

Chapter - 14 Natural Resources

Multiple Choice Questions

Q1. The atmosphere of the earth is heated by radiations which are mainly

- (a) radiated by the sun**
- (b) re-radiated by land**
- (c) re-radiated by water**
- (d) re-radiated by land and water.**

Answer: Option d) re-radiated by land and water.

Heating of air is due to solar radiations by land and water bodies. Some of the solar radiations are absorbed and rest is reflected back or re-radiated which heat up the atmosphere.

Q2. If there were no atmosphere around the earth, the temperature of the earth will

- (a) increase**
- (b) go on decreasing**
- (c) increase during day and decrease during night**
- (d) be unaffected.**

Answer: Option c) increase during day and decrease during night

Atmosphere is a temperature buffer. It stops the sudden increase in temperature in daytime and slow down the release of heat to prevent cooling at night. So, the average temperature of earth is stable. If there is no atmosphere then the temperature of earth will be very high during day and very low at night.

Q3. What would happen, if all the oxygen present in the environment is converted to ozone?

- (a) We will be protected more.**
- (b) It will become poisonous and kill living forms.**

(c) Ozone is not stable, hence it will be toxic.

(d) It will help harmful sun radiations to reach earth and damage many life forms.

Answer: Option b) It will become poisonous and kill living forms

Oxygen in atmosphere have two forms, i.e., diatomic molecule (O_2) and ozone (O_3). Ozone is thick blanket called ozone layer or ozonosphere in the stratosphere. Ozone is poisonous, damages the lungs, and cause respiratory diseases like asthma etc. Ozone is a weak mutagen and cause chromosomal abnormalities. So, if oxygen in the environment gets converted into ozone, then air will be toxic and kill all living beings.

Q4. One of the following factors does not lead to soil formation in nature.

(a) The sun

(b) Water

(c) Wind

(d) Polythene bags

Answer: Option d) Polythene bags

Temperature variations due to sun radiations, rain water and wind are biotic factors that help in the formation of soil from rocks. Polythene bags do not help in the formation of soil as they are non-biodegradable and do not undergo decomposition or weathering. They are pollutants that worsen the quality of soil.

Q5. The two forms of oxygen found in the atmosphere are

(a) water and ozone

(b) water and oxygen

(c) ozone and oxygen

(d) water and carbon dioxide.

Answer: Option c) ozone and oxygen

Oxygen occurs in atmosphere in two forms, as diatomic molecule (O_2) and triatomic ozone (O_3). Elemental oxygen is in the form of a diatomic molecule. Ozone is present 18–50 km above in

the atmosphere or stratosphere as thick safety blanket called ozonosphere, ozone shield or ozone layer.

Q6. The process of nitrogen-fixation by bacteria does not take place in the presence of

- (a) molecular form of hydrogen**
- (b) elemental form of oxygen**
- (c) water**
- (d) elemental form of nitrogen.**

Answer: Option b) elemental form of oxygen

Nitrogen fixation is to convert nitrogen or dinitrogen (N_2) into nitrate, ammonia and amino acids. Rhizobium and Azotobacter convert nitrogen into nitrates. Nitrogenase enzyme help in biological nitrogen fixation. This enzyme gets destroyed in presence of oxygen so, nitrogen fixing bacteria live in anaerobic conditions.

Q7. Rainfall patterns depend on

- (a) the underground water tables**
- (b) the number of water bodies in an area**
- (c) the density pattern of human population in an area**
- (d) the prevailing season in an area.**

Answer: Option b) the number of water bodies in an area

Rainfall is determined by factors like availability of water vapors, areas of low pressures, wind patterns, condensation of water vapors and direction of mountains. As the water bodies in area affects the availability of water vapors, they affect the rainfall pattern of a region.

Q8. Among the given options, which one is not correct for the use of large amount of fertilizers and pesticides?

- (a) They are eco-friendly.**
- (b) They turn the fields barren after some time.**

(c) They adversely affect the useful component from the soil.

(d) They destroy the soil fertility.

Answer: Option a) They are eco-friendly.

Fertilizers and pesticides are not eco-friendly but are source of air, water and soil pollution. Excess of fertilizers makes the soil acidic or alkaline and affects the fertility of soil. Prolonged use of fertilizers destroys soil fertility by killing the microorganisms that make soil humus and can destroy plant life and make land barren.

Q9. The nitrogen molecules present in air can be converted into nitrates and nitrites by

(a) a biological process of nitrogen fixing bacteria present in soil

(b) a biological process of carbon fixing factor presents in soil

(c) any of the industries manufacturing nitrogenous compounds

(d) the plants used as cereal crops in field.

Answer: Option a) a biological process of nitrogen fixing bacteria present in soil

Nitrogen molecules in the air is not used directly by plants and animals and is converted into five forms biologically. A number of symbiotic bacteria e.g., Rhizobium, Azotobacter etc. convert nitrogen into ammonia. Ammonium compounds are oxidized by nitrite bacteria like Nitrosomonas and Nitroso coccus to soluble nitrites, which are oxidized by nitrate bacteria like Nitrobacter and Nitrocystis to soluble nitrates.

Q10. One of the following processes is not a step involved in the water- cycle operating in 'nature.

(a) Evaporation

(b) Transpiration

(c) Precipitation

(d) Photosynthesis

Answer: Option d) Photosynthesis

The movement of water in living and non-living components of the biosphere or ecosystem is called water cycle. Evaporation, transpiration and precipitation help in water cycle.

Photosynthesis is an anabolic process where glucose is prepared by CO_2 and H_2O in the presence of light and chlorophyll and release oxygen as a by-product. No water molecules are released but are used in preparation of carbohydrates. So, photosynthesis is not involved in cycling of water.

Q11. The term “water-pollution” can be defined in several ways. Which of the following statements does not give the correct definition?

- (a) The addition of undesirable substances to water-bodies
- (b) The removal of desirable substances from water-bodies
- (c) A change in pressure of the water bodies
- (d) A change in temperature of the water bodies

Answer: Option c) A change in pressure of the water bodies

Water pollution is a change in the physical, biological or chemical content of water that affects the aquatic life and is unfit for use. Water pollution is due to addition of pollutants to water bodies. Polluted water has deficiency of oxygen, nutrients, pH etc. Thermal pollution, affect the aquatic organisms and cause their death too.

Q12. Which of the following is not a greenhouse gas?

- (a) Methane
- (b) Carbon dioxide
- (c) Carbon monoxide
- (d) Ammonia

Answer: Option d) Ammonia

The gases which reflect heat radiations are called greenhouse gases which keep the earth warm. Carbon dioxide (CO_2), methane (CH_4), chlorofluorocarbons (CFCs), nitrous oxide (N_2O), carbon monoxide (CO), etc. are greenhouse gases. Ammonia is not a greenhouse gas but building block of food and medicines.

Q13. Which step is not involved in the carbon- cycle?

- (a) Photosynthesis**
- (b) Transpiration**
- (c) Respiration**
- (d) Burning of fossil fuels**

Answer: Option b) Transpiration

The movement of carbon by living and non-living constituents of biosphere is called carbon cycle in the form of CO_2 in the air. Photosynthesis, respiration and burning of fossil fuels are different steps of carbon-cycle.

CO_2 from air is used by green plants and forms carbohydrate by process called photosynthesis which are used by animals to get energy.

Animals use these carbohydrate molecules to get energy and release CO_2 in the atmosphere. Burning of fossil fuels also releases CO_2 in the atmosphere.

Transpiration is loss of water from leaves and is not involved in carbon-cycle.

Q14. 'Ozone-hole' means

- (a) a large sized hole in the ozone layer**
- (b) thinning of the ozone layer**
- (c) small holes scattered in the ozone layer**
- (d) thickening of ozone in the ozone layer.**

Answer: Option b) thinning of the ozone layer

Ozone layer is about 18-50 km above in the atmosphere called ozone blanket. Production and release of ozone depleting substance (ODS) like chlorofluorocarbons cause thinning of ozone layer called as ozone hole.

Ozone hole was first discovered in Antarctica (1985). Amount of atmospheric ozone is measured by Dobson spectrometer and its unit is Dobson units (DU).

Q15. Ozone-layer is getting depleted because of

- (a) excessive use of automobiles**
- (b) excessive formation of industrial units**
- (c) excessive use of man-made compounds containing both fluorine and chlorine**
- (d) excessive deforestation.**

Answer: Option c) excessive use of man-made compounds containing both fluorine and chlorine

Ozone-layer is depleted due to excess of use and emission of chemicals like ODS (ozone depleting substances). ODS react with ozone present in the stratosphere and destroy them.

The ODS, Chlorofluorocarbon (CFCs) are synthetic chemicals used in refrigerators and air conditioners as coolants, in fire extinguishers, and as propellants. When released in the air, these produces 'active chlorine' (Cl and ClO) radicals and fluorine in the presence of UV radiations. These radicals in chain reaction, destroy ozone by converting it into oxygen. Due to this, the ozone layer in stratosphere becomes thin. A single chlorine atom destroys one lakh ozone molecules.

Q16. Which of the following is a recently originated problem of environment?

- (a) Ozone layer depletion**
- (b) Greenhouse effect**
- (c) Global warming**
- (d) All of the above**

Answer: Option d) All of the above

Due to excessive use of natural resources and emission of harmful pollutants into the environment, the quality of air is worsened. The percentage of carbon dioxide is doubled due to the industrial revolution by burning fossil fuels. Increased number of gases like CO₂ etc. has increased greenhouse effect and global warming. Release of CFCs and other chemical substances in atmosphere caused ozone hole which was discovered in 1985 in Antarctica.

Q17. When we breathe in air, nitrogen also goes inside along with oxygen. What is the fate of this nitrogen?

- (a) It moves along with oxygen into the cells.
- (b) It comes out with the CO₂ during exhalation.
- (c) It is absorbed only by the nasal cells.
- (d) Nitrogen concentration is already more in the cells so it is not at all absorbed.

Answer: Option b) It comes out with the CO₂ during exhalation

Nitrogen is an inert gas. About 78% of atmospheric air contains nitrogen gas and 78% of nitrogen in exhaled air. Nitrogen gas is not absorbed by human body and is exhaled in the environment. Elemental nitrogen in body is in the form of NH₄ ions, amino acids, etc.

Q18. Top-soil contains the following.

- (a) Humus and living organisms only
- (b) Humus and soil particles only
- (c) Humus, living organisms and plants
- (d) Humus, living organisms and soil particles

Answer: Option d) Humus, living organisms and soil particles

Soil profile has four distinct layers, called horizons. Horizon A is the top soil which is darker and of a looser texture than lower layers. Plant and animal matter collect on top soil.

Q19. Choose the correct sequences.

- (a) CO₂ in atmosphere → decomposers → organic carbon in animals → organic carbon in plants
- (b) CO₂ in atmosphere → organic carbon in plants → organic carbon in animals → inorganic carbon in soil
- (c) Inorganic carbonates in water → organic carbon in plants → organic carbon in animals → scavengers
- (d) Organic carbon in animals → decomposers → CO₂ in atmosphere → organic carbon in plants

Answer: Option a) CO₂ in atmosphere → decomposers → organic carbon in animals → organic carbon in plants

Carbon is present as carbon dioxide. This CO_2 is used in photosynthesis which converts carbon dioxide into glucose. Animals feed on the plants and use the glucose molecules to release CO_2 and energy. The dead plants and animals are used up by decomposers and become fossil fuel and humus.

Q20. Major source of mineral in soil is the

- (a) parent rock from which soil is formed
- (b) plants
- (c) animals
- (d) bacteria.

Answer: Option a) parent rock from which soil is formed

Soil is physical, chemical or biological weathering of hard rocks. Rocks contain minerals nutrients that are found in soil which depend on the type of rock from which the soil was formed.

Q21. Total earth's surface covered by water is

- (a) 75%
- (b) 60%
- (c) 85%
- (d) 50%.

Answer: Option a) 75%

Water covers 75% of earth's surface. 97.5% of the water is found in seas and oceans as saline water. Remaining 2.5% of water is fresh water in which 2% is frozen in the ice-caps at the poles. Thus, 0.5 % of total water support terrestrial life.

Q22. Biotic component of biosphere is not constituted by

- (a) producers
- (b) consumers
- (c) decomposer

(d) air.

Answer: Option d) air.

Biosphere consists of ecosystems and is zone of life on earth. It is a global ecological system with interaction with lithosphere, geosphere, hydrosphere and atmosphere.

Biotic components of biosphere consist of all living members of an ecosystem i.e., producers, consumers and decomposers which are connected through food.

Abiotic components are the non-living, chemical and physical part like air, water, sunlight etc.

Q23. An increase in carbon dioxide content in the atmosphere would not cause

(a) more heat to be retained by the environment

(b) increase in photosynthesis in plants

(c) global warming

(d) abundance of desert plants.

Answer: Option b) increase in photosynthesis in plants

Carbon dioxide is a greenhouse gas, an increase in its concentration lead to retain heat by the environment. The increased carbon dioxide and temperature increase the rate of photosynthesis in plants. The retaining of heat due to increased CO₂ concentration will cause an increase in global temperature and does not create xerophytic conditions, so there is no increase of desert plants.

Q24. Oxygen is returned to the atmosphere mainly by

(a) burning of fossil fuel

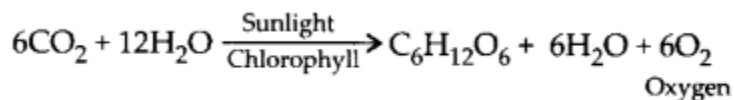
(b) respiration

(c) photosynthesis

(d) fungi.

Answer: Option c) photosynthesis

Plants release O₂ in the environment by photosynthesis, which is anabolic process in which CO₂ form carbohydrates like glucose molecules and oxygen is returned to the atmosphere.



Burning of fossil fuel use O_2 and gives CO_2 in the atmosphere. Respiration is a catabolic process where glucose molecules are oxidized and release energy and carbon dioxide. Fungi do not carry out photosynthesis and take up O_2 for respiration.

Q25. Low visibility during cold weather is due to

- (a) formation of fossil fuel
- (b) unburnt carbon particles or hydrocarbons suspended in air
- (c) lack of adequate power supply
- (d) none of these.

Answer: Option b) unburnt carbon particles or hydrocarbons suspended in air

Combustion of fossil fuels increases suspended particles in the air which are unburnt carbon particles called hydrocarbons. Presence of these pollutants' lower visibility in cold weather when water condenses. This is known as smog due to air pollution.

Q26. Growth of Lichens on barren rocks is followed by the growth of

- (a) moss
- (b) ferns
- (c) gymnosperms
- (d) algae.

Answer: Option a) moss

Lichens are first inhabitants of a rocky surface which produce acids like carbonic acids that corrode the rock. Lichens are flourished by mosses, which also grow on such surfaces. Rhizoids of mosses penetrate deeper in the rocks and cause the rocks to break up further.

Q27. Marked temperature changes in aquatic environment can affect

- (a) breeding of animals

- (b) more growth of aquatic plants
- (c) process of digestion in animals
- (d) availability of nutrients.

Answer: Option a) breeding of animals

Temperature of water bodies rise due to discharge of hot water from thermal plants that use water for cooling in different operations and discharge this hot water to water-bodies. This increase in temperature affects the aquatic organisms like reproduction of marine wildlife, release of immature eggs, prevent development of eggs, the process of digestion as enzymes works at specific temperature, solubility of nutrients in the water and aerobic decomposition is replaced by anaerobic fermentation and decay.

Q28. Soil erosion can be prevented by

- (a) raising forests
- (b) deforestation
- (c) excessive use of fertilizer
- (d) overgrazing by animals.

Answer: Option a) raising forests

Soil erosion is the removal and transport of top layer of soil with the help of strong winds and fast running rain water.

Soil erosion is prevented by forests, as roots of plants hold the soil particles and reduce the exposure of soil to air and wind.

Q29. What happens when rain falls on soil without vegetational cover?

- (a) Rain water percolates in soil efficiently
- (b) Rain water causes loss of surface soil
- (c) Rain water leads to fertility of the soil
- (d) Rain water does not cause any change in soil

Answer: Option b) Rain water causes loss of surface soil

Vegetation plays a vital role to prevent soil erosion. Roots of the plants hold the soil particles and avoid percolation of water into the deeper layers. Absence of vegetation cause the removal of upper layer of soil called soil erosion.

Q30. Oxygen is harmful for

- (a) ferns
- (b) nitrogen fixing bacteria
- (c) Chara
- (d) mango tree,

Answer: Option b) nitrogen fixing bacteria

Nitrogen fixation is the conversion nitrogen or dinitrogen (N_2) into nitrate, ammonia, amino acids. Bacteria like Rhizobium and Azotobacter convert the atmospheric nitrogen into nitrates. Nitrogenase enzyme help in biological nitrogen fixation which gets destroyed in presence of oxygen so, nitrogen fixing bacteria live in anaerobic conditions or isolated oxygen with the proteins like leghemoglobin.

Q31. Rivers from land, add minerals to sea water. Discuss how?

Answer:

A large number of salts and minerals are dissolved in water. Flowing water wears away hard rocks and carry particles of rocks downstream. The soluble minerals in rock particles get dissolved in river water. These dissolved minerals are carried through stream and carried from land to sea.

Q32. How can we prevent the loss of top soil?

Answer:

The removal and transportation of top layer of soil by strong winds and fast running rain water, is called soil erosion. Loss of top layer of soil is prevented by:

a) Increasing the vegetation by intensive cropping and planting of xerophytes, prevent the exposure of top soil to wind and rain and bind the loose soil and reduce the erosion.

b) The deforestation cause soil erosion. Top soil, bare of vegetation and its erosion is prevented by roots of plants i.e., trees by holding the soil. So, excessive cutting of trees is restricted or reduced to save trees, which prevents soil erosion.

c) Preventing overgrazing of pasture lands by animals like goat and sheep, etc. which restore the vegetation cover and prevent the soil erosion.

d) Terrace farming in hilly areas have steps at the slopes, so rain water move slowly and the soil is not washed away and prevent soil erosion.

Q33. How is the life of organisms living in water affected when water gets polluted?

Answer:

Life of organisms living in water is affected due to addition of pollutants in water in the following ways:

a) Addition of industrial wastes adds acids and alkalis to the water bodies and kill microorganisms present in water bodies.

b) Addition of fertilizers and sewage, adds nutrients to the water which causes excessive growth of algae, called eutrophication. The death and decomposition of organic matter, increase the biological oxygen demand, which reduces the dissolved oxygen and lead to death of aquatic organisms including fishes.

c) Regular discharge of industrial wastes with heavy metals in water bodies leads to biomagnification of heavy metals like mercury, cadmium etc. and threatens the life of aquatic organisms.

d) Hot water from thermal power plants, reduces the dissolved oxygen and kills aquatic organisms like fishes, etc.

Q34. During summer, if you go near the lake, you feel relief from the heat, why?

Answer:

During summer, when sitting near the water body provides relief from heat as air from water body have water vapors and is cool. The water body heats due to solar radiations so water causes the water vapor to rise upwards and condense. This water vapor is cooler than the dry air blowing on land which flow from water body to provides relief from the heat or high temperature during summer.

Q35. 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.

Answer:

In coastal areas, cool breeze flows from sea to the land during the day time. At night there is flow of air from land to sea because, the air above land heat faster and rises up, creating a region of low pressure below. The air above sea, is cool which moves into this region of low pressure so during the day, the direction of wind is from sea to the land. At night, both the land and the sea cools. As water cools down slower than the land, the air above water is warmer than the air above land. So, during night, the direction of wind is from land to the sea.

Q36. 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.

Answer:

Lichens and mosses are the first occupants on rock. They cause slow weathering of rocks and formation of soil. The lichens live on the rocks and produce carbonic acids and corrode the surface of rocks to form thin layer of soil. Mosses grow on such surfaces and causes the breaking of rocks. This process of weathering of rocks by living organisms is called biological weathering.

Q37. Soil formation is done by both abiotic and biotic factors. List the names of these factors by classifying them as abiotic and biotic?

Abiotic factors cause soil formation with non-living components of environment like sun, water and wind.

Biotic factors cause soil formation with living organisms like lichens, mosses, herbs, shrubs etc.

Q38. All the living organisms are basically made up of C, N, S, P, H and O. How do they enter the living forms? Discuss.

Answer:

All living organisms require essential elements like carbon, hydrogen, oxygen, nitrogen, Sulphur, phosphorus, etc. from lithosphere, hydrosphere and atmosphere and enter into living forms through plants in the form of organic material by the processes of photosynthesis, nitrogen fixation, etc. From plants it pass to other organisms through the food chain.

Q39. Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?

Answer:

The percentage of gases like oxygen, nitrogen and carbon dioxide remains almost constant in the atmosphere which is maintained by their constant flow through nutrient cycles.

Nutrient cycles like oxygen- cycle, carbon- cycle and nitrogen- cycle occurs by constant interaction between biotic and abiotic components of the biosphere by transfer of matter and energy between components of the biosphere.

The environment acts as a reservoir for these gases and living organisms take gases from it which are reverted to the environment by respiration, combustion, decomposition, etc. Any change in percentage of gases affect the ecosystem and living components of ecosystem

Q40. 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?

Answer:

Atmosphere plays a vital role in climate control and is a temperature buffer. It prevents increase in temperature in day light and prevent the escape of heat into the outer space during night preventing cooling during the night. In this way, the average temperature of earth is balanced. The moon is at same distance from the sun as the earth, but moon has no atmosphere, so there is temperature differences on the surface of moon. Moon gets heat as sun's rays fall on its surface and it cools down when sun's rays are not falling over it.

Q41. Why do people love to fly kites near the seashore?

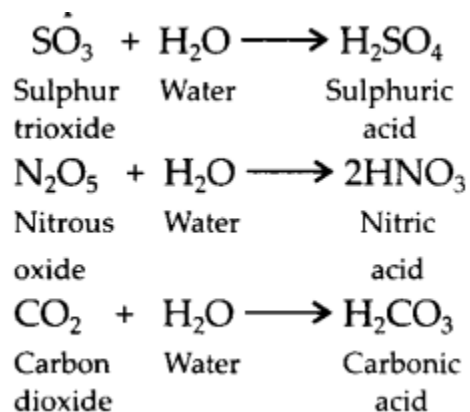
Answer:

In coastal areas, during day time, cool air flow from the sea to land. During day, the air on land gets heated fast and rises up creating low pressure. The cooler air from the sea moves into this area of low pressure. Thus, movement of air from sea to land creates winds and direction of it is from sea to land. So, flying kites near sea shore is easy and joyful.

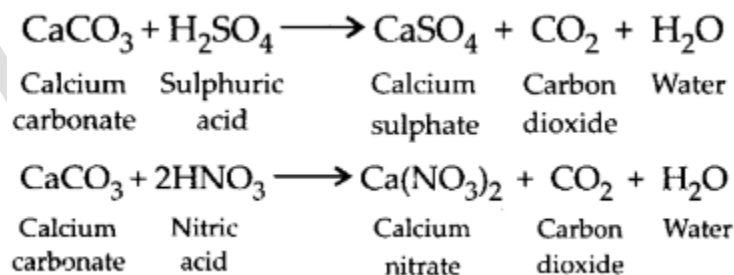
Q42. Why does Mathura refinery pose problems to the Taj Mahal?

Answer:

The Mathura oil refinery discharges large amounts of toxic gases into the atmosphere. Sulphur dioxide, oxides of nitrogen, hydrocarbons, carbon monoxide and aerosols are released in the atmosphere. The oxides of Sulphur, carbon and nitrogen react with water vapor present in the air to form sulphuric, carbonic and nitric acids.



These acids corrode stones, metals, paints and textiles. The gaseous pollutants from Mathura refinery get converted into acids and move towards Agra and cause excessive air pollution problem and is a threat to Taj Mahal. The acids present in rain corrode marble i.e., calcium carbonate of Taj Mahal.



Q43. Why do not lichens occur in Delhi whereas they commonly grow in Manali or Darjeeling?

Answer:

Lichens are pollution indicators or bio-indicators of air pollution. They are unable to survive with Sulphur dioxide and do not grow in areas with high SO_2 .

Delhi has maximum air pollution and high amount of SO_2 in air. Manali and Darjeeling are not polluted and are green cities as the SO_2 concentration is low in these areas. So, growth of lichens does not occur in Delhi which is air polluted and has high SO_2 concentration.

Q44. Why does water need conservation even though large oceans surround the land masses?

Answer:

Water is basic requirements of life. Water occupies a large area of earth's surface. 97.5% of the water is found in seas and oceans as saline water and is unavailable for human consumption because terrestrial bodies cannot survive with high amounts of dissolved salts present in saline water.

2.5% of the total water resources of the world consists of fresh water. About 2% is found in the ice-caps at the two poles and on snow-covered mountains. Remaining 0.6% is available to terrestrial life. 90% of this fresh water is underground as ground water and 10% is surface water. Thus, limited amount of fresh water is available as a renewable source through water cycle.

Q45. There is mass mortality of fishes in a pond. What may be the reasons?

Answer:

Mass mortality of fish in a pond occurred due to addition of substances that deteriorate the quality of water and unfit for sustaining life. Following are the reasons for death of fish in pond:

(i) **Heat:** thermal plants discharge hot water into water bodies, which decreases the dissolved oxygen of water and causes the mortality of living aquatic organisms.

(ii) **Radioactive wastes:** industries discharge radioactive metals or heavy metals like (Hg) into the water body. These toxic metals are consumed by fish. Ingestion of such toxic metals disturbs basic life processes and causes death.

(iii) **Algal bloom:** Addition of organic nutrients by fertilizers and sewage into water body causes the growth of algae, which reduces the dissolved oxygen in water body and causes death of aquatic organisms like fish, etc.

Q46. Lichens are called pioneer colonizers of bare rock. How can they help in formation of soil?

Answer:

Lichens are called colonizers of rock because they inhabit a rocky surface and form soil. While growing, they release acids that corrode the surface of rocks to form a thin layer of soil. This surface is available for the growth of other plants like mosses, etc. which cause the rock to break up. The whole process of weathering of rocks by living organisms is called biological weathering.

Question 47. "Soil is formed by water." If you agree to this statement then give reasons.

Answer:

Water causes the physical weathering of rocks and effects the formation of soil in following two ways:

(i) It gets into the cracks of the rocks due to heating by the sun. On freezing, the water expands in rock crevices to break it.

(ii) Flowing water wears out hard rocks. Fast flowing water carries particles of rocks downstream. On the way, these moving particles cause abrasion of rocks to form smaller particles. The water takes particles of rocks and deposits them. Thus, soil is formed far away from its parent rock.

Q48. Fertile soil has lots of humus Why?

Answer:

Soil is called fertile when it is able to sustain plant growth i.e., provide habitat to plants and in constant yields of high quality. A fertile soil is rich in nutrients including nitrogen, phosphorus and potassium. Fertile soil has humus which is dark-colored decayed organic matter rich in nutrients making the soil porous and increases its air and water holding capacity and helps plant growth. It is black so absorbs heat to warm the soil.

Q49. Why step farming is common in hills?

Answer:

Step farming or terrace farming occurs in hilly areas where small fields are formed in the form of steps or terraces for cultivation of crops which reduces the flow of rain water down the slopes of hills. Soil from upper hills gets deposited in lower terraces to prevent soil erosion in hilly regions.

Q50. Why are root nodules useful for the plants?

Answer:

Root nodules are present in leguminous plants like peas and beans which have symbiotic nitrogen fixing bacteria like Rhizobium, etc.

These symbiotic bacteria are useful for plants as they convert free atmospheric nitrogen which cannot be used by plants and animals into ammonia. The ammonium compounds are oxidized by nitrite bacteria like Nitrosomonas and Nitroso coccus to soluble nitrites, which are further oxidized by nitrate bacteria like Nitrobacter and Nitrocystis to soluble nitrates. This process is called biological nitrogen fixation.

These leguminous plants contain root nodules which are cultivated by farmers after wheat to restore nitrogen in soil as nitrates.

Long Answer Type Questions

Q51. How do fossil fuels cause air pollution?

Answer:

Burning of fossil fuels like coal, petroleum and natural gas in automobiles, industries and thermal power plants cause air pollution.

(i) **Acid rain:** oxides of Sulphur and nitrogen, by burning of fossil fuels, react with water to form H_2SO_4 and HNO_3 . These acids react with rainwater and form acid rain. Acid rain increases acidity of soil, decreasing its fertility and increases the acidity of water, affecting aquatic life.

(ii) **Carbon monoxide poisoning:** Incomplete burning of fossil fuels emit carbon monoxide that affects the function of central nervous system. Its large quantities in air, lead to carbon monoxide poisoning and reduce oxygen content in body tissues causing suffocation and death.

(iii) **Global warming:** Burning of fossil fuels emit large amount of 'green house gases' like carbon dioxide, methane and oxides of nitrogen trap infra-red radiations reflected by earth and increase earth's temperature called global warming which causes the melting of polar ice to rise sea level and flood in coastal regions.

(iv) **Smog:** The burning of fossil fuels increases the number of suspended particles in the air which are unburnt carbon particles like hydrocarbons whose presence in air lowers the visibility in cold weather, known as smog and causes allergies, heart diseases and cancer.

Q52. What are the causes of water pollution? Discuss how you can contribute in reducing water pollution.

Answer:

Water pollution is a change in the physical, biological or chemical qualities of water due to organic, inorganic, biological or radioactive substances that affects the aquatic life and makes water unfit for use. Main causes of water pollution are:

(i) **Sewage:** It is organic wastes in large underground drains called sewers which is a major water pollutant which increases nutrient of water bodies called eutrophication.

(ii) **Industrial wastes:** organic and inorganic chemicals contain large quantities of harmful chemicals like acids and alkalis are discharged into water bodies. The industrial wastes also contain radioactive substances like mercury, etc.

(iii) **Synthetic soaps and detergents:** Water with soaps and detergents is called gray water, discharged from house and factories, and make water unfit for human consumption.

(iv) **Fertilizers and pesticides:** they are used in fields to increase crop production which are added by rainwater into water bodies to pollute them.

(v) **Oil spills:** Drilling and shipping in oceans cause leakage of petroleum which damage flora and fauna of ocean water.

(vi) **Heat:** Release of hot water from power plants increases the temperature and decreases the dissolved oxygen in water, killing aquatic organisms.

(vii) **Unhygienic habits:** Bathing of humans and animals, washing clothes, defecation etc. near water bodies cause water pollution.

Water pollution is reduced by following steps:

(i) The sewage should not be discharged into the water body. Sewage treatment should be done to convert the harmful substances of sewage.

(ii) garbage and domestic wastes in the water body should be banned.

(iii) Dumping of toxic wastes from industries should have legal restrictions.

(iv) Trees should be planted near river banks to prevent soil erosion and siltation.

v) Use of fertilizers and pesticides should be reduced and replaced by manures and eco-friendly methodologies of farming.

Q53. 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?

Answer:

When a motor car, with its glasses closed is parked directly in the sun, the inside temperature of car rises high to greenhouse effect.

Infra-red radiations from sunlight pass through the glasses of the car and heat the interior of the car. Heated upholstery of the car emits long wavelength heat radiations. The glass of windows of the car do not allow these long wavelength heat radiations to pass out of the car. So, the heat is trapped inside the car and raises temperature.

Q54. Justify “dust is a pollutant”.

Answer:

Air pollutant is an agent whose increase in concentration worsens the quality of air and affects the health of living organisms. Pollutant is a particulate matter or a gaseous substance.

Dust is suspended particulate matter (SPM) which is harmful to humans, plants and animals, and is a primary air pollutant. The harmful effects of dust are:

- (a) Dust affects plant growth as it blocks stomata and covers the surface of leaf, preventing photosynthesis, respiration etc.
- (b) Dust causes allergic reactions in humans like bronchial asthma and chronic bronchitis.
- (c) Dust from industries like cotton dust, iron mill dust, mine dust, flour mill dust etc. causes respiratory problems like emphysema, tuberculosis etc.
- (d) Dust have heavy toxic metals like Hg, Pb, Cu, etc. which are harmful to both animals and plants.
- (e) The particulates collect in upper layers of atmosphere to form large colored clouds that obstruct solar radiation and lower the temperature of earth's surface.

Q55. Explain the role of the Sun in the formation of soil.

Answer:

The process of formation of soil from rocky earth's crust is pedogenesis. The rocks at the surface of earth are broken down by physical, chemical and biological processes to form fine soil particles.

Temperature changes due to radiation of sun help in the formation soil from the rocks. Under solar radiations, the rocks heat up and expand. At night, they cool down and contract. As all parts of the rocks do not expand and contract at the same time, cracks appear in the rocks and the large rocks break up into smaller pieces.

Q56. Carbon dioxide is necessary for plants. Why do we consider it as a pollutant?

Answer:

Green plants convert carbon dioxide to glucose in the presence of sunlight, which is stored in the form of starch by the process of photosynthesis.

CO₂ is a pollutant due to burning of fossil fuels, deforestation and human activities. Greenhouse gases trap the heat reflected by earth which heats the atmosphere and increase earth's average temperature called global warming. The harmful effects of global warming are:

- (i) Increase in temperature of earth melts polar ice caps which rise the sea level, due to which coastal regions are flooded or will be submerged.
- (ii) Increase in temperature of earth due to greenhouse effect will change weather and precipitation patterns.