

SHORT QUESTIONS

Q.1 Define environmental chemistry.

Ans. The branch of chemistry which deals with the effect of chemical and other pollutants on the environment. This branch of chemistry is also linked with other sciences. e.g., biology medicine, agriculture, public health etc.

Q.2 Write down the name of the component of the environments.

Ans. Environment consists of following components:

- | | |
|-------------------|-----------------------------|
| (i) Atmosphere | (ii) Hydrosphere |
| (iii) Lithosphere | (iv) Biosphere or ecosphere |

Q.3 Write down the importance of three gasses present in the atmosphere.

Ans. Nitrogen is present in atmosphere about 78%. N_2 is used by nitrogen fixing bacteria. Oxygen 21% is necessary for respiration of animals. Carbon dioxide is necessary for photosynthesis in plants.

Q.4 How much area of earth is covered by water? What is % of ocean water and ground water?

Ans. Hydrosphere covers approximately 70.8% area of earth in the form of oceans rivers lakes etc., on earth 97% of water is present in the form of oceans and 1% is ground water and 2% of fresh water is present in the form of ice caps glaciers.

Q.5 Which two elements are most abundant in the lithosphere?

Ans. The rigid rocky crust of earth is lithosphere. The most abundant element on earth is oxygen (46.6%) silicon (27.7%) iron (5%).

Q.6 What is ecosystem?

Ans. The small unit of biosphere which consist of community of organism and there interaction with environment is called ecosystem.

Q.7 What is pollution?

Ans. Any substance in the environment which adversely affect the human health, quality of life and natural functioning of ecosystem is called pollutant. e.g., smoke of vehicles and industrial waste, nuclear waste etc., livestock waste, noise.

Q.8 What is difference between primary and secondary pollutants?

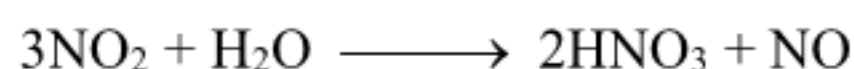
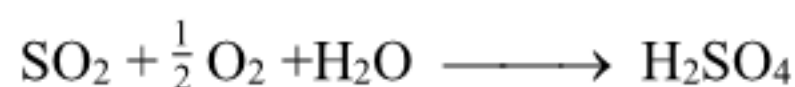
Ans. The pollutants which are directly introduced into the environment are called primary pollutants. Like CO_2 , CO, oxides of sulphur and hydrocarbons. The substance which is not directly introduced to the environment but forms by the interaction of primary pollutants with the environmental chemicals. H_2SO_4 and HNO_3 present in the acid rain are secondary pollutants.

Q.9 Carbon monoxide is called quiet killer why?

Ans. Carbon monoxide is highly poisonous gas and cause suffocation if inhaled. It bonds with blood haemoglobin more strongly than oxygen. Exposure of high concentration of CO cause unconsciousness and eventually death.

Q.10 What is acid rain?

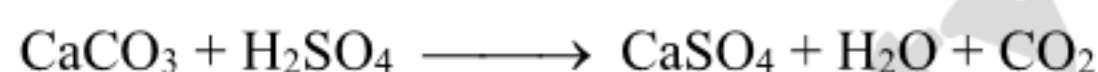
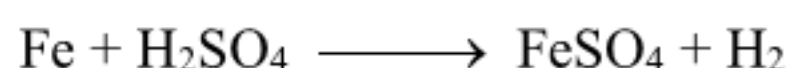
Ans. The rain having pH less than 5.6 is called acid rain. Normal rain water is slightly acidic due to presence of CO₂ present in the atmosphere. Carbon dioxide reacts with water to form carbonic acid. The main reason of acid rain are sulphur dioxide and nitrogen dioxide gases. These gases react with water to form sulphuric acid and nitric acid respectively.



These acids get mixed with the rain and come down on the earth. Acid rain corrodes steel marble, limestone, paint, plastic, cement and masonry work.

Q.11 Write down the two adverse effects of acid rain?

Ans. (i) Acid rain corrode the steels, marbles, limestones, plants, plastics etc.



(ii) By acidification of soil with acid rain, some nutrients of the soil leaches out and growth of plants is affected.

Q.12 What is smog?

Ans. The word smog is combination of smoke and fog. There are two types of smog: (i) reducing smog (ii) oxidizing smog. Reducing smog contains high contents of SO₂, CO₂ and H₂SO₄. Oxidising smog contains high contents of unburnt hydrocarbons, oxides of nitrogen and ozone.

Q.13 In which region of atmosphere, ozone is present and what is thickness of ozone layer?

Ans. Ozone layer is present in stratosphere region 15 km above earth surface. Thickness of ozone layer is 25 to 28 km.

Q.14 What is role of ozone in nature?

Ans. Ozone absorbs ultraviolet radiations of the sun. These radiations are harmful to plants and other materials like rubber, plastics.

Q.15 In which region ozone is produced and what is its concentration in stratosphere?

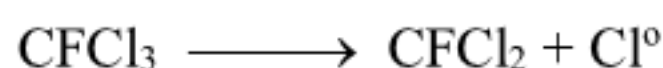
Ans. Ozone is produced in the tropical region due to photochemical reactions of oxygen from where it is transported to the polar regions. The concentration of ozone in stratosphere is 350 DU.

Q.16 What is ozone hole?

Ans. The decrease in the thickness of ozone layer in the stratosphere is termed as ozone hole. The thickness of ozone layer has been decreasing over antarctic region during the spring time since the mid 1970s.

Q.17 How thickness of ozone layer is reduced by chlorofluorocarbons?

Ans. Chlorofluorocarbons are used as refrigerant in air conditioning. They slowly diffuse into the stratosphere and reacts with ozone. Chlorine radical is generated when ultraviolet radiations fall at CFCs. They decompose ozone due to the following reactions.



Q.18 Temperature of stratosphere is greater than upper part of troposphere, although stratosphere is at higher attitude?

Ans. In troposphere, by increasing height air decreases and temperature also decreases. In the upper part of troposphere, the temperature decreases upto -56°C . Temperature of stratosphere increases from -56°C to -2°C . The increase in temperature is due to the presence of ozone layer which absorbs radiation and temperature increase.

Q.19 What are main sources of water pollution?

Ans. Ground water becomes polluted due to following reasons:

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|------------------------------|-------------------------------|
| (i) Live stock water | (ii) Land fills |
| (iii) Agriculture pesticides | (iv) Oil leakage from tankers |
| (v) Detergents | (vi) Septic tanks |

Q.20 Spilled oil damages the marine life, explain it?

Ans. Seawater is being polluted by accidental oil spills and leakage from the cargo oil tankers. Spilled oil damages the marine life often causing death. Oil layer affects the transmission of light through surface of water and process of photosynthesis is reduces or stops. Amount of dissolved oxygen decreases in the marine water and it cause death to aquatic life.

Q.21 What are pesticides?

Ans. The substances which are used to kill the pests are called pesticides. Pests harm the crops. Pesticides are classified as:

- | | |
|---|---|
| (i) Insecticides which kill insects | (ii) Herbicides, which kill unwanted plants |
| (iii) Fungicides which control the growth of fungus | |

Q.22 Which is the main pollutant of leather tanneries and how wastewater can be treated to remove it?

Ans. The main pollutant of leather tanneries is chromium (VI) which is highly toxic and carcinogenic. The waste water can be treated with reducing agent to change chromium (VI) to chromium (III). Trivalent chromium (III) is treated with alkali to form $\text{Cr}(\text{OH})_3$ which is precipitated out.

Q.23 How the quality of water is determined write name of methods?

Ans. Quality of water can be determined by the following methods:

- (i) Dissolved oxygen (D.O)
- (ii) Biochemical oxygen demand (BOD)
- (iii) Chemical oxygen demand (COD)

Q.24 What is biochemical oxygen demand?

Ans. The value of BOD is the amount of oxygen consumed as a result of biological oxidation of dissolved organic matter in the sample. It is capacity of organic matter in natural water to consume O_2 with five days. The normal values range from 4–8 ppm.

Q.25 What is chemical oxygen demand?

Ans. The organic content of water which consumes oxygen during chemical oxidation is chemical oxygen demand of water. The COD of water is determined directly by treating it with dichromate ion $Cr_2O_7^{2-}$, which is powerful oxidising agent.

Q.26 Name the processes by which quality of water can be improved?

- Ans.**
- (i) Aeration
 - (ii) Coagulation
 - (iii) Removal of hardness of water
 - (iv) Chlorination

Q.27 What is effect of aeration on water?

Ans. Aeration has following advantages:

- (i) It improve the oxygen demand in water.
- (ii) It removes foul smell.
- (iii) Oxidises water soluble Fe^{+2} ions to Fe^{+3} ions.

Q.28 What is coagulation? Which coagulant are used for purification of water?

Ans. The process in which colloidal particles will join together to make larger groups which separate in the form of precipitate is called coagulation. The substance which is used to form grouping of colloidal particles is called coagulant. e.g., alum, aluminum sulphate and ferric salts.

Q.29 How the colloidal particles of water are removed by adding alum?

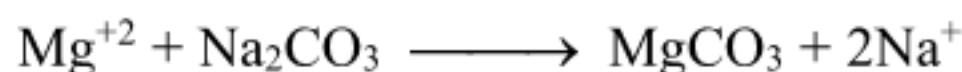
Ans. Alum when dissolved in water forms Al^{+3} ions. These Al^{+3} ions reacts with OH^- ions of water to form gelatinous aluminum hydroxide.



The suspended colloidal particles get absorbed at aluminum hydroxide and settle down as precipitate.

Q.30 Give two methods to remove hardness of water.

Ans. (i) Calcium and magnesium ions of water can be removed by adding washing soda in water.



- (ii) Ca^{+2} and Mg^{+2} ions of water can also be removed by ion-exchange method. Water is passed through Na-zeolite, which exchanges Ca^{+2} and Mg^{+2} ions of hard water by Na^{+} ions.



Q.31 What is solid waste management? What methods are usually used for disposal of solid waste?

Ans. The disposal of domestic, commercial, agricultural solid waste is called solid-waste management. Following methods are usually used for the disposal of solid waste.

- (i) Dumping of waste in sea or river (ii) Land fill
(iii) Incineration (iv) Recycling

Q.32 What is leachate?

Ans. The ground water, which seeps in the landfill and liquid from waste percolate through the refuse is called leachate.

Q.33 Explain the disposal of solid waste by incineration is better than other methods?

Ans. Incineration method has following advantages:

- (i) This method reduces the volume of solid waste.
(ii) Combustible components i.e., paper and plastic provides fuel for the fire.
(iii) In incineration, the heat of combustion may be used for producing steam which can run the turbine and electricity can be produced.

Q.34 Name different methods for recycling of plastics.

- Ans.** (i) Reprocessing (ii) Depolymerization
(iii) Transformation