

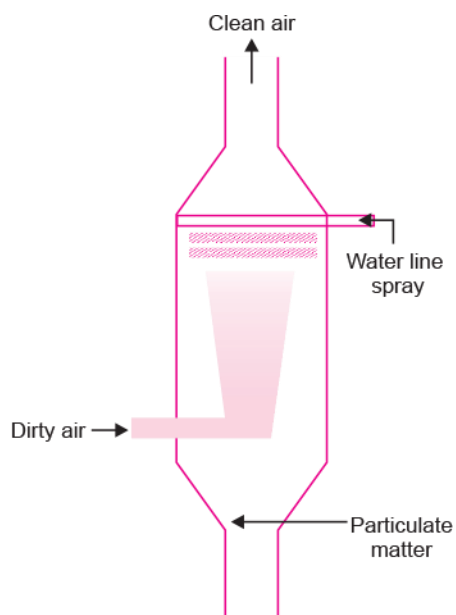
Short Answer Questions-II (PYQ)

[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:

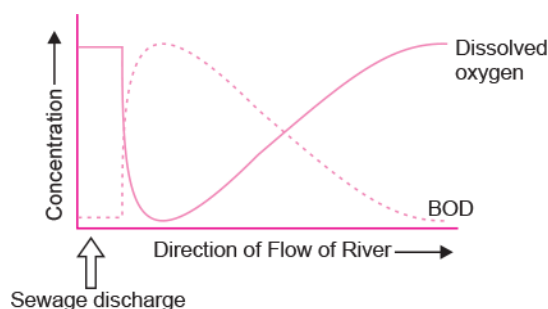
- i. Using electrostatic precipitators to remove particulate matter from exhaust of industries and thermal power plant.
- ii. Using scrubber to remove gases like SO_2 .
- iii. Use of catalytic converters in automobiles for reducing emission of poisonous gases.

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.

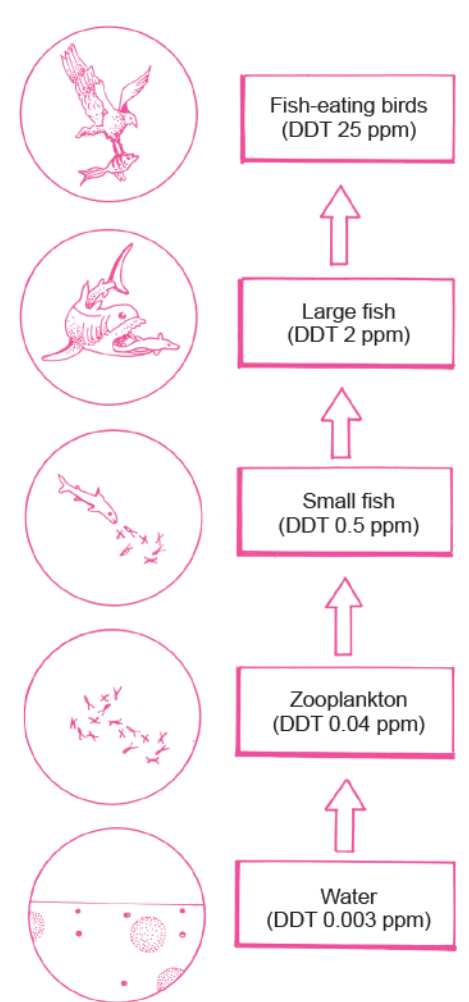
Q. Mention their effect on aquatic life in the river.

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.

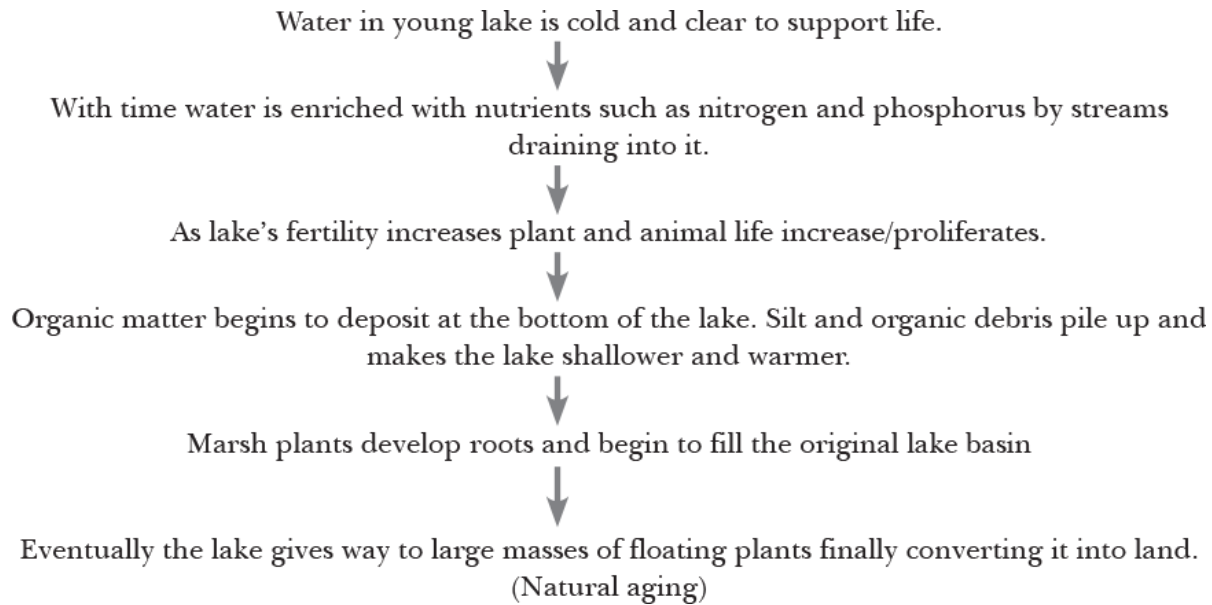
Ans. Accelerated eutrophication is nutrient enrichment of water bodies due to human activities like passage of sewage.

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.

- a. What has caused this increase?
b. 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.

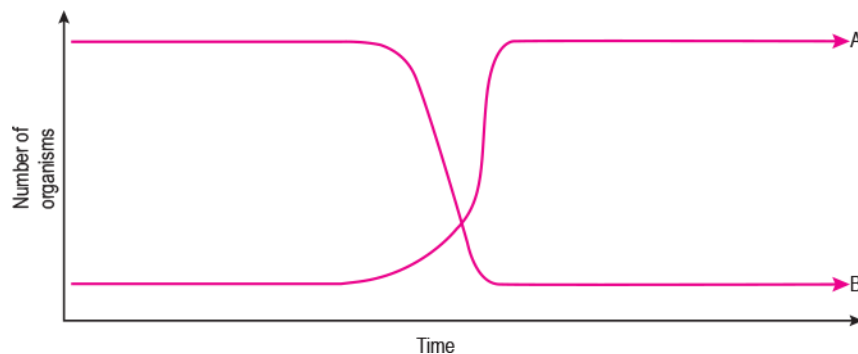
Q.6. What is global warming? List four strategies for reducing global warming.

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.