

Very Short Answer Questions (PYQ)

[1 Mark]

Q. 1. Mention two advantages for preferring CNG over diesel as an automobile fuel.

Ans. Advantages of CNG are:

- i. burns efficiently and leaves behind less unburnt residues
- ii. cheaper than petrol or diesel
- iii. causes less pollution
- iv. cannot be adulterated
- v. cannot be siphoned by thieves. (*any two*)

Q. 2. List two advantages of the use of unleaded petrol in automobiles as fuel.

Ans.

- i. Allows the catalytic convertor to remain active.
- ii. Reduces air pollution.

Q. 3. Why is the use of unleaded petrol recommended for motor vehicles equipped with catalytic converters?

OR

Why is it desirable to use unleaded petrol in vehicles fitted with catalytic converters?

Ans. Lead in petrol inactivates the catalysts (platinum, palladium and rhodium) which convert harmful pollutants (CO, unburnt hydrocarbons, nitric oxide) to lesser harmful pollutants (CO², H₂O, N₂).

Q. 4. An electrostatic precipitator in a thermal power plant is not able to generate high voltage of several thousands. Write the ecological implication because of it.

Ans. As a result of this particulate matter or dust particles will be released in the air causing air pollution.

Q. 5. In spite of being non-polluting, why are there great apprehensions in using nuclear energy for generating electricity?

Ans. There are great apprehensions in using nuclear energy because of accidental leakages and finding ways for safe disposal of radioactive waste.

Q. 6. Mention the information that the health workers derive by measuring BOD of a water body.

Ans. By measuring BOD of a water body, health workers find the amount of dissolved oxygen in water. The lesser the amount of dissolved oxygen, the more polluted the water body will be.

Q. 7. BOD of two samples of water A and B were 120 mg/L and 400 mg/L, respectively. Which sample is more polluted?

Ans. Sample B is more polluted than Sample A.

Q. 8. Write the name of the organism that is referred to as the 'Terror of Bengal'.

Ans. Water hyacinth (*Eichhornia crassipes*).

Q. 9. Excessive nutrients in a fresh water body cause fish mortality. Give two reasons.

Ans. Excessive nutrients result in excessive algal growth or eutrophication in the water body. Thus, the water quality becomes poor as the oxygen level decreases.

Q. 10. Why is *Eichhornia crassipes* nicknamed as "Terror of Bengal"?

Ans. *Eichhornia crassipes* is an aquatic weed that grows abundantly and very fast in eutrophic water bodies and imbalances water ecosystem. It causes oxygen depletion leading to death of aquatic life (eutrophication).

Q. 11. State the cause of accelerated eutrophication.

Ans. Pollutants from human activities, effluents from industries, effluents from home, sewage and agricultural wastes (chemical wastes radically accelerate the aging process).

Q. 12. How do algal blooms affect the life in water bodies?

Ans.

- i. Algal bloom pollutes water and deteriorates the water quality by depleting the oxygen content. This turns the water toxic and increases its BOD.
- ii. Algal blooms lead to death of aquatic organisms due to oxygen depletion.

Q. 13. Name two greenhouse gases produced by anaerobic microbes.

Ans. Carbon dioxide and methane.

Q. 14. State the effect of UV-B on human eye.

Ans. UV-B is absorbed by human eye and at high dose it causes inflammation of cornea. This is called snow-blindness cataract.

Q. 15. Write the unit used for measuring ozone thickness.

Ans. Dobson unit.

Q. 16. Mention the effect of global warming on the geographical distribution of stenothermals like amphibians.

Ans. Due to global warming, stenothermals would either migrate or die due to change in the temperature.

Q. 17. Mention the effect of UV rays on DNA and proteins in living organisms.

Ans. The high energy of UV rays breaks the chemical bonds within DNA and protein molecules.

Q. 18. How is snow-blindness caused in humans?

Ans. In human eye, cornea absorbs UV-B radiation, and a high dose of UV-B causes inflammation of cornea leading to snow-blindness.

Q. 19. Name the Greenhouse gases that contribute to total global warming.

Ans. N₂O, CFC, CH₄, CO₂.

Q. 20. State the purpose of signing the Montreal Protocol.

Ans. Montreal Protocol, was signed at Montreal, in 1987 to curb the emission of ozone depleting substances.

Q. 21. Why are lichens regarded as pollution indicators?

Ans. Lichens are regarded as pollution indicators because they do not grow in areas that are polluted. So their presence indicates no pollution in that area and their absence indicates that the area is polluted.

Very Short Answer Questions (OIQ)

[1 Mark]

Q.1. Expand BOD.

Ans. Biochemical Oxygen Demand.

Q.2. What type of UV radiation can be lethal to organisms?

Ans. UV-B radiations.

Q.3. Name the main source of air pollution.

Ans. Pollutants emitted by automobiles are the main sources of air pollution.

Q.4. Name any two metals found in the catalytic converter.

Ans. Platinum and palladium.

Q.5. In which year was the Air Prevention and control of pollution Act amended to include noise as air pollution.

Ans. 1987.

Q.6. Name the city in which the entire public road transport runs on CNG.

Ans. Delhi.

Q.7. How do plants control pollution?

Ans. Plants absorb and assimilate the pollutants like CO₂ and provide oxygen by the process of photosynthesis. This reduces the pollution.

Q.8. Name an industry which can cause air pollution, thermal pollution and eutrophication.

Ans. Fertiliser factory.

Q.9. What is an algal bloom?

Ans. The excessive growth of algae (free-floating) that causes colouration of water bodies is called algal bloom.

Q.10. Name the gases released during Bhopal gas tragedy in December, 1984.

Ans. Methyl isocyanate (MIC) and phosgene.

Q.11. Write any two effects of deforestation.

Ans.

- i. Soil erosion
- ii. Global warming.

Q.12. What is the raw material for polyblend?

Ans. Plastic waste.

Q.13. It is a common practice to undertake desilting of the overhead water tanks. What is the possible source of silt that gets deposited in the water tanks.

Ans. The soil particles carried by water from the source of supply.

Q.14. Domestic sewage contains certain substances or salts which are difficult to remove. Name any four of them.

Ans. Nitrate, phosphate, metal ions and organic compound.

Q.15. Eutrophication is the natural aging of a lake; mention any other feature which defines this term.

Ans.

- Depletion of dissolved oxygen in water
- Nutrient enrichment

Q.16. What is polar vortex?

Ans. Antarctic air circulating over the polar region is called polar vortex.

Q.17. Which of the following is not a greenhouse gas? CO₂, CH₄, O₂, CFCs.

Ans. O₂.

Q.18. Why does ozone hole form in spring and not in winter?

Ans. Sunlight is necessary for ozone degradation and it is available only during spring.

Q.19. What is meant by ozone hole?

Ans. Depletion of ozone widely in the stratosphere, particularly over the Antarctic region result in formation of thinned ozone layer called ozone hole.

Q.20. Name the gas which holds up ultraviolet rays.

Ans. Ozone.

Q.21. What is ozone shield?

Ans. The thin layer of ozone around the atmosphere that prevents entry of harmful UV rays in earth's atmosphere is called ozone shield.

Q.22. What is the other name given to Jhum cultivation?

Ans. Slash and burn agriculture.

Q.23. What is reforestation?

Ans. Reforestation is the process of restoring a forest that once existed but was removed at some point of time in the past.

Q.24. What is Amrita Devi Bishnoi Wildlife Protection Award given for?

Ans. It is given to individual or community from rural areas that has shown extraordinary courage and dedication for protecting wildlife.

Short Answer Questions-I (PYQ)

[2 Marks]

Q.1. Thermal power plants are inevitable in an industrial and densely populated country like ours. What harm do they do to the environment? Also mention any precaution that could be taken to save our environment.

Ans. The particulate and gaseous pollutants are released from thermal power plants which lead to harmful effects. These pollutants can cause:

- i. breathing or respiratory symptoms when inhaled.
- ii. irritation, inflammations and damage to lungs and premature death.

Precautionary measures include use of electrostatic precipitators by which 99% of the particulate matters can be removed from the exhaust.

Q.2. How do automobiles fitted with catalytic converters reduce air pollution? Suggest the best fuel for such vehicles.

Ans. Catalytic converters have expensive metals like platinum-palladium and rhodium as catalysts. As exhaust emission passes through catalytic converter, unburnt hydrocarbons are converted into carbon dioxide and water, and carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen gas.

Unleaded petrol is the best fuel for such vehicles.

Q.3.

- a. Name any two places where it is essential to install electrostatic precipitators. Why it is required to do so?
- b. Mention one limitation of the electrostatic precipitator.

Ans.

- a. It is essential to install electrostatic precipitators in thermal power plants and smelters to remove particulate matter.
- b. Limitation of the electrostatic precipitator:
 - i. particulate matter less than 2.5 micrometres are not removed.
 - ii. velocity of air between plates must be low enough to allow the dust to fall.
 - iii. it cannot work without electricity.

Q.4. What is polyblend? Why did the plastic manufacturers think of producing it? Write its usefulness.

Ans. Polyblend is a fine powder of recycled modified plastic. Polyblend was produced to recycle plastic waste. When blended with bitumen, polyblend can be used to lay roads that have increased road life.

Q.5. Mention how e-waste is produced and disposed off. Write the solution for its treatment.

OR

Name any two sources of e-wastes and write two different ways for their disposal.

OR

How e-wastes are being handled in our country? Write the correct solution for treating this waste.

Ans. Irreparable computers and other electronic goods are the known sources of electronic wastes (e-wastes). E-wastes are buried in landfills or incinerated. Recycling is the only solution for the treatment of e-wastes.

Q.6. How does an algal bloom cause eutrophication of a water body? Name the weed that can grow in such a eutrophic lake.

Ans. Algal bloom in the lake or any other water body forms a scum. The scum depletes the oxygen in the water leading to foul smelling of the water body. The oxygen depletion affects the aquatic life adversely resulting in the death of fish and ultimately the eutrophic lake itself dies. Water hyacinth grows in such a eutrophic lake.

Q.7. A crane had DDT level as 5 ppm in its body. What would happen to the population of such birds? Explain giving reasons.

OR

DDT content in the water of a lake that supplies drinking water to the nearby villages, is found to be 0.003 ppm. The kingfishers of that area were reported to have 2 ppm of DDT. Why has the concentration increased in these birds? What harm will this cause to the bird population? Name the phenomenon.

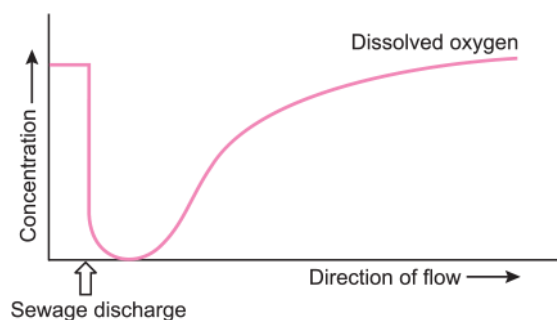
Ans. DDT being a toxic substance gets accumulated in the organism and passes on to the next higher trophic level because it cannot be metabolised or excreted. Thus, concentration of DDT has increased in the birds in the given case. The high concentration of DDT disturbs the calcium metabolism in birds, causes thinning of eggshells, their premature breaking and eventually causes a decline in the bird population.

The phenomenon is called biomagnification.

Q.8. Ornithologists observed decline in the bird population in an area near a lake after the setting of an industrial unit in the same area. Explain the cause responsible for the decline observed.

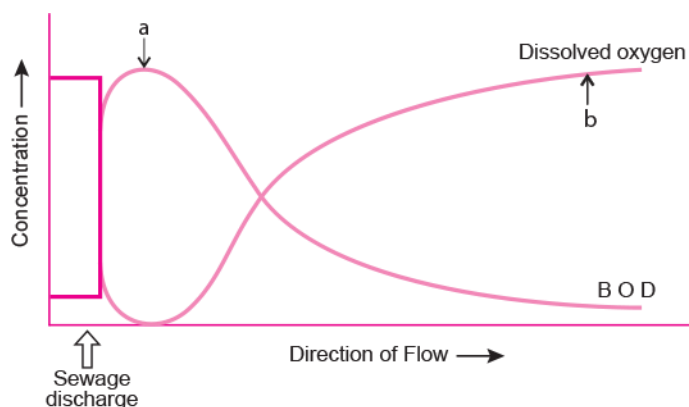
Ans. Harmful wastes from the industrial unit must have entered the trophic levels of food chain causing biomagnification. It must have accumulated in the birds as it can neither be metabolised nor be excreted. High concentration of harmful chemical may disturb calcium metabolism in birds causing thinning of the egg shells and their premature breaking, ultimately causing decline in bird populations.

Q.9. Study the graph given below. Explain how is oxygen concentration affected in the river when sewage is discharged into it.



Ans. When sewage is discharged into the river, the oxygen concentration declines sharply because a large amount of oxygen is consumed by aerobic microorganisms in river to decompose the organic matter in river. When the amount of organic matter reduces, the amount of dissolved oxygen again increases.

Q.10. Explain giving reasons the cause of appearance of peaks 'a' and 'b' in the graph shown below.



Ans. 'a'—High BOD due to sewage discharge.

'b'—Increase in dissolved oxygen due to sewage decomposition.

Micro-organisms involved in biodegradation of organic matter consume a lot of oxygen,

therefore, there is a sharp decline in dissolved oxygen. When the sewage is completely degraded, oxygen concentration again increases.

Q.11. “Determination of Biological Oxygen Demand (BOD) can help in suggesting the quality of a water body.” Explain.

Ans. High BOD of a water body indicates growth of more number of micro-organisms in water. This results in bad quality of water. Bad water quality will lead to death of aquatic creatures and hence more polluting potential. Whereas lower BOD of water body indicates less number of microorganisms in water. There is good quality of water in which aquatic life flourishes and there is less polluting potential.

The amount of oxygen required for microbial breakdown of biodegradable organic matter is called BOD.

Q.12. Lower BOD of a water body helps reappearance of clean-water organisms. Explain.

Ans. Lowering of Biological Oxygen Demand (BOD) results in decreased biodegradable material in the water body. This results in reduced microbial decomposition. When there is no decomposition, oxygen utilisation is reduced and there is more Dissolved Oxygen (DO) available. Thus, clean water-organisms reappear.

Q.13. Suppose sewage water is disposed off in the river. What will be its effect on BOD and dissolved oxygen.

OR

Sewage discharge into clean water body leads to increased fish mortality. Explain.

Ans. Discharge of sewage water into a river will increase nutrients and thereby promotes algal growth. This will result in rise of BOD (Biochemical Oxygen Demand) as decomposers will consume more dissolved oxygen in river. If sewage quantity is large, the whole of the dissolved oxygen will be consumed leaving nothing for respiration of fishes and other aquatic organisms. This increases the mortality rate of aquatic creatures.

Q.14. Explain the causes of global warming. Why is it a warning to mankind?

Ans. Global Warming

- The gradual continuous increase in average temperature of surface of the Earth as a result of increase in concentration of greenhouse gases is termed as global warming.
 - i. **Cause**
 - Increase in the level of greenhouse gases (CO₂, CFCs, etc.) in the atmosphere. These gases allow the heat waves to reach earth but prevent their escape and thus the earth becomes warm.

ii. **Effects**

- The temperature of the earth has increased by 0.6°C in last three decades, which will lead to changes in precipitation patterns.
- Rise in temperature leads to deleterious changes in environment resulting in odd climatic changes called **El Nino effect**.
- The rise in temperature will lead to the increased melting of polar ice caps which will cause the rise in sea level and many coastal areas will be submerged.
- Increased temperature will lead to increased weed growth, eruption of diseases and pests. Thus, crop productivity will decrease.

Q.15. Explain the relationship between greenhouse gases and global warming.

Ans. Greenhouse gases (CO_2 , CH_4 , N_2O , CFCs) allow the solar radiations to enter but prevent the escape of heat radiations of longer wavelength. The absorbed radiations again come to earth's surface and heat it up. Increase in the level of these greenhouse gases allow the heat waves to reach earth but prevent their escape and thus the earth becomes warm. There is gradual continuous increase in average temperature of earth surface leading to global warming.

Q.16. Explain the relationship between CFCs and ozone in the stratosphere.

Ans. UV rays act on CFCs and release chlorine. These chlorine atoms act on ozone to release O_2 , resulting in ozone layer depletion.

Q.17. List four benefits to human life by eliminating the use of CFCs.

Ans.

- i. Delay in aging of skin
- ii. Prevent damage to skin cells
- iii. Prevent skin cancer
- iv. Prevent snow blindness or inflammation of cornea
- v. Prevent cataract
- vi. Prevents ozone depletion
- vii. Prevents global warming
- viii. Reduces greenhouse effect
- ix. Reduces odd climatic changes or El Nino effect.

Q.18. Chlorofluorocarbons (CFCs) are widely used as refrigerants. Then why is it suggested to reduce its emission as far as possible? Explain.

OR

Refrigerants are considered to be a necessity in modern living, but are said to be responsible for ozone holes detected in Antarctica. Justify.

Ans. CFCs find wide use as refrigerants. CFCs discharged in the lower part of atmosphere move upward and reach stratosphere. In stratosphere, UV rays act on them

releasing chloride atoms. Chloride atoms degrade ozone, releasing molecular oxygen. Whatever CFCs are added to the stratosphere have permanent and continuing effects on ozone. These have resulted in ozone hole.

Q.19. Why are there regular reminders to reduce the use of CFCs in the production of industrial and household appliances? Explain.

Ans. CFCs discharged in the lower part of atmosphere move upward and reach stratosphere. In stratosphere, UV rays act on them releasing Cl atoms, which in turn degrade ozone. Ozone depletion will result in entry of harmful UV-B radiations into the earth's atmosphere resulting in deleterious effects on all living organisms.

Q.20.

- a. **State the cause of depletion of ozone layer.**
- b. **Specify any two ill-effects that it can cause in the human body.**

Ans.

- a. UV radiations act upon CFCs (chlorofluorocarbons) releasing Cl atoms in the stratosphere. These Cl atoms combine with O₃ and degrade it.
- b. Ill-effects of ozone depletion:
 - i. UV-B damages DNA and proteins of living organisms causing mutation.
 - ii. It causes skin aging, skin cell damage and skin cancers.
 - iii. UV-B is absorbed by human eye and at high dose it causes inflammation of cornea. This is called **snow-blindness** cataract.

Q.21.

- a. **Rearrange the following greenhouse gases in increasing order of their relative contribution to the total global warming: N₂O; CFC; CO₂; C₂H₄**
- b. **What is the effect of global warming on polar ice-caps? Comment on its possible ecological impact.**

Ans.

- a. C₂H₄ < N₂O < CFC < CO₂
- b. Global warming results in rise of atmospheric temperature. This leads to the increased melting of polar ice caps which will cause the rise in sea level and many coastal areas will be submerged.

Q.22. What is joint forest management? How can it help in conservation of forests?

Ans. Joint Forest Management (JFM) is a programme initiated by the Government of India in 1980 where government works closely with the local communities for protecting and managing forests. By this programme forests are conserved by locals in a

sustainable manner as locals are also benefited with forest products like fruits, gum, rubber, medicines, etc.

Q.23. How have human activities caused desertification? Explain.

Ans. Human activities like over-cultivation, unrestricted grazing, deforestation and poor irrigation practices result in arid patches of land. The fertile top soil that may take centuries to develop is eroded due to these activities. When large barren patches extend and meet over time, a desert is created. Increased urbanisation is also one of the causes of desertification.

Q.24. Write what was the percentage of forest cover of India at the beginning and at the end of the twentieth century. How different is it from the one recommended by the National Forest Policy of our country?

Ans. At the beginning of the twentieth century, forests covered about 30 % of the land of India. By the end of the century, it shrunk to 19.4 %, whereas the National Forest Policy (1988) of India has recommended 33 % forest cover for the plains and 67 % for the hills.

Q.25. Justify the need for signing of Montreal Protocol by the participating nations.

Ans. The Montreal Protocol was signed to control the emission of ozone depleting substances. Excessive use of CFCs and other ozone depleting chemicals has resulted in thinning of ozone layer. Further thinning would allow harmful UV-B radiations to enter Earth's atmosphere and have deleterious effects on living organisms.

Q.26. Answer the following questions:

Q. Why are the colourful polystyrene and plastic packaging used for protecting the food, considered an environmental menace?

Ans. The colourful polystyrene and plastic packaging are non-biodegradable and non-ecofriendly.

Q. Write about the remedy found for the efficient use of plastic waste by Ahmed Khan of Bangalore.

Ans. The remedy was found by developing polyblend, which is a fine powder of recycled modified plastic. Polyblend is mixed with bitumen to lay roads. This enhanced the water repellent property of bitumen and enhanced the life of roads.

Q.27. Answer the following questions:

Q. Name the green house gases that caused global warming.

Ans. CO₂, CH₄, N₂O, chlorofluorocarbons or CFCs

Q. Which of them has caused ozone hole and how?

Ans. Ozone degradation has increased due to chlorofluorocarbons (CFCs). CFCs are refrigerants which react with UV in stratosphere to release chloride atoms. Chloride atoms act as catalyst to degrade ozone and release molecular oxygen. CFCs have permanent and continued effect as chloride atoms are not consumed.

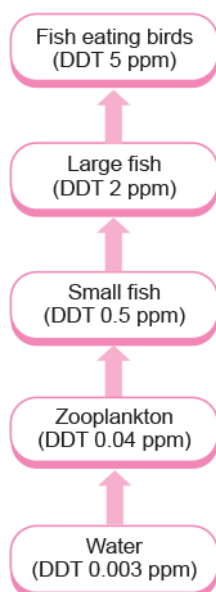
Q.28. Plenty of algal bloom is observed in a pond in your locality.

- a. Write what has caused this bloom and how does it affect the quality of water.**
- b. Suggest a preventive measure.**

Ans.

- a. Presence of large amounts of nutrients (Nitrogen and Phosphorus) in water causes excessive growth of algae. This growth depletes dissolved oxygen in water and imparts distinct colour to the water bodies. The bloom forming algae are extremely toxic and deteriorates water quality resulting in fish mortality.
- b. Following preventive measures can be carried out:
 - i. Treatment of waste water before it reaches the pond.
 - ii. Integrated waste water treatment.
 - iii. Avoid using NPK fertilisers.
 - iv. Use of organic or biodegradable manure or resort to organic farming.

Q.29. Study the given aquatic food chain and answer the questions that follow:



- i. Give reasons why there is a continuous increase in the DDT content in different trophic levels of the chain.
- ii. Name the phenomenon responsible for the increase in DDT content.

Ans.

- i. DDT enters the food chain when they reach water. Since they are not degradable these get accumulated progressively at each trophic level. As they reach higher trophic levels, the concentration of DDT also increases.
- ii. Biological magnification.

Short Answer Questions-I (OIQ)

[2 Mark]

Q.1. What is hybrid vehicle technology. Explain the advantages with a suitable example.

Ans. Vehicle running on dual mode like petrol and CNG are hybrid vehicle. As CNG is a green fuel there is conservation of fossil fuel and reduction in the environmental pollution.

Q.2. What can be the effect of discharging hot (thermal) water into a water body on the organisms in it?

Ans.

- i. A number of organisms will die that are sensitive to high temperature.
- ii. Hot water will reduce oxygen content of water and thus increased BOD will affect the aquatic animals.

Q.3. Differentiate between 'bad' ozone and 'good' ozone.

Ans.

S. No.	Bad ozone	Good ozone
(i)	The ozone found in the lower atmosphere is called bad ozone.	The ozone found in the stratosphere is called good ozone.
(ii)	It harms both plants and animals.	It absorbs UV radiation and protects the living organisms from its harmful effects.

Q.4. A person has inhaled air having particulate pollutants of size less than 2.5 micrometers in diameter. What could be the impact of their pollutants on his respiratory system?

Ans. Particulate pollutants inhaled deep into the lungs cause irritation, inflammation, damage to the lungs, and premature death.

Q.5. Is it true that if the dissolved oxygen level drops to zero the water will become septic? Given example which could lower the dissolved oxygen content of an aquatic body.

Ans. Yes, the water become septic if the dissolved oxygen drops to zero. Organic pollution (biodegradable) is an example.

Q.6. It is a common practice to plant tree and shrubs near the boundary walls of building. What purpose do they serve?

Ans. The plant growing near the boundary wall act as barrier for sound pollution and act as dust catchers.

Q.7. What is ozone shield and why is it important? Name the gases that cause stratospheric ozone depletion.

Ans. The thin layer of ozone around the atmosphere that prevents entry of harmful UV rays is called ozone shield. Ozone shield functions as a shield against strong UV radiations. The gases that cause ozone depletion are methane, nitrous oxide and chlorofluorocarbons.

Q.8. Name any one of the green house gases and its possible source of production on a large scale. What are the harmful effects of it?

Ans. CO₂ and Methane. CO₂ levels are increasing due to burning of fossil fuel leading to global warming.

Q.9. Which one gas is most abundant out of the four commonest greenhouse gases? Discuss the effect of this gas on the growth of plants.

Ans. Carbon dioxide is the most abundant (60 per cent) among greenhouse gases. With doubling of concentration growth of plants (carbon dioxide fixing) increases by 30 per cent in shortterm period. At higher concentration of CO₂, stomata close and hence transpiration rate will be reduced.

Q.10. What is meant by Jhum cultivation? Explain how it is responsible for deforestation.

Ans. In Jhum cultivation, farmers clear the trees of the forest and burn the plant remains. The ash of the burnt vegetation contains minerals and is used as fertiliser. The land is then used for farming or cattle grazing. After cultivation, farmers move to another area and this process is repeated. Thus, in north-eastern states of India, this practice has caused major deforestation.

Q.11. How do chlorofluorocarbons destroy ozone layer?

Ans. Chlorofluorocarbons (CFCs) break down in the presence of UV rays and produce active chlorine. The chlorine atoms break down ozone into molecular O₂, thereby depleting ozone layer.

Q.12. Describe *Chipko Movement*.

Ans. *Chipko* movement was started in Garhwal, Himalayas in 1974 by Shri Sundar Lal Bahuguna to prevent cutting down of trees. The leaders of *Chipko* Movement believe in 5 Fs—food, fodder, fuel, fertilisers and fibres provided by the forest.

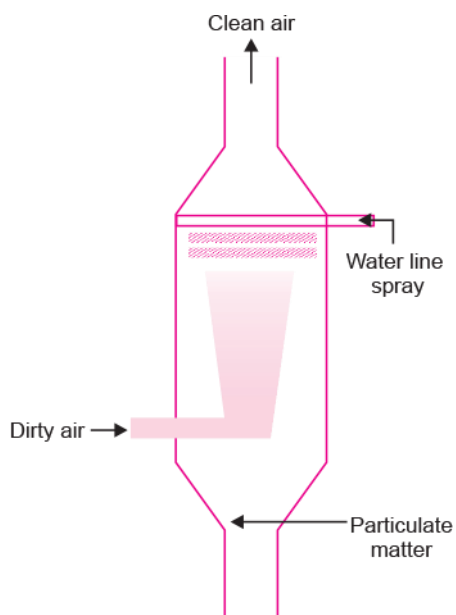
Short Answer Questions-II (PYQ)

[3 Marks]

Q.1. How does an electrostatic precipitator work to remove particulate pollutants released from the thermal power plants?

Ans. Electrostatic precipitator (ESP)

- ESP has electrode wires and a stage of collecting plates.
- Electrode wires are provided with an electric current of several thousand volts, which produces a corona that releases electrons.
- These electrons attach to dust particles and give them a negative charge within a very small fraction of a second.
- Collecting plates are earthed so that they attract charged dust particles.
- The velocity of air passing through plates is slow enough to allow the dust particles to fall.



Electrostatic precipitator

Q.2. Mention the major cause of air pollution in metro cities. Write any three ways by which it can be reduced.

Ans. Major causes of air pollution are: Refer to Basic Concepts Point 2(i).

Control methods:

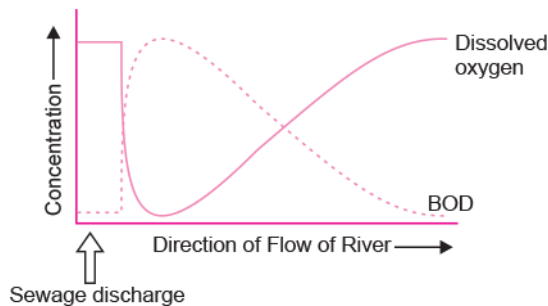
- i. Using electrostatic precipitators to remove particulate matter from exhaust of industries and thermal power plant.
- ii. Using scrubber to remove gases like SO_2 .
- iii. Use of catalytic converters in automobiles for reducing emission of poisonous gases.

Q.3. By the end of 2002 the public transport of Delhi switched over to a new fuel. Name the fuel. Why is this fuel considered better? Explain.

Ans. The fuel was CNG or compressed natural gas. CNG is considered better because of the following reasons:

- i. CNG burns more efficiently unlike diesel or petrol.
- ii. Very little of it is left unburnt.
- iii. It cannot be adulterated.
- iv. It is cheaper than petrol or diesel.

Q.4. Study the graph given below and answer the questions that follow:



Q. What is the relationship between dissolved oxygen and biochemical oxygen demand (BOD)?

Ans. As BOD refers to the amount of oxygen consumed if all the organic matter in one liter of water were oxidised by bacteria. Thus, greater the BOD, lesser will be the dissolved oxygen in sewage discharge.

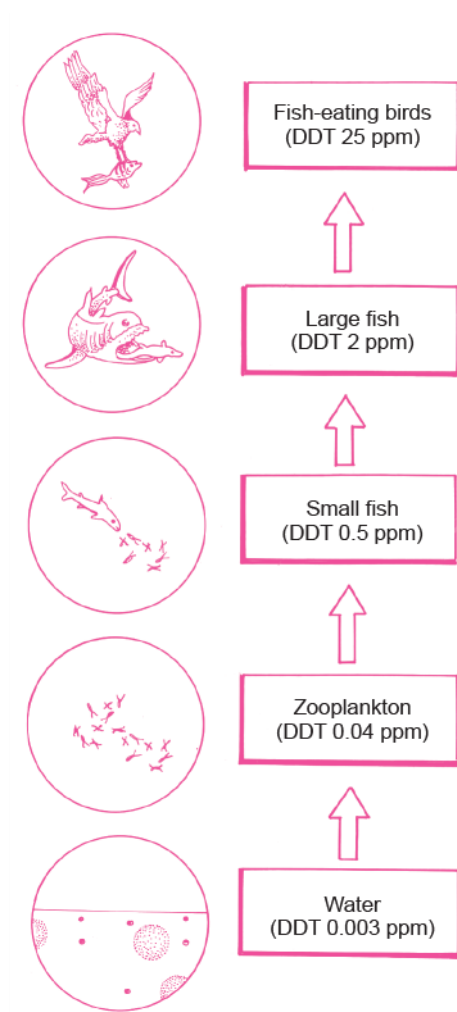
Q. Mention their effect on aquatic life in the river.

Ans. Effects on aquatic life:

- a. It causes high mortality rate of aquatic animals.
- b. The excessive nutrients facilitate algal growth causing algal bloom.

Q.5. With the help of a flow chart, show the phenomenon of biomagnification of DDT in an aquatic food chain.

Ans.



Biomagnification of DDT in an aquatic food chain

Q.6. Explain accelerated eutrophication. Mention any two consequences of this phenomenon.

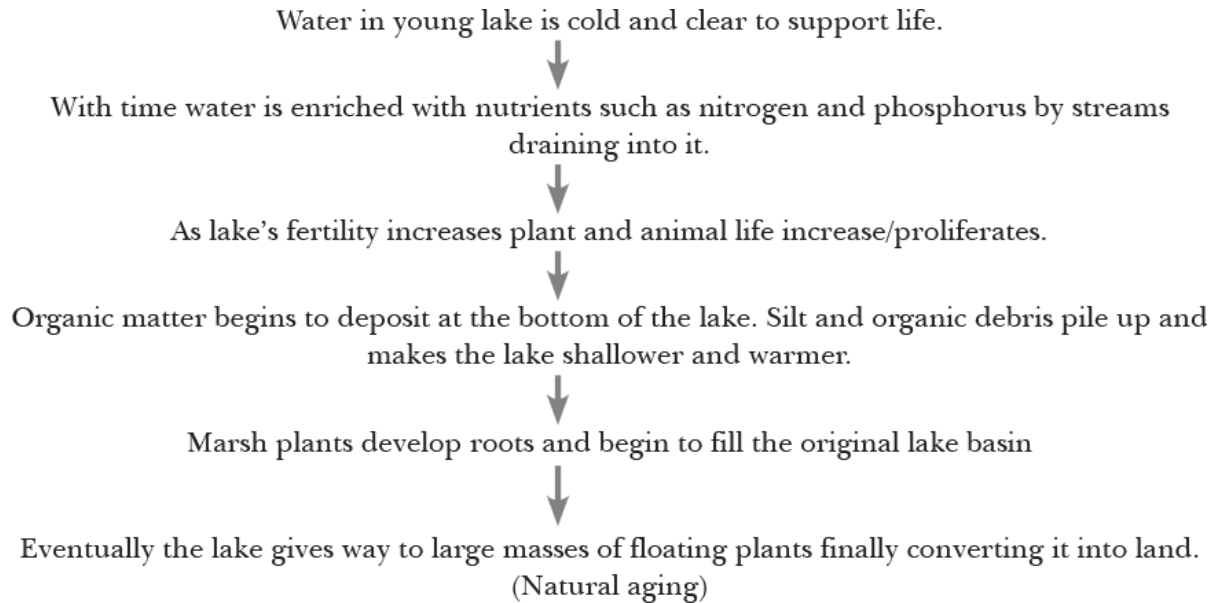
Ans. Accelerated eutrophication is nutrient enrichment of water bodies due to human activities like passage of sewage.

Consequences are:

- i. Large amount of nutrients in waters causes excessive growth of planktonic algae (called algal bloom) which impart characteristic colour to water bodies.
- ii. Depletion of oxygen content of water leading to the death of the aquatic organisms.

Q.7. With the help of a flow-chart exhibit the events of eutrophication.

Ans.



Q.8. Eutrophication is the natural aging of a lake. Explain.

Ans. Eutrophication is the natural aging of a lake by biological enrichment of its water. In a young lake, the water being cold and clear, does not support much life. But with time, streams draining into the lake introduce nutrients such as nitrogen and phosphorus, which encourage the growth of aquatic organisms. As the lake's fertility increases, plant and animal life begins to develop and organic remains begin to be deposited on the lake's bottom. Over the centuries, as silt and organic debris pile up, the lake grows shallower and warmer. Now, the warm water organisms replace those that live in a cold environment. Marsh plants take root in the shallows and begin to fill in the original lake basin. Eventually, the lake develops large masses of floating plants (bog), finally converting into land.

Q.9. What is eutrophication? How does a lake undergo accelerated eutrophication?

Ans. Eutrophication

- It is defined as the natural aging of a lake by biological enrichment of its water.
- Water in a young lake is cold and clear to support life.
- With time, it is enriched with nutrients by streams draining into it.
- This encourages growth of aquatic life—plant and animal life.
- Organic remains deposit at the bottom of the lake and with time makes the water warmer.
- Eventually, floating plants develop in the lake, finally converting into land.
- According to climate, size of lake and other factors, natural ageing of lake may span thousands of years.
- The accelerated aging of lakes due to sewage and agricultural and industrial wastes is called **cultural** or **accelerated eutrophication**.

Q.10. Explain the cause of algal bloom in a water body. How does it affect an ecosystem?

OR

How does algal bloom destroy the quality of a fresh water body? Explain.

Ans. Domestic sewage and industrial effluents contains nutrients like nitrogen and phosphorus which favour the excessive growth of planktonic (free-floating) algae.

Its harmful effects cause:

- i. sharp decline in dissolved oxygen content in the water.
- ii. deterioration of water quality and causes mortality of aquatic life forms.
- iii. distinct odour from the water bodies.

Q.11. Why is the concentration of toxins found to be more in the organisms occupying the highest trophic level in the food chain in a polluted water body? Explain with the help of a suitable example.

Ans. The concentration of toxic materials like heavy metals and pesticides increase at each trophic level of a food chain and is more in organisms of highest trophic level due to their accumulation at each trophic level. For example, when DDT was used to control mosquitoes in a lake of USA, 800 times more DDT was found in the phytoplanktons than in the water of the lake. Zooplanktons had about 13 times more DDT than phytoplanktons. It was also observed that the fishes population had 9–40 times more DDT than zooplanktons and fish eating birds had 25 times more DDT than fish.

Q.12. Explain the causes of global warming. Why is it a warning to mankind?

Ans. Causes of global warming:

- i. Deforestation
- ii. Rise in the concentration of greenhouse gases (CO, CH₄, CFCs, NO).
- iii. Burning of fossil fuels
- iv. Rise in industrial wastes and pollutants.

Global warming is a warning to mankind because:

- i. Rise in temperature is leading to increased melting of polar ice-caps as well as of other places like the Himalayan snow caps. This will result in a rise in sea level that can submerge many coastal areas.
- ii. Deleterious changes in the environment results in odd weather and climate changes, e.g., El Nino effect.

Q.13. Answer the following questions:

Q. State the consequence if the electrostatic precipitator of a thermal plant fails to function.

Ans. Particulate matter will pollute the air

Q. Mention any four methods by which the vehicular air pollution can be controlled.

Ans. Vehicular pollution can be controlled by:

- a. Phasing out of old vehicles.
- b. Use of unleaded petrol.
- c. Use of low-sulphur petrol and diesel.
- d. Use of catalytic converters in vehicles.
- e. Applying stringent pollution level norms for vehicles.

Short Answer Questions-II (OIQ)

[3 Marks]

Q.1. Mention the six harmful effects of noise on human health.

Ans. Six harmful effects of noise on human population are:

- a. Sleeplessness
- b. Stress
- c. Increased rate of heartbeat and hypertension
- d. Breathing problems
- e. Damage of ear drums impairing hearing ability permanently.
- f. Gastric problems—nausea
- g. Emotional disturbance

Q.2.

- a. **Expand BOD.**
- b. **At a particular segment of a river near a sugar factory, the BOD is much higher than the normal level. What is it indicative of? What will happen to the living organisms in this part of the river?**
- c. **Under what conditions will the BOD be lowered in the river? How will it affect the aquatic life?**

Ans.

- a. BOD—Biochemical Oxygen Demand
- b. It indicates the addition of lot of organic matter; microorganisms involved in the biodegradation of organic matter in the water body consume a lot of oxygen and

as a result, there is a sharp decline in the dissolved oxygen content downstream from the point of addition of effluent from the factory. This causes mortality of fish and other aquatic organisms.

- c. When the amount of organic matter decreases and the microbes do not need oxygen for decomposition, the BOD decreases. Thus, aquatic organisms will start flourishing.

Q.3. What is the difference between biological oxygen demand and chemical oxygen demand? What is the effect of a higher biological oxygen demand on the level of dissolved oxygen and sensitive organisms in a water body?

Ans.

S. No.	Biological Oxygen Demand (BOD)	Chemical Oxygen Demand (COD)
(i)	It is the amount of oxygen required for microbial breakdown of organic matter.	It is the amount of oxygen required for oxidation of both biodegradable and non-biodegradable organic matter in the water.
(ii)	Its value is less than COD.	Its value is more than BOD.

Higher biological oxygen demand shows that the dissolved oxygen in water bodies is much reduced and thus aquatic animals will die.

Q.4. A factory drains its waste water into the nearby lake. It has caused algal bloom.

Q. How was the algal bloom caused?

Ans. Algal bloom is caused due to large amounts of nutrients present in the waste water.

Q. What would be the consequences?

Ans. It causes deterioration of water quality and increased fish mortality rate. Some bloom forming algae are toxic to human beings and animals.

Q. Name the phenomenon that caused it.

Ans. Accelerated eutrophication.

Q.5. It has been recorded that the temperature of the earth's atmosphere has increased by 0.6°C.

- What has caused this increase?**
- Explain its consequences.**

Ans. Global Warming

- The gradual continuous increase in average temperature of surface of the Earth as a result of increase in concentration of greenhouse gases is termed as global warming.
 - i. **Cause**
 - Increase in the level of greenhouse gases (CO₂, CFCs, etc.) in the atmosphere. These gases allow the heat waves to reach earth but prevent their escape and thus the earth becomes warm.
 - ii. **Effects**
 - The temperature of the earth has increased by 0.6°C in last three decades, which will lead to changes in precipitation patterns.
 - Rise in temperature leads to deleterious changes in environment resulting in odd climatic changes called **El Nino effect**.
 - The rise in temperature will lead to the increased melting of polar ice caps which will cause the rise in sea level and many coastal areas will be submerged.
 - Increased temperature will lead to increased weed growth, eruption of diseases and pests. Thus, crop productivity will decrease.

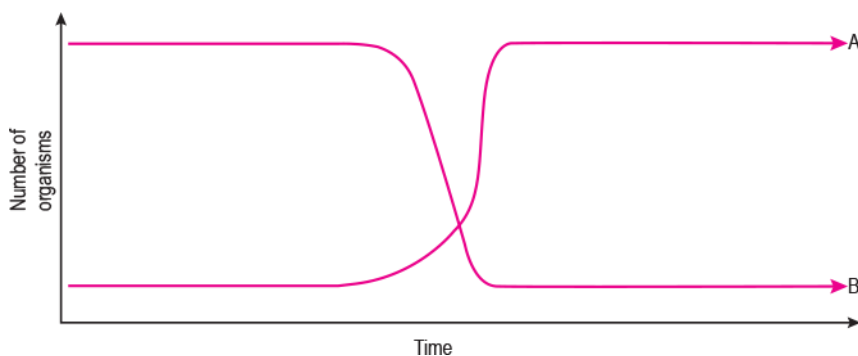
Q.6. What is global warming? List four strategies for reducing global warming.

Ans. Increase in the level of greenhouse gases in the atmosphere causes the rise in global mean temperature called global warming.

Four strategies for reducing global warming are:

- a. Reducing deforestation
- b. Planting trees (afforestation)
- c. Slowing down the growth of human population
- d. Reduction of emission of greenhouse gases into the atmosphere
- e. Cutting down use of fossil fuels
- f. Improving efficiency of energy usage.

Q.7. Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilisers.



Answer the questions based on the facts given above:

Q. Name the organisms depicting the patterns A and B.

Ans. A-algae/planktonic (free floating) algae

B-fish/aquatic animals

Q. State the reason for the growth pattern seen in A.

Ans. Due to excessive loading of nutrients or fertilisers from adjacent agricultural land results increase in nutrients.

Q. Write the effects of the growth patterns seen above.

Ans. Effects: decrease in dissolved oxygen (DO), increase in BOD, fish mortality, unpleasant odour/eutrophication.

Long Answer Questions (PYQ)

[5 Marks]

Q.1. Explain biomagnification. How does the biomagnification of DDT affect the population of fish-eating birds?

Ans. Unknowingly some harmful chemicals enter our bodies through the food chain. We use several pesticides and other chemicals to protect our crops from diseases and pests. These chemicals are either washed down into the soil or into the water bodies. From the soil, these are absorbed by the plants along with water and minerals, and from the water bodies these are taken up by aquatic plants and animals. This is one of the ways in which they enter the food chain. As these chemicals are not degradable, these get accumulated progressively at each trophic level. As human beings occupy the topmost level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies. This phenomenon is known as biological magnification.

The population of fish-eating birds living on the bank of a contaminated lake differs from those living on the bank of another lake free from such insecticides (DDT). DDT being highly poisonous caused the thinning of their egg-shells and population of birds declined. The phenomenon is known as biological magnification.

Q.2. Answer the following questions:

Q. What depletes ozone in the stratosphere? How does this affect human life?

Ans. Chlorofluorocarbons (CFCs) deplete ozone in the stratosphere.

UV(B) damages DNA causing mutation, skin cancer, inflammation of cornea, cataract, aging of skin, snow blindness.

Q. Explain biomagnification of DDT in an aquatic food chain. How does it affect the bird population?

Ans. If DDT leaches from the agricultural field, it gets into the water body (the concentration is 0.0003 ppm) and enters the food chain: zooplanktons (0.04 ppm) → small fish (0.05 ppm) → large fish (2 ppm) → any fish eating bird (5 ppm). Concentration of DDT increases along the food chain, reaching a high level in the top carnivore bird.

DDT concentration disturbs Ca^{++} metabolism, egg shells become thin, premature breaking resulting in decline in bird population.

Q.3. Answer the following questions:

Q. What is El Nino effect? Explain how it accounts for biodiversity loss.

Ans. El Nino effect refers to the odd climatic changes due to rise in temperature. It leads to increased melting of polar ice caps as well as other places like the Himalayan snow caps. This will result in a rise in sea level that can submerge many coastal areas. Thus, resulting in biodiversity loss.

Q. Explain any three measures that you as an individual would take, to reduce environmental pollution.

Ans. Measures to reduce environmental pollution

- i. Use of renewable energy resources.
- ii. Use of television and other gadgets at low pitch.
- iii. Minimum use of fossil fuel.
- iv. No tobacco smoking.
- v. Planting more trees.

Long Answer Questions (OIQ)

[5 Marks]

Q.1. Discuss the following:

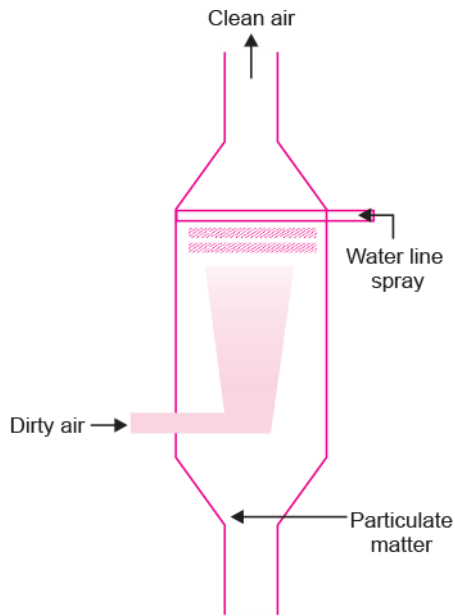
Q. *Chipko* Movement

Ans. *Chipko* Movement: *Chipko* movement (Hug the Trees Movement) was an organised resistance to the destruction of forests. It started in 1974 in Reni village of Garhwal. A contractor was allowed to cut trees in a forest near the village. When the contractor's workers appeared, the women of the village reached the forest quickly and clasped the tree trunks with their arms, preventing the workers from cutting down the trees. Mr. Sunder Lal Bahuguna, a Gandhian activist and philosopher was the leader of *Chipko* Movement.

Q. Scrubber

Ans. Scrubber:

- i. It is used to remove gases like sulphur dioxide from industrial exhaust.
- ii. The exhaust is passed through a spray of water or lime.
- iii. Water dissolves gases and lime reacts with sulphur dioxide to form a precipitate of calcium sulphate and sulphide.



Scrubber

Q. Radioactive wastes.

Ans. Radioactive wastes: Radioactive wastes such as uranium, are used as fuel in the atomic power plant. The accidental leakage and disposal of radioactive wastes are the most serious problems. All safety measures for this purpose should be strictly enforced. Highlevel radioactive wastes generate a lot of heat and thus require cooling, as well as special protective shield during handling and transport. Radiation, that is given off by nuclear wastes is extremely harmful to the organisms, because it causes mutation at a very high rate. At high doses, nuclear radiation is lethal but at lower doses, it creates various disorders, the most frequent of all being cancer. Therefore, nuclear waste is an extremely potent pollutant and has to be dealt with utmost caution.

Q.2. Explain the ways by which solid waste can be disposed.

Ans. Methods of Solid Waste Disposal

- i. **Open burning:** Municipal waste is reduced by burning in open dumps but the unburnt waste serve as the breeding ground for rats and flies.
- ii. **Sanitary landfills:** Wastes are dumped in a depression or trench after compaction and covered with dirt. But seepage of chemicals from these landfills can pollute underground water resources.
- iii. **Rag-pickers and kabadiwallahs:** Wastes are collected and separated out into reusable or recyclable categories.
- iv. **Natural breakdown:** The biodegradable materials are kept into deep pits in the ground for natural breakdown.
- v. **Recycling:** E-wastes can be recycled in specifically built factories or manually to recover important metals.

- vi. **Incineration:** Majority of e-wastes generated in developed world is exported to developing world where they are incinerated.

Q.3. What is integrated waste water management? Discuss its advantage.

Ans. Integrated Waste Water Treatment

- In the town of Arcata situated on northern coast of California, an integrated waste water treatment process was developed with the help of biologists from Humboldt State University
- The cleaning occurs in two stages:
 - i. The conventional sedimentation, filtration and chlorine treatments are given. The treated water still contains lots of heavy metals and other dangerous pollutants.
 - ii. Appropriate plants, algae, fungi and bacteria were grown in a marshland through which water was flowed. The various life forms neutralise, absorb and assimilate the pollutants and purify the water naturally.
- **'Ecosan'** toilets have been developed in areas of Kerala and Sri Lanka for **ecological sanitation**.
- **Advantages of ecological sanitation:**
 - i. It is a practical, hygienic and efficient method of waste disposal.
 - ii. It is cost effective.
 - iii. Human excreta can be recycled into natural fertiliser to replace chemical fertiliser.

Q.4. What is meant by ozone shield? Name two ozone depleting substances. How do the ozonedepleting substances affect the ozone shield? Write one damaging effects of ozone depletion on humans and plants respectively.

Ans. The thin layer of ozone around the atmosphere that prevents entry of harmful UV rays is called ozone shield. Methane and CFCs are the two ozone depleting substances.

Chlorofluorocarbons (CFCs) release active chlorine (Cl atom) when acts with UV rays and Cl atoms degrade ozone releasing molecular oxygen. Depletion of ozone allows the entry of UV-B radiation to the earth which damages DNA causes mutation leading to skin cancer in humans and also rate of photosynthesis decreases in plants.