

QB365
Important Questions - Environmental Chemistry
11th Standard CBSE

Chemistry

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

Section-A

- 1) What is the temperature range of the atmosphere? 1
- 2) What are primary and secondary pollutants of the air? 1
- 3) What is chlorosis? 1
- 4) What is the importance of measuring BOD of a water body? 1
- 5) What is the size range of particulates? 1
- 6) What are viable and non-viable particulates? 1
- 7) Dissolved oxygen in water is very important for aquatic life. What processes are responsible for the reduction of dissolved oxygen in water? 1
- 8) What do you mean by biochemical oxygen demand (BOD)? 1
- 9) A farmer was using pesticides on his farm. He used the product of his farm as food for rearing fishes. He was told that fishes were not fit for human consumption because large amount of pesticides had accumulated in the tissues of fishes. Explain how did this happen? 1
- 10) How can domestic waste be used as manure? 1

Section-B

- 11) For dry cleaning in the place of tetrachloroethene, liquefied carbon dioxide with suitable detergent is an alternative solvent. What type of harm to the environment will be prevented by stopping use of tetrachloroethene? Will use of liquefied carbon dioxide with detergent be completely safe from the point of view of pollution. Explain. 2
- 12) Ozone is a toxic gas and is a strong oxidising agent even then its presence in the stratosphere is very important. Explain what would happen if ozone from this region is completely removed? 2
- 13) How is ozone produced in the stratosphere? 2
- 14) How is the temperature effected as we go up the earth's surface? Explain 2
- 15) What do you mean by ozone hole?What are its consequences? 2
- 16) Why is it expected by scientists that coastal land will be flooded in future? 2

- 17) Sonu and Nilesh were friends. In winters, one day when they were going to school at 10:00 am Sonu felt irritation in his eyes and throat. He was also unable to breath. 2
 Nilesh immediately took him to a doctor. Doctor gave him the proper remedy. When he became well, Nilesh asked reason for this Doctor answered him satisfactorily.
 (i) Can you guess what reason was given by the doctor for the illness of Sonu.
 (ii) Why such kind of polluting atmospheric change occurs?
 (iii) What should be done to prevent the formation of smog?
 (iv) What values are possessed by Nilesh?
- 18) Mr. Grover owner of a dry cleaning shop, was using tetrachloromethane earlier as a solvent for dry-cleaning. 2
 The compound contaminates the ground water and is also suspected carcinogenic. Mr. Raj owner of another dry cleaning shop is using CO₂ these days.
 Hydrogen peroxide is being used for bleaching purpose.
 (i) What are the advantages of using liquid CO₂ with suitable detergent for dry-cleaning?
 (ii) What is the advantage of using H₂O₂ as bleaching agent?
 (iii) What values are possessed by Mr. Raj?
- 19) What are the harmful effects of photochemical smog and how can they be controlled? 2
- 20) On the basis of chemical reactions involved, explain how do chlorofluorocarbons cause thinning of the ozone layer in the stratosphere? 2

Section-C

- 21) Some time ago formation of polar stratospheric clouds was reported over Antarctica. Why were these formed? What happens when such clouds break up by the warmth of sunlight? 5
- 22) Have you ever observed any water pollution in your area? What measures would you suggest to control it? 5
- 23) Do you observe any soil pollution in your neighbourhood? What efforts will you make for controlling the soil pollution? 5
- 24) How can you apply green chemistry for the following? (i) To control photochemical smog 5
 (ii) To avoid use of halogenated solvents in dry
 (iii) To reduce use of synthetic detergents
 (iv) To reduce the consumption of petrol and diesel

Section-A

- 1) . 1
- 2) . 1
- 3) . 1
- 4) 1
 BOD is a measure of level of pollution caused by organic biodegradable material present in the sample of given water. Low value of BOD indicates that water contains less organic matter.
- 5) 5nm to 500000 nm 1

- 6) 1
Viable particulates are small size living organisms such as bacteria, fungi, moulds, algae, etc. Non-viable particulates are formed by disintegration of large size materials or condensation of small size particles or droplets, e.g. mist, smoke, fume, and dust.
- 7) 1
The processes which are responsible for the reduction of dissolved oxygen in water are excessive use of phosphatic and nitrate fertilisers, detergents, the discharge of human sewage and organic waste from food, paper and pulp industries. The microorganisms which oxidise organic matter also use oxygen dissolved in water. Moreover, during night, photosynthesis stops but the aquatic plants continue to respire, resulting in reduction of dissolved oxygen.
- 8) 1
The amount of oxygen required by bacteria to break down the organic matter present in a certain volume of a sample of water is called biochemical oxygen demand (BOD). The amount of BOD in the water is a measure of the amount of organic matter in water, in terms of how much oxygen will be required to break it down biologically. Clean water would have BOD value of less than 5 ppm.
- 9) 1
Pesticides from the soil are transferred into the crops and from the crops these are transferred into fish food. through the run-off water from fields and enter the bodies of fishes. Therefore, pesticides are transferred from lower trophic level to higher trophic level through food chain. Over the time, the concentration of pesticides in fishes reach a level which causes serious metabolic and physiological disorders
- 10) 1
Domestic wastes are collected in small bins and carried to the disposable site. At the site garbage is sorted out and separated into biodegradable wastes. Biodegradable wastes such as vegetable and fruits waste, animal waste, etc., are deposited in land fills and are converted into manure.

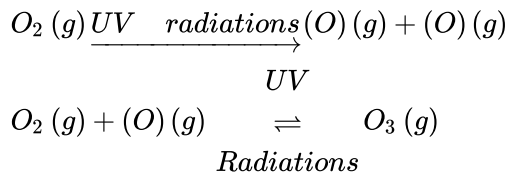
Section-B

- 11) 2
(i) Tetrachloroethene, $\text{Cl}_2\text{C}=\text{CCl}_2$ is suspected to be carcinogenic and also contaminates the ground water. This harmful effect will be prevented by using liquefied CO_2 along with suitable detergent
(ii) Use of liquefied CO_2 along with detergent will not be completely safe because most of the detergents are non-biodegradable and they cause water pollution. Moreover, liquefied CO_2 will ultimately enter into the atmosphere and contribute to the green house effect.
- 12) 2
Ozone prevents harmful UV radiations of the Sun from reaching to the earth's surface, thereby it protects life from adverse effects of UV radiations. If ozone is removed completely from the stratosphere, the UV rays will reach to the earth and will lead to several diseases like sunburn, skin infection etc.

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Ozone in the stratosphere is a product of the action of UV radiations on dioxygen (O_2) molecules. The UV radiations split apart molecular oxygen into free oxygen atoms. These oxygen atoms combine with the molecular oxygen to form ozone.



14)

2

As we go up the earth's surface, from 0-11 km (called troposphere), temperature decreases and from 11-50 km (called stratosphere), temperature increases. From 50-85 km (called mesosphere), temperature again decreases and from 85-100 km (called thermosphere), temperature again increases.

15)

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In the stratosphere, ozone is continuously created and destroyed by the sun's radiations. This results in an equilibrium concentration of ozone. In 1980s atmospheric scientists working in Antarctica reported about the depletion of ozone layer commonly known as ozone hole over the South Pole.

16)

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Due to green house effect, temperature of the earth's surface is expected to rise. This will result into melting of glaciers and polar ice caps. As a result, level of sea water will rise causing floods in the coastal land

17) (i) Sonu became ill because of photochemical smog which caused irritation in his eyes and throat

2

9ii) Smog is formed when sunlight is absorbed by O_3 , oxides of nitrogen and hydrocarbons.

(iii) Formation of smog can be prevented by controlling the emission of oxides of nitrogen and sulphur.

(iv) Nilesh is helpful, intelligent and curious.

18) (i) It will result in less harm to ground water.

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(ii) It gives better results and makes use of lesser amount of water

(iii) He is using better ecofriendly chemicals for dry cleaning and saving environment.

19)

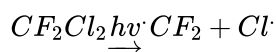
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Photochemical smog consists of O_3 , NO, acrolein, formaldehyde and PAN. O_3 and NO irritate the nose and throat and their high concentration causes a headache, chest pain, dryness of throat, cough, difficulty in breathing. Aldehydes and PAN cause irritation in eyes. PAN is highly toxic substance to plants and causes bronzing of tender leaves. Ozone also affects the rubber articles and causes cracking and ageing.

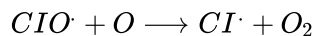
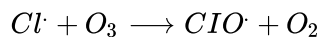
Control of Photochemical smog if primary precursors of photochemical smog such as hydrocarbons and NO_2 are controlled, the secondary precursors such as O_3 and PAN will automatically be reduced.

Certain Plants such as Pinus, Juniperus etc., can metabolise nitrogen oxide and can help in reducing photochemical smog.

Chlorofluorocarbons are introduced into the atmosphere from aerosol sprays in which they function as propellants and from refrigerating equipment in which they act as coolants. It is also used as solvents. It has very long life and stay in the atmosphere for years and ultimately reach the upper layer of the atmosphere where it decomposes in presence of UV-radiation of the sun.



The active chlorine atoms then destroy the ozone layer.

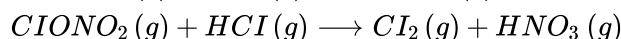
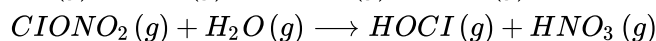
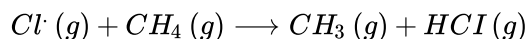
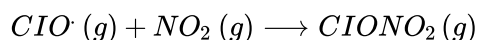


It has been found that one thousand ozone molecules in the stratosphere.

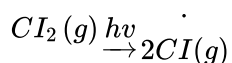
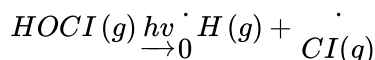
Section-C

In the summer season, nitrogen dioxide and methane react with chlorine monoxide and chlorine free radicals forming chlorine sinks, preventing much ozone depletion, whereas in winters, special type of clouds, called the polar stratospheric clouds are formed over Antarctica.

These polar stratospheric clouds provide the surface on which chlorine nitrate gets hydrolysed to form hypochlorous acid. It also reacts with hydrogen chloride to give molecular chlorine.



When sunlight returns to the Antarctica in the spring, the Sun's warmth breaks up the clouds and HOCl and Cl₂ are photolysed by sunlight.



The chlorine radicals thus formed, initiate the chain for ozone depletion.

Yes, polluted water is the water whose quality has been degraded by the addition of substance such as chemical effluents, metal residues, sewage, oil, fertilisers, detergents, etc.

It can be controlled by the following methods.

(i) Industrial waste discharge from paper, fertilisers, should not be allowed to get mixed in water bodies such as river, lakes, etc.

(ii) Non-biodegradable detergents should be used for cleaning of clothes

(iii) The pH of water should be checked.

(iv) Excessive use of fertilisers should be prevented.

(v) oils spills should be avoided as much as possible

(vi) Domestic waste water should be properly discharged and treated.

(vii) Avoid the use of DDT, malathion at home.

(viii) Waste water should be treated in sewage treatment plant

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Yes, it can be controlled by the following methods. (i) Insecticides, pesticides which are used for the protection of our crops cause soil pollution. Herbicides (weed killers) also cause soil pollution. Therefore, there is a need for their judicious use.

(ii) After the World War-II, DDT was put to use in agriculture to control the damages caused by insects, due to adverse effects, its use has been banned in India. Pesticides such as aldrin and dieldrin are organic toxins. These are water insoluble and physiological disorders in animals. Now a days organophosphates and carbamates are also used as pesticides. These are more biodegradable but these chemicals are severe nerve toxins and hence, more harmful to human

Therefore, chemicals like fertilisers, detergents pesticides polymers, should be used only when necessary

(iii) Biodegradable domestic waste should be deposited in land fills.

(iv) Non- biodegradable waste should be recycled.

(v) use of polythene should be avoided.

(vi) Household waste, biological waste and chemical waste is often incinerated. Incineration greatly reduces the waste volume.

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(i) Certain plants, e.g. Pinus, Juniparus, Quercus, Pyrus and Vitis can metabolise nitrogen oxide (NO) and therefore, their plantation could help in reducing photochemical smog.

(ii) Liquefied CO₂ with a suitable detergent is used for dry cleaning and H₂O₂ is used for the better results and makes use of lesser amount of water.

(iii) Soaps are 100% biodegradable so they should be used in place of detergents. Now-a-days biodegradable detergents are available. Therefore, they should be used in place of non-biodegradable hard detergents.

(iv) CNG should be used as it causes much less pollution. Moreover, electrical vehicles should be used to reduce the consumption of petrol and diesel