

Very Short Answer Type Questions

[1 Mark]

Q. 1. What are renewable resources?

Ans. Resources which can replenish themselves by quick recycling are called renewable resources. For example, forests and wildlife.

Q. 2. What are the two main causes of over-exploitation of natural resources?

Ans. Growing population and industrialisation.

Q. 3. Name the component of air that has maximum solubility in water.

Ans. Carbon dioxide

Q. 4. In which zone of atmosphere is ozone layer present?

Ans. Stratosphere

Q. 5. Which gas is added to the atmosphere by the decay of organic matter?

Ans. Carbon dioxide

Q. 6. Name the two things essential for existence of life on Earth.

Ans. (i) Natural resources like air, land and water.

(ii) Energy of the Sun.

Q. 7. Name the processes which help to maintain the balance between oxygen and carbon dioxide in the environment.

Ans. Photosynthesis and respiration.

Q. 8. What are the two forms of elemental oxygen found in the atmosphere?

Ans. Molecular oxygen and ozone.

Q. 9. Which group of organisms is poisoned by elemental oxygen?

Ans. Anaerobic bacteria

Q. 10. What is the effect of oxygen on nitrogen fixation?

Ans. Nitrogen fixation cannot take place in the presence of oxygen.

Q. 11. What are the basic requirements for existence of life?

Ans. Food, water, air and optimum temperature.

Q. 12. How is humus a major factor in deciding the soil structure?

Ans. Humus makes the soil more porous and allows the water and air to penetrate deep in soil.

Q. 13. What are clouds?

Ans. Clouds are collection of tiny particles of liquid or solid water occurring in the atmosphere above the Earth's surface.

Q. 14. Name any one source of freshwater.

Ans. Rainwater

Q. 15. From where do we procure table salt?

Ans. From sea water

Q. 16. Give any two uses of groundwater.

Ans. It is used for human consumption and irrigation. purposes

Q. 17. Why step farming is common in hills?

Ans. Step farming is practised in hills to check soil erosion through water currents on the slopes.

Q. 18. What is topsoil?

Ans. The topmost layer of the soil which contains soil particles, humus, as well as living organisms is called topsoil.

Q. 19. What do you mean by fertility of the soil?

Ans. Fertility is the capacity of the soil to sustain plant life with the required nutrients.

Q. 20. What are biodegradable pollutants?

Ans. They are the pollutants that degrade by natural means. For example, paper, excreta of animals, etc.

Q. 21. Name the organisms that help in bringing back the minerals from the living system to the nutrient pool.

Ans. Decomposers

Q. 22. Which group of plants has nitrogen-fixing bacteria in the root nodules?

Ans. Leguminous plants

Q. 23. Name the organism found in the root nodules of leguminous plants.

Ans. Rhizobium bacteria.

Q. 24. What are CFCs?

Ans. CFCs or chlorofluorocarbons are man-made organo-halogens used in refrigerators that degrade the ozone layer.

Q. 25. The atmosphere of the Earth is heated by which radiations?

Ans. Through long wave radiations re-radiated by land and water.

Q. 26. How are the nitrogen molecules present in air converted into nitrates and nitrites?

Ans. By the biological process of nitrogen fixing bacteria present in soil.

Q. 27. What is 'ozone hole'?

Ans. The thinning of ozone layer at few places is called the ozone hole.

Q. 28. What is the major source of mineral in soil?

Ans. The parent rock from which soil is formed.

Q. 29. What does marked temperature changes in aquatic environment mainly affect?

Ans. Breeding of aquatic animals.

Short Answer Type Questions – I

[2 Marks]

Q. 1. What are the harmful effects of ozone?

Ans. Inhaling ozone causes dryness of mucous membrane of the mouth, nose and throat; it changes visual activity; causes headache and pulmonary congestion. It even harms leafy vegetables, field crops, fruits and forest trees.

Q. 2. There is mass mortality of fishes in a pond. What may be the reasons?

Ans. (i) Addition of hot water.

(ii) Addition of poisonous (mercury) compounds in water.

(iii) Blockage of gills of fishes with any pollutant.

Q. 3. Write the major uses of oxygen.

Ans. The major uses of oxygen are:

(i) It is necessary for respiration in the living beings.

(ii) Oxygen is essential for combustion, i. e., burning.

Q. 4. How is carbon dioxide fixed?

Ans. (i) Green plants convert CO_2 into glucose in the presence of sunlight by the process of photosynthesis.

(ii) Many marine animals use carbonates dissolved in sea water to make their cell.

Q. 5. All the living organisms are basically made up of C, N, S, P, H and O. How do they enter the living forms? Discuss.

Ans. Plants take up C and H by the process of photosynthesis and the rest of the minerals are absorbed from the soil. Consumers take in O and H by the process of respiration and the rest of the minerals are taken via food.

Q. 6. Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?

Ans. Cycling of these gases maintains consistency of these gases. These are taken up and released by almost every living organism and thus their concentration in the atmosphere is maintained.

Q. 7. Justify "Dust is a pollutant".

Ans. Dust is present in air as suspended particles. It can cause allergy and other respiratory diseases. It also affects plant growth by covering stomata on leaf surface

and blocking them. It acts as the carrier of toxic compounds like heavy metals. Thus, dust acts as a pollutant.

Q. 8. What causes acid rain?

Ans. The burning of fossil fuels like coal and petroleum produces oxides of nitrogen and Sulphur which reach the atmosphere. When they dissolve in rain, they form nitric acid and sulphuric acid and fall as acid rain.

Q. 9. What is smog?

Ans. The suspended particles like unburnt carbon particles and hydrocarbons mix with smoke and fog in the atmosphere, especially in the cold weather to form smog which results in a lowered visibility.

Q. 10. How is ozone layer useful to us?

Ans. Ozone is present in the upper layers of the atmosphere (stratosphere). Before reaching the Earth, the sunrays pass through the stratosphere. The ozone layer present there absorbs the harmful UV rays present in the sunrays and prevent them from reaching the Earth. Thus, it protects the entire planet from disastrous effects of UV rays.

Q. 11. Why is it said that nitrogen is very important for us?

Ans. Nitrogen is the most abundant gas in our atmosphere. In fact it makes up 78% of our atmosphere and is also a part of many molecules essential to life like proteins, nucleic acids (DNA and RNA) and some vitamins, Moreover, it is found in other biologically important compounds such as alkaloids and urea. Thus, nitrogen is very important for us.

Q. 12. How is a balance maintained in the environment?

Ans. The living or biotic components (plants and animals) and the non-living or physical components (air, water, soil, light and temperature) interact and affect each other, resulting in the establishment of a complex and complete balance in the environment. There is a continuous cycle of nutrients among the biotic and abiotic components.

Q. 13. What are the two main sources of air pollution?

Ans. (i) Fixed sources: These are fixed or located at specific sites, like industrial units, electric power plants, etc.

(ii) Mobile sources: These include the vehicles and different modes of transport using fossil fuels.

Q. 14. Write the major uses of water.

Ans. water is used

(i) for drinking and cooking,

(ii) for bathing and washing clothes,

(iii) for irrigation, and

(iv) in industries.

Q. 15. Why does water need conservation even though large oceans surround the land masses?

Ans. Marine water is not useful for human and plant life directly due to high salt content. Uneven distribution of limited freshwater resources need conservation to cater to the demands.

Q. 16. What are aerosols?

Ans. They are certain chemicals like fluorocarbons, released in the air either naturally or by human activities in the form of mist or vapour. Fluorocarbons, which deplete the ozone layer on the atmosphere, are emitted by jet aeroplanes in the form of aerosols.

Q. 17. What are the factors determining the soil type?

Ans. The soil type depends on the following factors:

(i) Size of the soil particles.

(ii) Amount of humus.

(iii) Microorganisms present in the soil.

Q. 18. What makes the biosphere dynamic but stable system?

Ans. A constant interaction between biotic and abiotic components of biosphere makes it dynamic and stable. Interaction consists of transfer of matter and energy between different components of biosphere.

Q. 19. Explain the role of the Sun in the formation of soil.

Ans. During the daytime, the rocks are heated up by the Sun and thus they expand. Whereas, at night they cool down and thus contract. Since all parts of the rock do not expand and contract at the same rate, it results in cracking of rocks, breaking them into smaller pieces.

Q. 20. How do fossil fuels cause air pollution?

Ans. The combustion of fossil fuels like coal, petroleum, etc., not only produces energy but also produces oxides of nitrogen and sulphur like carbon monoxide, sulphur dioxide, oxides of nitrogen as well as smoke particles. These gases accumulate in the atmosphere and leads to inhalation problems, acid rains, and increase in the amount of suspended particles in the air.

Q. 21. What would happen if the Sun heated the Earth's surface equally everywhere?

Ans. If the Sun heated the Earth's surface equally there would be no pressure difference and thus no movement of air. This would ultimately result in an increased surface temperature.

Q. 22. What do you mean by biological nitrogen fixation?

Ans. Biological nitrogen fixation means the conversion of atmospheric nitrogen into useful nitrogen compounds by bacteria and algae. The bacteria present in the root nodules of leguminous plants like *Rhizobium* as well as some blue green algae help in the fixation of atmospheric nitrogen.

Q. 23. The flow of energy is unidirectional whereas the biogeochemical transfer is cyclic. Why is it so?

Ans. A large amount of energy is always lost into the atmosphere during its transfer from one level to another. This lost energy cannot be replenished from the atmosphere. Thus, the energy flow is unidirectional. On the other hand, the biogeochemical substances are never lost in the biogeochemical cycle. They are only recycled.

Q. 24. Justify the statement 'The nitrogen cycle is supposed to be an ideal cycle in the biosphere'.

Ans. The nitrogen cycle is said to be an ideal cycle in the biosphere because the amount of nitrogen remains constant throughout the entire cycle and no nitrogen is lost. Hence, it follows the law of conservation of matter. In the other cycles of biosphere there is either loss of energy or loss of matter.

Q. 25. Why are oceans salty?

Ans. As water flows through rivers, it dissolves small amounts of mineral salts from the rocks and soil of the river beds. This very salty water flows into the oceans and seas. Continuous evaporation of water from the oceans and seas (and freezing of polar ice) results in the increased concentration of minerals in sea water. Thus, the remaining water gets rather saltier as time passes.

Q. 26. Carbon dioxide is necessary for plants. Why do we consider it as a pollutant?

Ans. Plants require CO_2 in an optimum amount for the process of photosynthesis. But, high concentration of (more than normal) CO_2 is harmful and considered as a pollutant. Higher concentration of CO_2 is one of the causes of greenhouse effect and global warming as it absorbs the infrared radiations thus increasing the temperature of Earth. This leads to many environmental problems.

Q. 27. Rivers from land add minerals to sea water. Discuss how.

Ans. Water is capable of dissolving a large number of substances. As water flows over the rocks containing soluble minerals, some of them get dissolved in the water. Thus, rivers carry many nutrients from land to the sea.

Q. 28. Following are a few organisms

(a) lichen **(b) mosses**

(c) mango tree **(d) cactus**

**Which among the above can grow on stones and also help in formation of soil?
Write the mode of their action for making soil.**

Ans. Lichens and mosses grow on rocks. Lichens and mosses release chemical substances which break down the stones resulting in the formation of soil.

Short Answer Type Questions – II

[3 marks]

Q. 1. Why does life not exist on Venus and Mars while it exists on Earth?

Ans. The major component of the atmosphere on Venus and Mars is carbon dioxide. In fact, CO₂ constitutes up to 95-97% of the atmosphere on these planets. So, no life is known to exist on these planets as O₂ is necessary for maintaining life. On the other hand, the atmosphere on Earth has life supporting gases like nitrogen, oxygen, CO₂ and water vapour. Apart from that, water is also present only on Earth.

Q. 2. Why is carbon dioxide produced in large extents?

Ans. We all need oxygen to break down glucose molecules and get energy for all our activities. During glucose breakdown, carbon dioxide is released. Moreover, a lot of carbon dioxide is produced during combustion of various industrial and other human activities. Forest fires also produce a lot of carbon dioxide. Combustion in vehicles contribute a large amount of carbon dioxide to the atmosphere.

Q. 3. In coastal area, wind current moves from the sea towards the land during day but during night it moves from land to the sea. Discuss the reason.

Ans. Air moves from a region of high pressure to a region of low pressure. Air above the land gets heated quickly during day and starts rising. This creates a region of low pressure as a result of which air above the sea rushes into this area of low pressure. This movement of air from one region to other creates winds. During night, as water cools down slowly, the air above water is warmer than the air on land. So, air moves from land to sea creating winds.

Q. 4. Name the major industrial air pollutants.

Ans. The major industrial air pollutants are:

- | | |
|--|---------------------|
| (i) SO ₂ , CO ₂ , oxides of nitrogen | (ii) H ₂ |
| (iii) Fumes of acids | (iv) Dust |
| (v) Particles of unburnt hydrocarbons | (vi) Lead |
| (vii) Asbestos | (viii) Cement |

Q. 5. Name the properties of potable drinking water.

Ans. (i) It should be clear and colourless.

(ii) It must not be foul-smelling.

(iii) It must have sufficient amount of oxygen dissolved in it.

(iv) It should be free from harmful microorganisms.

(v) It must also be free from various chemical pollutants that are injurious to our health.

Q. 6. What methods should be employed for conserving water resources?

Ans. (i) Careful and economical use of water.

(ii) Artificial recharging of groundwater.

(iii) Dams should be built for storage of flood water.

(iv) Rainwater harvesting.

Q. 7. How can the water released from dams affect the aquatic life?

Ans. Like all lifeforms, aquatic organisms also survive within a certain temperature range only. The water in the deep reaches of the dams is cooler than water at the surface. When it is released suddenly in water bodies, the temperature of the water there is reduced significantly, which is very dangerous for aquatic organisms and may affect their breeding. The eggs and larvae of various aquatic animals are highly susceptible to temperature changes.

Q. 8. How is the life of organisms living in water affected when water gets polluted?

Ans. Addition of undesirable chemicals like pesticides, fertilisers, industrial wastes and domestic wastes not only kill the aquatic organisms, they also cause water-borne diseases. With the addition of pollutants, the phytoplankton and other organisms require more oxygen for their degradation, thus decreasing the amount of oxygen available in water. Due to this reduction in the dissolved oxygen in water, there are adverse effects on the aquatic organisms leading to their deaths.

Q. 9. Enlist the main causes of soil erosion.

Ans. The main causes of soil erosion are:

(i) deforestation;

(ii) excessive overgrazing;

(iii) urbanisation; and

(iv) leaving the land uncultivated for a long time.

Q. 10. Why is replenishment of soil essential? Describe two natural ways of soil replenishment.

Ans. Some nutrients of the soil get depleted by growing the same crop year after year. So, replenishment of the soil is essential to keep it fit for further cultivation.

Two natural ways of soil replenishment are:

(i) Crop rotation, and

(ii) Leaving the agricultural land uncultivated for one or two seasons so as to allow it to regain its fertility.

Q. 11. "Soil is formed by water." If you agree to this statement then give reasons for your answer.

Ans. Water helps in formation of soil in the following ways:

(i) Water wears off the rocks over a long period of time.

(ii) Small rocks in the flowing water rub against other rocks creating small particles which are carried away downstream and deposited as soil.

(iii) Water expands on freezing. So when it is deposited in crevices of rocks, rocks crack into smaller pieces.

Q. 12. What is the role of plants in controlling air pollution?

Ans. There is a balance between the CO_2 which occurs at the Earth's surface, CO_2 dissolved in oceans, and that found in marine and terrestrial sediments. The burning of fossil fuels increases the amount of CO_2 in the atmosphere causing air pollution. Plants control air pollution because during the process of photosynthesis, they take in CO_2 from the atmosphere and in turn release O_2 . Thus, decreasing the level of CO_2 in the atmosphere.

Q. 13. What is photochemical smog and what are its effects?

Ans. Oxides of nitrogen combine chemically in sunlight and produce hydrocarbons, peroxyacetal nitrate (PAN), and ozone which are commonly known as photochemical smog. This is very harmful and makes eyes watery, affects the growth of plants by checking the rate of photosynthesis and increases the rate of transpiration.

Q. 14. Describe the major factors which lead to water pollution. Give examples.

Ans. The following are the major factors which lead to water pollution:

(i) The addition of undesirable substances to water bodies. For example, addition of industrial wastes containing poisonous salts like pesticides, insecticides, etc. are fatal for aquatic life.

(ii) The removal of desirable substances from water bodies. For example, depletion of dissolved oxygen and nutrients has adverse effects on aquatic life.

(iii) Change in temperature of water in the water bodies. The aquatic animals are adapted to live under certain temperature range. A sudden change of temperature may affect breeding of aquatic animals, their eggs and larvae, etc. For example, pouring of water at very high temperature from nuclear reactors may cause death of fishes and aquatic animals. Similarly, pouring cold water from dams also affects aquatic life adversely.

Q. 15. What are the harmful effects of water pollution?

Ans. (i) Polluted water causes a number of water-borne diseases like cholera, typhoid, jaundice, diarrhoea, hepatitis and dysentery.

(ii) Presence of acids or alkalies in water destroys certain microorganisms, which carry out the self-purification process in rivers.

(iii) Decrease in the amount of dissolved oxygen in the water body adversely affects the life of aquatic organisms.

(iv) Change in water temperature disturbs the aquatic life as eggs and larvae of various animals are badly affected by such changes.

Q. 16. Give the names of a few organisms that help in nitrogen fixation.

Ans. (i) Rhizobium helps in the fixation of atmospheric nitrogen into ammonia.

(ii) Nitrosomonas converts ammonia to nitrates

(iii) Nitrobacter converts nitrites into nitrates.

Q. 17. How are CFCs harmful for the environment and living beings?

Ans. CFCs contain both chlorine and fluorine. CFCs are very stable and do not get degraded by any natural process. In the ozone layer present in the outer region of the atmosphere (25-40 km above sea level), CFCs are dissociated by ultraviolet light to release free chlorine atoms. Free chlorine atoms catalyse the breakdown of ozone molecules (O_3) into oxygen. This results in degradation of the ozone layer. Thinning of the ozone layer would allow penetration of ultraviolet light into Earth's atmosphere causing blindness, skin cancer and mutations.

Q. 18. What will be the consequences of global warming?

Ans. An increase in global temperatures can cause:

(i) change in the amount and pattern of precipitation, i. e., rain, snow, etc.

(ii) melting of polar ice and rise of sea level,

(iii) extreme weather conditions like floods, droughts, heat wave, hurricanes and tornadoes, etc.

Q. 19. Why is the circulation of carbon in nature important?

Ans. The carbon in the form of food travels to animals from plants through food chains. In atmosphere the concentration of carbon dioxide is very low - only about 0.03% to 0.04%. Therefore, if carbon dioxide is not circulated back to our nutrient pool, there will be shortage of CO_2 and plants will not be able to carry out photosynthesis and the whole cycle will be disrupted. Combustion of fuel also adds carbon dioxide in the atmosphere. Carbon thus cycles through physical and biological activities.

Long Answer Type Questions

[5 marks]

Q. 1. How has industrialisation led to an increase in air pollution? What steps should be taken to check air pollution?

Ans. Industrialisation has led to increased pollution of air in following ways:

(i) Due to industrialisation, the consumption of fossil fuels has increased. Combustion of fossil fuels has increased production of gases like CO, SO₂, SO₃, NO₂ and CO₂ which are toxic.

(ii) There has been depletion in the ozone layer because of increase in the production of chemicals like chlorofluorocarbons which are used as insulators, refrigerants, solvents and aerosol propellants. This has resulted in the entry of UV rays into Earth's atmosphere, which has affected various organisms.

(iii) Combustion of fossil fuels also increases the amount of suspended particles in air causing pollution.

Steps taken to check air pollution are:

(i) Planting more trees, as they purify air by intake of CO₂ gas and release of O₂. This will reduce the greenhouse effect.

(ii) Reducing the consumption of fossil fuels.

(iii) Laying emphasis on the use of non-conventional sources of energy like wind energy, solar energy, tidal energy, etc., which reduce pollution to great extent.

Q. 2. What is the importance of water for plant life?

Ans. Water is very essential for the survival and growth of plants.

(i) Seeds germinate in the presence of water.

(ii) Water helps in the growth of plants.

(iii) Plants manufacture their food by the process of photosynthesis in the presence of sunlight, carbon dioxide, water and a green pigment called chlorophyll.

(iv) Water dissolves the nutrients present in the soil which is then transported to the various parts of the plant.

(v) Water provides a medium for transportation of food and minerals within the plant.

(vi) Water also helps in maintenance of the plant structure by providing appropriate pressure to the plant tissues.

Q. 3. How is carbon stored in our planet?

Ans. Carbon is stored in the following ways.

- (i) As organic molecules, in the living and dead organisms found in the biosphere.
- (ii) As carbon dioxide in the atmosphere.
- (iii) As organic matter in soils.
- (iv) As fossil fuels and sedimentary rock deposits such as lime stone, dolomite and chalk.
- (v) In the oceans as dissolved atmospheric carbon dioxide and as carbonate shells in marine organisms.

Q. 4. What are the sources of soil pollution?

Ans. Soil pollution mainly results from the following sources:

- (i) Industrial wastes:** wastes discharged from pulp and paper mills, chemical industries, oil refineries, coal and mining industries, etc., are responsible for soil pollution.
- (ii) Urban wastes:** solid wastes and refuse in urban areas contribute to soil pollution.
- (iii) Radioactive pollutants:** radioactive substances resulting from explosions of nuclear devices, atmospheric fall out from nuclear dust penetrate the soil and pollute it.
- (iv) Fertilisers:** excessive application of fertilisers to the soil to increase food and vegetable production causes soil pollution.
- (v) Pesticides:** different kinds of pesticides used to control pests cause soil pollution.
- (vi) Farm wastes:** wastes from cows, cattle, pigs and poultries are one of the major sources of soil pollution.
- (vii) Chemical and metallic pollutants:** synthetic chemicals are a source of trace metals which are added to the soil either deliberately or as an impurity.
- (viii) Biological agents:** soil gets large quantities of human, animal, bird excreta which constitute the major source of soil pollution by biological agents.

Q. 5. What are the effects of soil pollution?

Ans. Effects of soil pollution:

- (i)** Chemicals, pesticides, metals, industrial wastes, animal refuse and other pollutants are extremely toxic to living beings and plant products, and cause severe chronic diseases posing a serious threat to human health.
- (ii)** Solid wastes result in offensive odour and cause clogging of groundwater filters.

(iii) Polluted soil damages crops and agricultural production due to decreased soil fertility.

(iv) When food containing radioactive substances is consumed by human beings, they cause a number of undesirable diseases of the digestive track, thyroid gland, etc.

(v) Pesticides not only pose a potential hazard to man, animal, fish and livestock, but they severely affect the desired yield of crops, fruits and vegetables, which become unfit for eating.

Q. 6. How can we control soil pollution?

Ans. Following measures may be taken to control soil pollution:

(i) Proper dumping of unwanted materials.

(ii) Organic wastes contained in animal dung can be used for preparation of compost, manure and biogas rather than throwing them as waste and polluting the soil.

(iii) Natural soil microorganisms should be used to increase the soil fertility rather than the use of pesticides and insecticides.

(iv) To minimise soil pollution, waste such as paper, plastics, glass, metals, chemicals and industrial wastes should be recycled and reduced instead of throwing in the soil.

(v) Use of chemicals, insecticides, etc., should be banned.

Q. 7. Describe the water cycle.

Ans. The water cycle is the journey water takes as it circulates from the land to the sky and back again. It involves the following steps:

(i) The Sun's heat provides the energy for evaporation of water from the Earth's surface (oceans, lakes, rivers, etc.)

(ii) Plants also lose water into the air by the process of transpiration.

(iii) Wind carries the moisture laden air. The water vapour eventually condenses forming tiny droplets in clouds. When clouds meet cool air over the land, precipitation (rain, hail or snow) is triggered and water returns to the land in the form of rainfall.

(iv) All water that falls on the land does not immediately flow back into the sea. Some water seeps into the ground. Some of the underground water is trapped between rocks or clay layers. This is called ground water. Some of this ground water finds its way to the surface through springs. We also bring the ground water to the surface for our use through wells or tube wells. Water is also used by terrestrial animals and plants for various life processes. Most of the water flows down the hills as run offs (above the ground or underground), eventually returning to the seas as slightly salty water.

Q. 8. Describe the steps and processes involved in the nitrogen cycle.

Ans. The various steps of nitrogen cycle are as follows:

(i) Nitrogen fixation: It is the conversion of atmospheric nitrogen into water-soluble compounds like nitrates and nitrites either by the free-living bacteria or Rhizobium that are found in the root nodules of legumes. Atmospheric nitrogen also gets converted into nitrates and nitrites naturally by lightning.

(ii) Ammonification: Death and decay of plant bodies release ammonia into the atmosphere. Animals also give out ammonia along with urea and uric acid as excretory products. These nitrogenous compounds are converted to ammonia by putrefying bacteria and the process is known as ammonification.

(iii) Nitrification: Ammonia is then converted first into nitrites and then into nitrates by the nitrifying bacteria, the process being called as nitrification. Plants generally take up nitrates and nitrites and convert them into amino acids.

(iv) Denitrification: When the animal or the plant dies, denitrifying bacteria in the soil convert the various compounds of nitrogen back into nitrates and nitrites. The nitrates and nitrites are converted into elemental nitrogen by Pseudomonas. This process is called denitrification.

Q. 9. Why is replenishment of forests necessary?

Ans. Forests need to be replenished because of the following reasons:

(i) Rainfall: During transpiration, trees give out enormous amount of water vapour. This water vapour helps in the formation of rain clouds. So, if trees are cut and not replenished, the rainfall in the area will reduce.

(ii) Natural rate of tree growth: Forests cannot be regrown in a few days or months as trees take many years to grow fully. Thus, it becomes necessary to replenish the forests periodically.

(iii) Soil erosion: If a large number of trees are cut, the soil becomes naked. The top soil, which is rich in organic matter will be washed away by water or carried away by wind. Trees help in binding the soil.

(iv) Carbon dioxide-oxygen balance: Forests have a very large number of trees which give out O_2 and take in CO_2 in the day by photosynthesis. In this way, they help in maintaining the carbon dioxide-oxygen balance in the atmosphere.

(v) Timber and fuel: Forests are the best suppliers of timber for furniture and fuel. So, for their constant supply forests need to be replenished.

Q. 10. What are the sources of oxygen in the atmosphere?

Ans. Sources of oxygen in the atmosphere:

- (i) Early in the evolution of the Earth, oxygen is believed to have been released from water vapour by ultra-violet radiations and accumulated in the atmosphere as the hydrogen escaped into the outer layer of the Earth's atmosphere.
- (ii) The main driving factor of the oxygen cycle is when water and carbon dioxide combine in the presence of sunlight and chlorophyll to form glucose and oxygen by the process of photosynthesis.
- (iii) Molecular oxygen is mainly contained in rocks and minerals.
- (iv) Molecular oxygen is also released in the atmosphere by the process of photolysis.
- (v) The weathering process initiated by organisms can also free the oxygen from the lithosphere.
- (vi) Plants and animals extract nutrient minerals from rocks and release oxygen in the process.

Q. 11. Why is it necessary to conserve natural resources? How can they be conserved?

Ans. Natural resources are a precious gift of nature to the mankind. The natural resources and the living organisms are interdependent on each other and form the biosphere. We should use them judiciously for our benefit, but avoid their depletion. The only way to create balance and harmony with nature is to conserve our natural resources.

Some of the ways of conservation of our natural resources are:

- (i) They should be protected from being polluted.
- (ii) More and more vegetation should be planted and endangered species of plants and animals should be protected.
- (iii) The wild animals should be conserved by establishing national parks and sanctuaries.
- (iv) Hunting of animals should be prohibited.
- (v) Recycling of waste materials must be encouraged.
- (vi) We should use alternative sources of energy rather than conventional sources like fossil fuels.

HOTS (Higher Order Thinking Skills)

Q. 1. If there is no atmosphere around the Earth, what will happen to its temperature?

Ans. The atmosphere around the Earth prevents the heat radiation to escape into the outer space. So, in the absence of the atmosphere, the temperature of Earth will decrease up to freezing point during night and increase during day because atmosphere is no longer there to absorb radiations. Thus, it maintains fairly uniform temperature during the day and night.

Q. 2. What would happen if all the oxygen present in the environment is converted to ozone?

Ans. Ozone is a poisonous gas and is thus only present in a thin layer in the stratosphere. If all the oxygen is converted to ozone, the environment will become poisonous and will lead to killing of all living forms.

Q. 3. When we breathe in air, nitrogen also goes inside along with oxygen. What is the fate of this nitrogen?

Ans. The nitrogen inhaled during respiration is not used in the body and it comes out with CO₂ during exhalation.

Q. 4. Why does moon have very cold and very hot temperature variations, e.g., from 190°C to 110°C, even though it is at the same distance from the Sun as the Earth is?

Ans. Absence of atmosphere on the moon has resulted in varying temperature on its surface. The temperature on Earth is maintained by the atmospheric layer around the Earth. It absorbs radiation avoiding overheating and prevents loss of heat from the surface preventing Earth's cooling.

Q. 5. Why is the air near the busy roads more polluted than air at a distance from the busy roads?

Ans. Burning of gasoline to power cars and trucks gives out particulate carbon, carbon dioxide, carbon monoxide, hydrocarbons, oxides of nitrogen and sulphur. Emissions released directly into the atmosphere from the vehicles remain confined in the congested areas near busy roads.

Q. 6. Large amount of carbon dioxide is produced during cellular respiration, burning of fossil fuels and forest fires. Still the concentration of carbon dioxide in Earth's atmosphere is only 0.03%. On the planets Venus and Mars, it constitutes 95-97% of the atmosphere. Give reason for this difference.

Ans. Earth's atmosphere has less carbon dioxide because:

(a) Green plants fix carbon dioxide during photosynthesis.

(b) Most marine animals use carbonates dissolved in sea water and make their shells.

Q. 7. A motor car, with its glass totally closed, is parked directly under the Sun. The inside temperature of the car rises very high. Explain why.

Ans. Infrared radiations in sunlight pass through the glass and heat the interior of the car. The radiation emitted by upholstery and other inner parts of the car cannot pass out of the glass, so the heat trapped inside raises the temperature of the interior. This is because glass is transparent to infrared radiation from the Sun having smaller wavelengths than that emitted by the interior of the car which are of longer wavelengths to which the glass is opaque.

Q. 8. Why do people love to fly kites near the seashore?

Ans. Due to the uneven heating of land and sea, there is movement of air leading to wind formation near seashore. Because of the wind created during day time people fly kites near seashore.

Q. 9. Why does Mathura refinery pose problems to the Taj Mahal?

Ans. Mathura refinery releases toxic gases (like oxides of sulphur) which results in acid rain. Due to this there is discolouring and corrosion of the marbles of Taj Mahal.

Q. 10. Why do not lichens occur in Delhi whereas they commonly grow in Manali or Darjeeling?

Ans. Lichen is a bio-indicator and sensitive to SO₂ pollution from automobiles. Delhi has maximum automobile pollution, hence has a highly polluted environment. Due to the polluted environment, lichen do not survive in Delhi whereas they are present in the pollution-free environment of Darjeeling or Manali.

Q. 11. During summer, if you go near the lake, you feel relief from the heat, why?

Ans. During summer, due to the high temperature there is evaporation of the water. This results in a comparative lower temperature on water surface and thus the air near the water bodies is cooler.

Value Based Questions

1. While driving in the countryside, Kapil saw square panels attached on the street lights along the road. He found out that these were photovoltaic solar panels which tapped solar energy and converted it to electrical energy to make the street lights function. He liked this idea so much that he got similar solar panels installed at his residence also.

Answer the following questions based on the above information:

- (i) In what respects is the installation of solar panels useful to Kapil?**
- (ii) Which values is Kapil promoting by installing solar panels?**
- (iii) How can Kapil promote similar values to other in the neighbourhood?**

Ans. (i) Conservation of energy, financial savings, conservation of natural resources.

(ii) Environmental care, savings, promotion of use of alternative sources of energy.

(iii) Creating awareness about advantages of use of renewable sources of energy, motivating the neighbours for use of technology for better quality of living.

2. Anurag's friend visits his house for the weekend. He observes the following undesired practices without much care for water:

- (i) Plants are watered 2-3 times a day excessively.**
- (ii) Taps are often running even when not required.**
- (iii) Cars are being washed by wrong methods leading to lot of wastage of water. He talks to Anurag about the wrong practices resulting in wastage of water and tells him that water should be used judiciously.**

Answer the following questions based on the above information:

- (i) Which values are being neglected in the activities in the above situation?**
- (ii) What are the adverse effects of the activities observed at Anurag's house?**
- (iii) How can the values related to minimisation of wastage of water in everyday life be promoted?**

Ans. (i) Judicial use of natural resources, mismanagement of natural resources.

(ii) Wastage of water results in reduced ground water, less water for drinking .

(iii) Turning off water taps when not in use, Repair of leaking taps, Watering plants with a watering can once a day, washing/cleaning cars with a dry/wet cloth instead of water running through a pipe, etc.

(iv) Creating consciousness about limited water resources and its judicious use.

3. Parul has gone for a picnic near a lake along with her classmates and teacher. All the children were happy to be in such a beautiful place and started playing. All the children spread the toffee wrappers and empty chips packs in either the lake or the garden. The teacher observed that it was only Parul who collected all these wastes and put them in the dustbins. Teacher was delighted by Parul's act and told everyone to follow Parul's example.

Answer the following questions based on the above information:

(i) What values are being promoted by Parul?

(ii) How can throwing waste in the lake affect the environment?

(iii) Suggest some ways by which you can spread awareness about pollution in your school?

Ans. (i) Concern for environment, good manners.

(ii) Throwing waste in the lake will contaminate the water. This will lead to the deaths of plants and animals in the lake. This polluted water will then become the breeding ground for germs and bacteria which may be disease causing.

(iii) By organizing discussions/setting up cleanliness committees/celebrating Environment day.

4. A laundry engaged in washing clothes has been pouring waste water directly into the river. Over a period of time, it was found that large numbers of fish were dying in the river.

Answer the following questions based on the above information:

(i) Mention the reasons for the dying of fish.

(ii) Is there any way it can be avoided?

(iii) Mention values associated with above situation.

Ans. (i) The chemical detergents in the waste water accumulate in the body of fish. The process is called biological magnification. These accumulated chemicals interrupt the metabolic processes and ultimately results in death.

(ii) The situation can be avoided by not discharging the waste water directly into the river or by treating the waste water before its discharge.

(iii) Environmental conservation.

5. Raj is a farmer residing on the outskirts of Delhi. Upon a visit to a fertiliser shop, the salesman inquired of Raj of the crop he anticipated to cultivate in the coming season. During the conversation, the crop concerned was conveyed. The salesman suggested that urea and other nitrogenous fertiliser be used. Mukesh, quietly but keenly listening the conversation intervened and told Raj that for the concerned crop nitrogenous fertilisers shall not be required.

Respond to the following questions using the information provided above:

- (i) What values are shown by Mukesh?**
- (ii) What can be the concerned crop possibly?**
- (iii) What can be the reason for Mukesh's suggestion?**

Ans. (i) Mukesh is aware how unusual use of nitrogenous fertilisers is dangerous for environment thus he showed his concern towards environment.

(ii) The concerned crop possibly will be a leguminous plant.

(iii) According to Mukesh, the nitrogenous fertiliser is not required as leguminous crop was grown due to which atmospheric nitrogen is already present in the soil.

6. A priest of temple collected dried garlands, holy old books and some statues. He asked his son to throw in the river. But instead of throwing, he buried them in the soil.

- (i) In the situation above, who wins your support: the priest or the son? Justify your answer by giving two reasons.**
- (ii) What are the values reflected in the behaviour of son?**

Ans. (i) The son, as he does not want to pollute the river and he was very well aware of biodiversity.

(ii) Awareness and concern towards environment.

7. A gardener was seen burning dry leaves in the garden daily by a bunch of school kids. The kids went to him and advised not to burn those leaves and told about this practice's ill effects.

- (i) What ill-effects were the kids talking of?**
- (ii) What do you suggest the gardener to do with the leaves instead of burning?**
- (iii) Write any two values shown by the kids.**

Ans. (i) Burning of leaves causes air pollution as the smoke contain carbon dioxide content in the atmosphere would cause more heat to be retained by atmosphere and lead to global warming.

(ii) He can bury the leaves in compost pit instead of burning.

(iii) Awareness towards the love to save mother planet earth, imparting knowledge.

8. The Resident Welfare Association of an area refused the proposal of installation of a mobile tower in their complex.

- (i) Co-relate the refusal with the environment and extinction of house sparrow.**
- (ii) Comment upon the values shown by RWA.**

Ans. (i) The proposal was refused by the RWA as the radiations from the mobile tower cause cancer, fatigue, cataracts, reduced mental concentration, etc. It has also been

noticed that by heat radiation of mobile tower, the house sparrows are getting extinct in nature day by day.

(ii) Protecting nature, concern toward the society.

9. A news item, telling about mysterious disease affecting people of nearby village, inspired Rahul to find out the cause behind it. On investigation, he discovered that the only source of water for the village is a small river on whose banks three paper factories are situated. Rahul along with villagers made efforts and got those factories closed.

(i) what values are promoted by Rahul?

(ii) What role should the government play in protecting the environment?

(iii) Do you identify with the cause Rahul fought for?

Ans. (i) Environmental concern, responsibility towards humanity.

(ii) (a) Government should make laws limiting the pollutants amount.

(b) It should take immediate actions to ban the factories which do not comply the rules of discharging wastes in water bodies.

(iii) Rahul fought for disease causing organisms like the bacteria which cause cholera.

10. Raghu switched from traditional to modern farming practices in which he used large amounts of fertilisers and pesticides to gain an increase in profit.

(i) What are the adverse effects of modern farming?

(ii) What do you think will be effect on the soil in long run?

(iii) What alternative method could be more beneficial for farming?

Ans. (i) The adverse effects of modern farming involve the use of fertilisers and pesticides which leads to soil pollution.

(ii) In a long run it will destroy the soil structure by killing the soil micro-organism which recycle nutrients in the soil.

(iii) Organic farming.]