal to the plated.

In copper plating, a copper plate is fixed at the anode, the object to be plated is fixed at the cathode and copper sulphate solution is used as the electrolyte.

When the electric supply is switched on, the copper plate at the anode released positively charged copper ions. The copper ions move from the anode to the cathode and deposit on the metal object at the cathode. In copper electroplating, the electrolyte, the copper sulphate ($CuSO_4$) solution remains unchanged.

5. Let's know about how does an electrolyte conduct electricity.

   The flow of an electric current through the electrolyte or its solution occurs in a device called an electrolytic cell. An electrolysis cell is a vessel in which positive and negative electrodes are fixed in a definite manner. Electrodes are sold or plates made up of conducting materials. They are connected with the source electricity.

   The electrode connected to the positive terminal becomes the anode and the electrode connected with the negative terminal is the cathode. The electrolyte solution is filled with electrolytic cell. When electricity flows through the electrolyte the positively charged cations migrate towards cathode and negatively changed anions move towards the anode.

6. The use of electroplating are as follows:
   (i) The purpose of electroplating is to coat a metal having a certain desired property such as wear resistance corrosion protection, lubricity, etc. For example when chromium metal is plated on ion, it protects the object from corrosion, given a food finish and (makes it look attractive.)
   (ii) Zinc coating is used to protect steel.

HOTS

They cannot be coated with a metal by electroplating.

Find Out

The rusting occur on iron but not in steel because steel is a alloy and mosit air does not react on its surface.

Science Olympiad

1. Solid copper sulphate does not conduct electricity but when it is dissolved in water it does conduct electricity because it is an ionic compound. The conduction of electricity is due the ions in the ionic compounds. When it is dissolved in water, the ion dissociate and conduct.
2. It is done to protect people from electric shocks, because water is good conductor of electricity.

13. Light

A. Tick (✓) the correct option.

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

B. Tick (✓) mark the correct and cross (✗) out the incorrect statements.

1. ✗, 2. ✓, 3. ✗, 4. ✓, 5. ✓

C. Draw a labelled diagram to show:

1. Do it yourself.
2. Do it yourself.

D. Very short answer type question.

1. Reflection of light
2. Dispersion
3. Nightblindness
4. Hypermetropia
5. Rainbow

E. Short answer type questions.

1. The phenomenon due to which a ray of light ravelling from one optical medium to another leaves off from its surface with the change of angle is called reflection of light.
2. The laws of reflection are as follows:
   (i) The incident ray, the normal drawn at the point of incidence and reflected ray all lie in the same plane.
   (ii) When a ray of light is reflected by a surface the angle of incidence angle *i* is equal to the angle of reflection angle *r i.e.*, angle *i* = angle *r*.
3. The phenomenon of left appearing right and right appearing left on reflection in a plane mirror is known as lateral inversion.
4. Refraction is the bending of light as it passes from one transparent substance into another. This bending by refraction makes it possible for us to have lenses, magnifying glasses, prisms and rainbows. Even over eyes depend upon this bending of light.
5. The phenomena of splitting up of white light into seven colours is known as dispersion of light.

F. Long answer type questions.

1.

Incident Ray	Reflected Ray
The ray of light which strikes a reflected surface is called the incident ray.	The incident ray which reflects after striking the reflecting surface is called the reflected ray.

2. When we see a plane mirror almost everyday. So, we have got many amazing experiences with it. If you stand in front of a plane mirror, you will see an image of yourself. This happens because light passes from you to the mirror and bounces back to your eye. Images produced by plane mirror have a number of properties.
3. The major characteristics in a plane mirror are as follows:
   (i) The image is of the same size as the object.
   (ii) The image is at the same distance from the mirror as the object appears to be (i.e., the image distance = the object distance)
   (iv) The image produced is upright.
   (vi) The image is virtual one.
4.

Real Images	Virtual Images
(i) A real image is the collection of focus points actual made by converging rays.	A virtual image is the collection of focus points made by extensions of diverging rays.
(ii) A real image occurs where rays converge.	A virtual image occurs where rays only appear to diverge.

5. The eyes have roughly spherical shape. The human eye is very small approximately 2.5 cm in length. The eyelids act as this shutter of the eye has an eye ball, and there is a white fluid all around it the outer part of the eye is tough so asa to protect the interior parts from shocks and accidents.

   The main parts of our eye are cornea, iris, pupil, lens, etc.

HOTS

It happens because when we stay in sunlight the pupil becomes small to avoid excessive light entering into eyes. When we come in a darkened hall the pupil stays small because eyes cannot adjust the environment directly. That is why, we can't see properly in darkened hall after coming from sunshine.

Find Out

To eye donate you are required to fill the pledge form and send it to any of nearest eye bank. Once you are registered is an eye donor you will be provided an eye donor card.

Science Olympiad

1. We feel more depth in the bucket filled with kerosene.
2. This difference is because of their wavelengths.

14. Our Universe

A. Tick (✓) the correct option.

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

B. Match the following.

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

C. Very short answer type questions.

1. Venus
2. They are called terrestrial planets because they have a compact rocky surface.
3. 365¼ days
4. Saturn
5. Spiral and elliptical

D. Short answer type questions.

1. Stars are huge celestial bodies made mostly of hydrogen and helium that produce light and heat from chumming nuclear forges inside their cores.
2. The stars, the sum, the moon, planets and shooting stars are known as celestial or heavenly bodies.
3. We live in milky way galaxy.
4. The planets are made from compact rocky planets. The Mercury, Venus, Earth and Mars are terrestrial planets.
5. The life is not possible on the Venus because the atmosphere of this planet does not contain oxygen and is made up mostly of carbon dioxide.
6. A falling star or a shooting star has nothing to all to do with a star. These amazing streaks of light you can sometimes see in the night sky are caused by tiny bits of dust and rock called meteoroids falling into the Earth's atmosphere and burning up.
7. An earthquake is the result of a sudden release of stared energy in the earth's crust that creates seismic waves.

E. Long answer type questions.

1. Ursa major is the constellation with seven bright stars. It can be clearly seen in the sky. These seven stars are arranged in the form of a dipper— three stars in the handle and four in its level. That is why, this constellation is also known of the Big Dipper. This name is obtained from the word dipper— a utensil used in the olden days to drink water.
2. During the day, the part of the earth, we live on faces the sum and is bright. As the earth rotates we move away from the sun out so it becomes dark and it is night. After a few hours, the part of the earth which had moved away from the sun returns in front of the sum and

the sun appears to rise in the sky.

3. Some important features of milky way are as follows:
   (i) It is a very large collection of stars.
   (ii) The two common shapes of galaxies are spiral and ellaptical. Some galaxies are spiral and some are elliptical.
   (iii) All stars we see in the night sky are in our own milky way.

4.

Terrestrial Planets	Gaseous Planets
(i) The planets with rocky bodies are known as terrestrial planets.	The planets which mainly made foam gases are called gaseous planets.
(ii) Mercury, Venus, Earth and Mars are terrestrial planets.	Jupiter, Saturn, Uranus and Neptune are called gaseous planets.

5. Scientists or researchers think about the possibility of life on the mars. It is similar to the earth in some respects, a day on Mars is only slightly longer than a day on the earth. It has an atmosphere and it also has seasons like the earth. Similar the earth it has ice at north and south poles. All these features show that life may be possible on the mars, but conditions are not suitable for survival of life.

6.

Asteroids	Comets
(i) These are small, irregular shaped rocky bodies orbiting the sun.	These are fascinating celestial bodies which orbit round the sun. These are balls of ice and dust.
(ii) They are located mostly between Mars and Jupiter but are also found elsewhere.	The orbit of some of them take them beyond the solar system.

HOTS

1. No, it will not possible on the Venus because it spins the opposite direction of the earth.
2. Do it yourself.

Find Out

The answer has been given.

Science Olympiad

1. We will find that the sun is rising from West and is setting in the east in a case of Venus.
2. Do it yourself.

3. No, it will not look the same because the streak of light is caused due to the combined effect of earth's extreme gravitational pull and a friction with its atmosphere which actually burns the whale meter. So if meteor heads towards the moon, no streak of light will appear.

15. Air and Water Pollution

A. Tick (✓) the correct option.

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

B. Tick (✓) the correct and cross (✗) out the incorrect statements.

1. ✗, 2. ✗, 3. ✓, 4. ✓, 5. ✓

C. Give reasons.

1. A thermal power plant can transform a beautiful lake into a dead lake, as it produces fire ahead warm water in a large amount.
2. Incomplete combustion of fossil fuels pollutes air because it emits poisonous gas into the atmosphere.
3. Excessive use of fossil fuels can increase the earth's average temperature as they emit green house gases into the atmosphere.
4. If we continue to pollute air at the present role many coastal villages might get submerged because it causes increasing of average temperature of earth, which creates global warming or called the melting of ice present on poles.

D. Very short answer type questions.

1. Carbon dioxide, sulphur dioxide, carbon monoxide, etc.
2. Vehicles on roads.
3. Carbon dioxide, methane, etc.
4. Carbon dioxide.
5. Because they make the water in lakes poisonous.
6. Some water pollutants are detergent, pesticides, insecticides, etc.
7. the process by which a body of water becomes enriched in dissolved nutrients that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen.
8. The sewage should not dumped into this rivers because it cause water pollution.

E. Short answer type questions.

1. Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants.
2. Four diseases caused by air pollution are asthma, lung cancer, bronchitis, tuberculosis, etc.
3. Acid rain may be defined as the rainwater containing sulphuric acid and nitric acid which are formed from the oxides of sulphur, nitrogen and carbon present in the air pollutants.

4. Global warming is the temperature of the earth's atmosphere, caused by the increase of certain gases.
5. Water contains extremely small insoluble particles. They remain suspended in water and take a long time to settle. Filtering such as a mixture is a slow process because the tiny insoluble particles block the pores of a filtering device. The suspended particles can be separated by a process called loading.

F. Long answer type question.

1. Some major causes of air pollution air as follows:
   (i) Volcanic eruption may eject gases and particular matter.
   (ii) The industries emit poisonous smoke into the atmosphere which pollute air.
   (iii) Thermal power plants consume coal, emit fly ash and hydrocarbons and other gases which cause serious air pollution.
   (iv) Deforestation leads to air pollution by increasing the amount of carbon dioxide in the atmosphere.
2. Acid rain may be defined as the rainwater containing sulphuric acid (H_2SO_4) and nitric acid (NHO_3) which are formed from the oxides of sulphur, nitrogen and carbon present in the air as pollutants off from its surface with the change of angle is called reflection of light.
3. Some effects of global warming are as follows:
   (i) If affects agriculture and food production.
   (ii) It may cause of melting of ice in the polar regions and increase the sea level. This would submerge low lying coastal regions and islands.
   (iii) it increases rainfall and occurance of floods in some regions.
   (iv) It causes frequent droughts in some regions.
4. Biological contaminated water is harmful to health of people. It contains organic waste and harmful micro-organisms that can cause diseases. Water gets biologically contaminated mainly when large amounts of organic waste from forms and homes is flows directly into rivers.
5. A pond can become a dead zone because of cultivation. The nutrients stimulate excessive growth of aquatic plant life which block light from reaching the deeper regions of the waters. This kills many types of organic animals. When plants died, they decompose. The decomposing of plants and aquatic animals use up most of the oxygen dissolved in water. This results in the death of fish and other animals and the area turns into a deed zone.

6. Some method to purify water are as follows:
   (i) Filtration
   (ii) Sedimentation
   (iii) Loading
   (iv) Distillation, etc.

HOTS

1. Planting more trees can help in reducing the problem of carbon dioxide in the atmosphere as the plants use carbon dioxide for synthesis their food and they release oxygen.
2. The water which is found near the surface.

Find out

1. About 1°C

Science Olympiad

1. I think these vehicles should be sun on CNG.
2. CNG is considered as a better fuel for vehicles because it is a pollution free fuel and also cheaper than diesel.
3. An oil spills causes serious marine pollution and also becomes a reason of death of animals living in sea water.

Model Test Paper -1

A. Answer the following questions in short.

1. The production of new individuals from parents are called reproduction.
2. The full form of DNA is deoxyribonulic acid.
3. Protoplasm is the colourless liquid within a cell that comprises the cytoplasm, nucleus and organelles.
4. Biodiversity can be defined as the variety and variability of all organisms like plants, animals and microorganisms.
5. Graphite is a non-metal which is used in making electrodes in dry cells and electric ores. It is also used as a lubricant.

B. Answer the following questions in detail.

1. Non-metals like carbon and phosphorus are important elements for living beings. Phosphorus is indispensable to all living organisms. It is in present in bones. Compounds of phosphorus convert energy stored in food into energy required by cells for performing various tasks. Phosphorus also forms an important part in the genetic material in the cells.
2. Drip irrigation is an efficient system of watering plants. It spplies water to the plants with the help of pipes. The supply of water can be regulated and supplied only when the plant need it. Since water is supplied drop by drop near the roots. Most of the water is absorbed. The main advantages are as follows:
   (i) It saves about 50% of water.
   (ii) Plants gets right amount of water at a proper time.
   (iii) Plants grow faster and produce bitter field.

3. Some preventive measures of malaria are as follows :
   (i) Do not allow water to collect around homes, gardens, schools, offices, etc. & mosquitoes lay eggs in water.
   (ii) Use mosquito net to sleep in.
   (iii) Use mosquito repellent carroms to keep mosquitoes away.
   (iv) If malaria common, ask your doctor to prescribe preventive medicines. Take preventive medicines regularly.
4. Some properties of synthetic fibres are as follows:
   (i) Nylon fibre is stron and has high electricity.
   (ii) It is resistant to acids and bases and does not absorb water.
   (iii) The synthetic fibres are extremely strong and durable.
   (iv) The fabrics made by these fibres dry out quickly.
   (v) Most of the synthetic materials are light yet strong, absorb specific dyes, dry easily and erquire no or light ironing.
5. Coal tar is thick black oily liquid obtained by the destructive distillation of coal. It is a mixture of several carbon compounds. On further fractional compounds it yeilds many important organic compounds such as benzone, toluene, napthalene, phenol, etc. These compounds are used to make pesticides, explosives, fertilizers, etc.

C. Fill in the blanks.

1. exists 2. cell 3. sexual 4. One cell, ball 5. preservation

D. Match the following.

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

E. Differentiate between the following:

1. **Natural Fibres:** The fibres which we get from plants and animals are called natural fibres such as cotton, silk, wool, etc.
   Synthetic Fibres: Some types of fibres are made by man in factories with the help of chemicals. There are called synthetic fibres such as nylon, rayon, terylene, etc.
2. **Metals:** A metal is an element that readily forms positive ions and has metallic bonds.
   Non-metals: Substances which are soft and dull, i.e., non-lustrous, non sororous, non-ductile and poor conductor of heat and electricity are called non-metals.
3. **Cell Wall:** In some unicellular organisms and all kinds of plants, the outermost boundary of the cell is called the cell wall.
   Chloroplast: Most plant cells passes saclike organelles, these are called chloroplasts.

F. Tick (✓) the correct option.

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

G. Write the reasons of the following:

1. Rayon resembles silk in appearance and hence, the name artificial silk.
2. Electrical plugs and sockets are made of thermosets because it is harder than other plastics and is good electrical insulator.

H. Complete the following chemical equations.

1. Iron oxide (salt) 2. Copper oxide
3. Salts and hydrogen gas 4. Sulphuric oxide

Model Test Paper -2

A. Answer the following questions in short.

1. Force is a push and a pull that can be used to change the speed, direction or shape of a body.
2. Sound needs a medium to travel. The medium can be air, water or a solid such as a metal wire.
3. 1. the outer crust or lithosphere of the earth is made up of a number of separate plates of rock called tectonic plates. These plates fit together like pieces of a jigsaw puzzle.
4. An electric current is a stream of charged particles, such as electrons or ions, moving through an electrical conductor or space.
5. The phenomenon due to which a ray of light ravelling from one optical medium to another leaves off from its surface with the change of angle is called reflection of light.

B. Answer the following questions in detail.

1. A cataract is a clouding of the eye's natural lens, which lies behind the iris and the pupil. Cataracts are the most common cause of vision loss in people over age 40 and is the principal cause of blindness in the world.
2. During the day, the part of the earth, we live on faces the sum and is bright. As the earth rotates we move away from the sun out so it becomes dark and it is night. After a few hours, the part of the earth which had moved away from the sun returns in front of the sum and the sun appears to rise in the sky.

   Some important features of milky way are as follows:

   (i) It is a very large collection of stars.

   (ii) The two common shapes of galaxies are spiral and ellaptical. Some galaxies are spiral and some are elliptical.

   (iii) All stars we see in the night sky are in our own milky way.
3. Some major causes of air pollution air as follows:

   (i) Volcanic eruption may eject gases and particular matter.

   (ii) The industries emit poisonous smoke into the atmosphere which pollute air.

   (iii) Thermal power plants consume coal, emit fly ash and hydrocarbons and other gases which cause serious air pollution.

   (iv) Deforestation leads to air pollution by increasing the amount of carbon dioxide in the atmosphere.
4. The use of electroplating are as follows:

   (i) The purpose of electroplating is to coat a metal having a certain desired property such as wear resistance corrosion protection, lubricity, etc. For example when chromium metal is plated on ion, it protects the object from corrosion, given a food finish and (makes it look attractive.)

(ii) Zinc coating is used to protect steel.

5. Where soft soil are accompanied by a high water table, earthquake shaking may trigger soil liquefaction flooding the area with sand and ground water rejected to the surface. Large landslides can also fill river valleys creating an unstable dam that can flood large areas upstream of the obstruction.

C. Define the following:

1. Conduction-charging a neutral body by bringing it in contact with another body.
2. Current electricity— the flowing charges of electricity.
3. Electroplating- The process of depositing a thin layer of any superior metal over an object of a cheaper metal using electricity.
4. Dispersion: The phenomenon of splitting up of white light into seven colours.

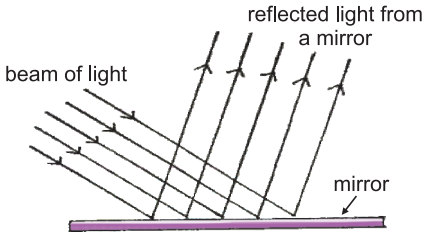
D. Write 'T' for True and 'F' for False.

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

E. Tick (✓) the correct option.

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

F. Draw a laballed diagram to show the regular reflection.



G. Write the reasons of the following.

1. The tyres have grooves on their surface to create friction between tyres and road.
2. Aeroplanes and ships have streamlived body because this shape makes these air— resistant.
3. heavy tanks have broad chains to move to increase the area of contact. Because of this tank can earn cross ground which is sinking as the pressure exerted on the ground is comparatively.

H. Write the reasons of the following.

1. gravitation 2. atmosphere 3. force 4. contact 5. vibration

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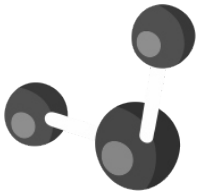

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