Environmental Issues- Exemplar Solutions

Multiple Choice Questions (MCQs)

1. Non-biodegradable pollutants are created by
(a) nature
(b) excessive use of resources
(c) humans
(d) natural disasters
Ans. (c) humans

2. According to the Central Pollution Control Board, particles that are responsible for causing great harm to human health are of diameter
(a) 2.50 micrometers
(b) 5.00 micrometers
(c) 10.00 micrometers
(d) 7.5 micrometers
Ans. (a) 2.50 micrometers

3. The material generally used for soundproofing of rooms like a recording studio and auditorium, etc., is
(a) cotton
(b) coir
(c) wood
(d) styrofoam
Ans. (d) styrofoam

4. Compressed Natural Gas (CNG) is
(a) propane
(b) methane
(c) ethane
(d) butane
Ans. (b) methane

5. World's most problematic aquatic weed is
(a) *Azolla*
(b) *Wolffia*
(c) *Eichhornia*
(d) Trapa
Ans. (c) *Eichhornia*

6. Which of the following causes biomagnification?
(a) SO_2

(b) Mercury
(c) DDT
(d) Both (b) and (c)
Ans. (d) Both (b) and (c)

7. The expanded form of DDT is
(a) dichloro diphenyl trichloroethane
(b) dichloro diethyl trichloroethane
(c) dichloro dipyrydyl trichloroethane
(d) dichloro diphenyl tetrachloroacetate
Ans. (a) dichloro diphenyl trichloroethane

8. Which of the following materials takes the longest time for biodegradation?
(a) Cotton
(b) Paper
(c) Bone
(d) Jute
Ans. (c) Bone

9. Choose the incorrect statement.
(a) The Montreal Protocol is associated with the control of emissions of ozone-depleting substances
(b) Methane and carbon dioxide are greenhouse gases
(c) Dobson units are used to measure oxygen content
(d) Use of incinerators is crucial to disposal of hospital wastes
Ans. (c) Dobson units are used to measure oxygen content

10. Among the following, which one causes more indoor chemical pollution?
(a) Burning coal
(b) Burning cooking gas
(c) Burning mosquito coil
(d) Room spray
Ans. (a) Burning coal

11. The green scum seen in the freshwater bodies is
(a) blue green algae
(b) red algae
(c) green algae
(d) Both (a) and (c)
Ans. (d) Both (a) and (c)

12. The loudness of a sound that a person can withstand without discomfort is about
(a) 150 dB
(b) 215 dB
(c) 30 dB

(d) 80 dB
Ans. (d) 80 dB

13. The major source of noise pollution worldwide is due to
(a) office equipment
(b) transport system
(c) sugar, textile, and paper industries
(d) oil refineries and thermal power plants
Ans. (b) transport system

14. Match correctly the following and choose the correct option

A. Environment Protection Act	1. 1974
B. Air Prevention and Control of Pollution Act	2. 1987
C. Water Act	3. 1986
D. Amendment of Air Act to include noise	4. 1981

The correct matches are
(a) A-3, B-4, C-1, D-2
(b) A-1, B-3, C-2, D-4
(c) A-4, B-1, C-2, D-3
(d) A-3, B-4, C-2, D-1
Ans. (a) A-3, B-4, C-1, D-2

15. Catalytic converters are fitted into automobiles to reduce emission of harmful gases. Catalytic converters change unburnt hydrocarbons into
(a) carbon dioxide and water
(b) carbon monoxide
(c) methane
(d) carbon dioxide and methane
Ans. (a) carbon dioxide and water

16. Why is it necessary to remove sulphur from petroleum products?
(a) To reduce the emission of sulphur dioxide in exhaust fumes
(b) To increase efficiency of automobile engines
(c) To use sulphur removed from petroleum for commercial purposes
(d) To increase the life span of engine silencers
Ans. (a) To reduce the emission of sulphur dioxide in exhaust fumes

17. Which one of the following impurities is easiest to remove from wastewater?
(a) Bacteria

(b) Colloids
(c) Dissolved solids
(d) Suspended solids
Ans. (d) Suspended solids

18. Which one of the following diseases is not due to contamination of water?
(a) Hepatitis B
(b) Jaundice
(c) Cholera
(d) Typhoid
Ans. (a) Hepatitis B

19. Nuisance growth of aquatic plants and bloom-forming algae in natural water is generally due to high concentrations of
(a) carbon
(b) sulphur
(c) calcium
(d) phosphorus
Ans. (d) phosphorus

20. Algal blooms impart a distinct colour to water due to
(a) their pigments
(b) excretion of coloured substances
(c) formation of coloured chemicals in water facilitated by physiological degradation of algae
(d) absorption of light by algal cell wall
Ans. (a) their pigments

21. Match the items in column I and column II and choose the correct option.

Column I	**Column II**
A. UV	1. Biomagnificatron
B. Biodegradable organic matter	2. Eutrophication
C. DDT	3. Snow blindness
D. Phosphates	4. BOD

The correct match is
(a) A-2, B-1, C-4, D-3
(b) A-3, B-2, C-4, D-1
(c) A-3, B-4, C-1, D-2
(d) A-3, B-1, C-4, D-2

Ans. (c) A-3, B-4, C-1, D-2

22. In the textbook, you came across Three Mile Island and Chernobyl disasters associated with the accidental leakage of radioactive wastes. In India, we had Bhopal gas tragedy. It is associated with which of the following?
(a) CO_2
(b) Methyl isocyanate
(c) CFCs
(d) Methyl cyanate
Ans. (b) Methyl isocyanate

Very Short Answer Type Questions

1. Use of lead-free petrol or diesel is recommended to reduce the pollutants emitted by automobiles. What role does lead play?
Ans. Catalytic converters, which contain expensive metals such as platinum, palladium, and rhodium as catalysts, are fitted into automobiles to reduce the emission of poisonous gases and convert unburnt hydrocarbons into CO_2 and H_2O.
Motor vehicles equipped with a catalytic converter need to use unleaded petrol because lead in the petrol inactivates the catalyst and increases the hydrocarbon emission, thereby harming the environment.

2. In which year was the Air (Prevention and Control of Pollution) Act amended to include noise as air pollution?
Ans. In 1987, the Air (Prevention and Control of Pollution) Act was amended to include noise as a source of air pollution.

3. Name the city in our country where the entire public road transport runs on CNG.
Ans. In Delhi, the entire public surface transport, especially road transport, runs on compressed Natural Gas (CNG).

4. 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 source of silt that gets deposited in the overhead water tank is soil particles, which are carried out with water from the source of supply, like deep borewell, rivers, etc.

5. What is cultural eutrophication?
Ans. The phenomenon wherein effluents from the industries and homes accelerate the natural and cultural ageing process of lakes and other water bodies that normally may take thousands of years is called accelerated eutrophication.

6. List any two adverse effects of particulate matter on human health.
Ans. The fine particulate (PM of size 2.5 μm or less) can cause problems
(i) Breathing and respiratory
(ii) Irritation
(iii) Inflammations

(iv) Damage to the lungs and premature death

7. What is the raw material for polyblend?
Ans. Polyblends are natural man-made fibres, made by the mixture of two or more polymers, especially plastic waste products.

8. Blends of polyblend and bitumen, when used, help to increase road life by a factor of three. What is the reason?
Ans. Polyblend is a fine powder of recycled modified plastic. The binding property of plastic makes the road last longer, besides giving it added strength to withstand more loads. This is because

- (i) Plastic increases the melting point of the bitumen, which would prevent it from melting in India's hot and extremely humid climate, where temperatures frequently cross 50°C.
- (ii) Rainwater will not seep through because of the plastic in the tar.

9. Mention any two examples of plants used as windbreakers in the agricultural fields.
Ans. Windbreakers or shelter belts provide shelter from wind and protect soil from erosion. Jamun and imli, and some other trees like babul, Lawsonia, Thevetia, and Calotropis act as wind breakers in the agricultural field.

10. Name an industry which can cause both air and thermal pollution and as well as eutrophication.
Ans. Chemical fertiliser units, thermal power plants, refineries, smelting and metallurgical processing units, steel mills, and the industries using steam or water as coolant cause both air and thermal pollution. The chemical release from these Industries (if rich in nitrogen and phosphorus) may result in eutrophication.

11. What is an algal bloom?
Ans. The extensive growth of planktonic (free-floating) algae in water bodies due to the presence of organic matter in water (nitrogen and phosphorus) that acts as a food source is called an algal bloom. This imparts a distinct colour to the water bodies.

12. What do you understand by biomagnification?
Ans. Biomagnification refers to the increase in the concentration of toxic substances at successive trophic levels in the food chain. This happens because a toxic substance accumulated by an organism cannot be metabolised or excreted, and when this organism is eaten up by another animal of a higher order trophic level, it is passed on to this animal and then to the next higher trophic level, and so on.

13. What are the three major kinds of impurities in domestic wastewater?
Ans. The three major kinds of impurities in domestic wastewater are

- (i) Dissolved salts such as nitrates, phosphates, other nutrients, toxic metal ions, and organic compounds.
- (ii) Biodegradable organic matter.
- (iii) Pathogenic microorganisms.

14. What is reforestation?

Ans. Reforestation is the process of restoring a forest that had once existed but was removed at some point of time in the past. Though it can occur naturally in a deforested area but we can expedite it by planting trees with due consideration to the biodiversity that earlier existed in that area.

15. What is the best solution for the treatment of electronic waste?
Ans. The best solution for the treatment of electronic waste is to recycle it. Electronic waste recycling facilities have advanced considerably, and now they can recycle 95-98% by weight.
Recycling has two-fold benefits.

- (i) It prevents the toxic components of computers from entering the delicate environment and groundwater via landfill.
- (ii) It also slows the use and mining of primary raw materials.

Short Answer Type Questions

1. Is it true that carpets and curtains/drapes placed on the floor or wall surfaces can reduce noise levels? Explain briefly?
Ans. Yes, it is true that placing/using carpets on the floor and curtains on the wall surface, windows, reduces the noise level. This is because the curtains and carpets on the wall surface and carpet act as a muffling device and absorb sounds of moderate level.

2. What is hybrid vehicle technology? Explain its advantages with a suitable example?
Ans. The technology used to run vehicles on dual mode, like petrol or compressed natural gas, is said to be hybrid vehicle technology. These vehicles run on either petrol or CNG. As CNG is a clean and green fuel so it is helpful to reduce environmental pollution and also to conserve petrol, fossil fuels.

3. Is it true that if the dissolved oxygen level drops to zero, the water will become septic? Give an example that could lower the dissolved oxygen content of an aquatic body.
Ans. Yes, it is true, in case of zero level of dissolved oxygen (DO), the water becomes septic. Organic pollution, like fertiliser in aquatic bodies, is responsible for lowering (up to zero) the level of dissolved oxygen.

4. Name any one greenhouse gas and its possible source of production on a large scale. What are the harmful effects of it?
Ans. The common greenhouse gases are CO_2, CH_4, CFCs, nitrogen oxides (NO_2), water vapour, and O_3. The level of CO_2 (greenhouse gas) is increasing due to large-scale deforestation, changes in land use, and the unlimited burning of fossil fuels, and is leading to global warming. The sources of methane and other main greenhouse gases are garbage dumps, incomplete decomposition by anaerobic methanogens, flooded paddy fields, and marshy land. About 90-95% of CH4 is produced/generated by rice fields of Asia.

5. It is a common practice to plant trees and shrubs near the boundary walls of buildings. What purpose do they serve?
Ans. A common practice to grow and maintain trees and shrubs near the boundary wall of residential, official buildings acts as a barrier for sound and checks noise pollution. This green belt of trees and shrubs also acts as an effective measure to check primary air pollutants like dust, flyash, etc.

6. Why has the National Forest Commission of India recommended a relatively larger forest cover for hills than for plains?

Ans. It is our moral duty to protect, restore, and conserve/preserve forests as they are highly beneficial for mankind. In India, around 30% of the land was covered by forest in the early 20th century, which had been reduced to 18-19% by the year 2000. National Forest Commission of India (1988) recommended a relatively large forest cover (67%) for the hills and 33% for the plains.

Recommendation of a large forest area for hills is due to its properties like checking soil erosion, percolation, and recharging groundwater, checking landslide and other natural calamities, and maintaining the original flora and fauna of hills.

7. How can slash-and-burn agriculture become environment friendly?

Ans. Slash-and-burn agriculture can be environmentally friendly if

- (i) Small, widely scattered plots are used for cultivation as the forest ecosystem will not suffer damage.
- (ii) Crop rotation is used so that the soil does not lose fertility entirely.
- (iii) keeping the cropping period small and the fallow (unplanted) period longer.

8. What is the main idea behind the "Joint Forest Management Concept" introduced by the Government of India?

Ans. The main idea behind the joint forest management concept introduced by the Government of India was to involve the local communities in forest conservation. This concept was adopted considering the extraordinary courage and dedication the local people showed in protecting the wildlife through movements like the Bishnois' movement in Jodhpur and the Chipko Movement in the Garhwal Himalayas.

9. What do you understand by Snow-blindness?

Ans. The inflammation of the cornea caused due to the excessive absorption of ultraviolet-B radiation is called snow-blindness cataract.

10. How has DDT caused a decline in bird population?

Ans. High concentrations of DDT disturb calcium metabolism in birds, which causes thinning of the egg shell and their premature breaking, eventually causing a decline in bird populations.

11. Observe the figures A and B given below and answer the following questions

A

B

(i) The power generation by the above two methods is non-polluting, True/False.
(ii) List any two applications of solar energy
(iii) What is a photovoltaic cell?
Ans.

- (i) Figure A is a solar energy panel, and Figure B is wind windmill device. Both devices produce power without polluting the environment.
- (ii) Solar lamp (lantern) (made up of an LED lamp, a photo-voltaic solar panel, and a rechargeable battery) and solar hot water system (geyser) are the two applications of solar energy.
- (iii) A solar cell is also called a photovoltaic cell. It is a form of photoelectric cell that converts the light energy into electrical energy through a photovoltaic cell.

Long Answer Type Questions

1. Write a short note on electronic waste. List the various sources of e-waste and the problems associated with its disposal.
Ans. Solid waste can be biodegradable, recyclable non-biodegradable, and can be categorized as municipal waste (sewage), industrial waste, hospitals and nursing wastes, and electronic waste. Irreparable computers, mobiles, and other electronic goods are often known as ‘e-waste’ or electronic waste.
Source of e-waste: The Majority of the developing countries, like China, Pakistan, and India, import irreparable electronic goods for their valuable metals like copper, nickel, and gold. Disposal of e-waste. Such waste should be buried in landfills or incinerated. In developing countries, metal from e-waste is extracted manually. So, while working with e-waste, one can be exposed to toxic substances present in it, and may get affected by skin diseases in the future. However, recycling is the only solution for the treatment of electronic waste.

2. What is organic farming? Discuss the benefits of organic farming as a viable practice in the context of developing nations like India.
Ans. An organic farming system primarily aims at sustainable production in an eco-friendly and pollution-free environment. The land is cultivated by using techniques such as crop rotation, green manure, composting, and biological pesticides along with beneficial microbes (biofertilisers) instead of chemical fertilisers and pesticides, etc. The benefits of organic farming are

- (i) Maintains long-term soil fertility.
- (ii) Controls pests and diseases without harming the environment.
- (iii) Ensures that water stays clean and safe.
- (iv) Makes use of resources which the farmer already has, to make it economic.
- (v) Helps produce nutritious food and high-quality crops.

Organic farming in India
Using organic farming techniques makes much more sense for developing nations like India. As we know that modern, intensive agriculture makes the use of expensive chemical fertilisers and herbicides, which leach out from the soil and pollute rivers, lakes, and water bodies, and also damage the soil fertility in the long run.

3. Waterlogging and soil salinity are some of the problems that have come in the wake of the Green Revolution. Discuss their causes and adverse effects on the environment.

Ans. Waterlogging and soil salinity are caused by extensive irrigation without proper drainage of water. Continuous presence of water draws salt to the surface of the soil, which gets deposited as a thin crust on the land surface or starts collecting at the roots of the plants.

Adverse effects

- (i) Increased salt content stunts the growth of crop plants.
- (ii) Root cells saturated with saline water get damaged.
- (iii) Plants die.
- (iv) Crop yield gets affected.
- (v) Financial loss to the farmers.

Although properly managing the soil-water system can correct the salination and waterlogging, the economic costs of this are very high.

4. What are multipurpose trees? Give the botanical and local names of any two multipurpose trees known to you and list their uses.

Ans. Multipurpose trees are those tree that on plantation fulfills several purposes, like shade, providing, soil improvement, providing wood, fruit, and food, etc. In other words, multipurpose trees serve a wide variety of functions and services for human needs.

Neem (Azardicta indica) is known for its medicinal properties. Its fruit, leaves, wood, and oil extracted from wood are used in most of the ayurvedic medicines. Its wood is pest-resistant due to chemical azardiction. Another important tree is the coconut palm. Its botanical name is Cocos nucifera and belongs to the family Palmae. It serves a variety of functions. We get oil, wood, and fibre from this plant. This plant has fibre, medicinal, and commercial importance.

Some other multipurpose trees are Moringa oleifera and Gliricidia sepium, which are widely used for fences in Central America and provide firewood, fodder, and fix atmospheric N2. While M.oleifera is commonly used for animal forage and shade, its leaves are edible.

5. What are the basic characteristics of a modern landfill site? List any three and also mention the reasons for their use.

Ans. Characteristics of a modern landfill include

- (i) Methods to contain leachate, such as lining with clay or plastic liners.
- (ii) Compaction and covering of the waste to prevent it from being blown by the wind.
- (iii) Installation of a landfill gas extraction system to extract the gas for use in the generation of power.

The use of modern landfill sites must be promoted due to the following reasons.

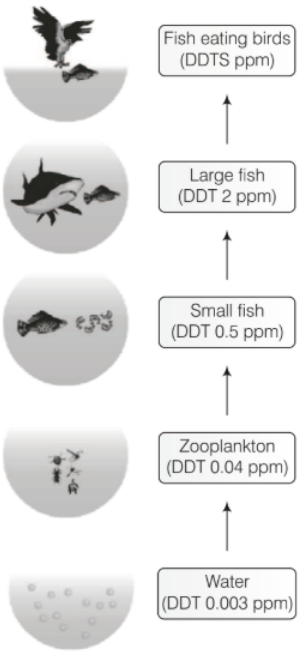
- (i) They stimulate waste prevention via recycling and recovery of waste.
- (ii) They create a uniform cost for the disposal of waste, which consequently will prevent the unnecessary transport of waste.
- (iii) They prevent or reduce the negative effects on the environment, as well as the risks to human health arising from the landfilling of the waste.

6. How does an electrostatic precipitator work?

Ans. An electrostatic precipitator can remove over 99% particulate matter present in the exhaust from a thermal power plant by the following mechanism.

- (i) It has electrode wires that are maintained at several thousand volts, which produce a corona that releases electrons.
- (ii) These electrons attach to dust particles, giving them a net negative charge.
- (iii) The collecting plates are grounded and attract the charged dust particles.
- (iv) The velocity of air between the plates is kept low enough to allow the dust to fall.

7. Observe the figure and answer the following questions.



(i) What ecological term is used to describe the DDT accumulation at different trophic levels?
(ii) List any one effect of DDT accumulation on birds.
(iii) Will DDT accumulation lead to eutrophication?
(iv) Does it affect the BOD?
(v) Name a disease caused by the accumulation of any heavy metal.
Ans.

- (i) The ecological term used to describe the DDT accumulation at different trophic levels is called biomagnification.
- (ii) High concentrations of DDT disturb calcium metabolism in birds, which causes thinning of egg shells and their premature breaking, eventually causing a decline in bird populations.
- (iii) Yes, DDT accumulation can lead to eutrophication.
- (iv) It increases the BOD, resulting in a decrease in dissolved oxygen in the water body.
- (v) Eating fish that has accumulated mercury, a heavy metal, causes a disease called Minamata. It is characterised by diarrhoea, haemolysis, numbness, deafness, mental derangement, meningitis, and death.