

Ecology and Environmental Sciences

Time Duration: Three hours

Maximum Marks: 40

Note:- Question 1 is compulsory and from Q.2 to Q.6, answer any four.

Q.1. Answer in True/False to Any 10 of the following and justify your answer.

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- a) The depletion of the ozone layer is primarily caused by the release of chlorofluorocarbons (CFCs), which are greenhouse gases.
- b) Cloud seeding is a technique used to disperse clouds and reduce rainfall in areas prone to flooding.
- c) The combustion of fossil fuels is the sole source of carbon dioxide emissions, which are the primary driver of the greenhouse effect.
- d) Wetlands play a crucial role in water purification by filtering out pollutants and sediment.
- e) The Water Prevention and Control of Pollution Cess Act, 2003, regulates the disposal of waste and effluents into the river by the factories and enables the maintenance of streams and water bodies.
- f) Nanomaterials like carbon nanotubes and graphene can be used as highly sensitive sensors for detecting trace amounts of pollutants in water and air.
- g) The Environment Protection Act in India was enacted to address only air pollution issues and does not cover water pollution or other environmental concerns.
- h) Organic pollutants in water, such as pesticides and industrial solvents, can bioaccumulate in aquatic organisms and pose risks to human health through the food chain.
- i) Chlorination is the only method used for treating domestic wastewater, making it safe for discharge into water bodies or reuse.
- j) Phytoremediation, which uses plants to remove or immobilize pollutants from soil, is a cost-effective and environmentally friendly approach to soil remediation.
- k) The term 'carbon footprint' only refers to the amount of carbon dioxide emitted by human activities.
- l) Noise pollution is considered a form of environmental pollution, but it does not contribute to climate change or ozone depletion like other types of pollution do.

Q.2. Compare and contrast the primary sources and characteristics of indoor and outdoor air pollution. Which poses a greater risk to human health, and why?

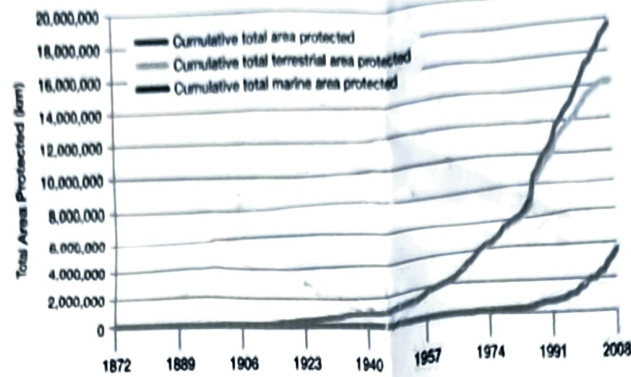
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Q.3. Highlight the recent advancements in the development of nanosensors and nanomaterials for detecting and monitoring water and air pollution. Explain the underlying principles and unique properties that make these nanostructures effective for environmental monitoring applications.

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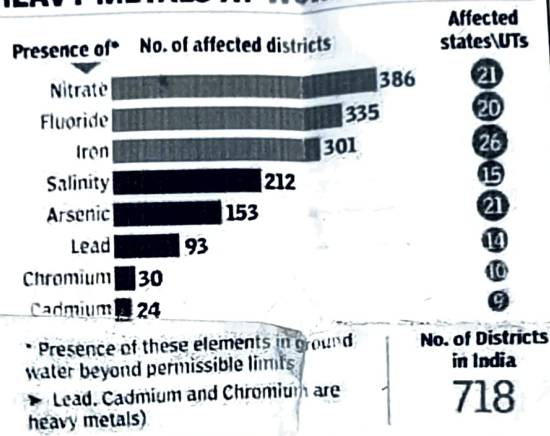
Q.4. Describe the conventional treatment processes employed for domestic and industrial wastewater, including the primary, secondary, and tertiary treatment stages. Highlight the specific techniques used for the removal of various contaminants.

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ii) Explain how the heavy metals are found in groundwater.

### HEAVY METALS AT WORRYING LEVELS



Q.6. Discuss the role of industrial activities in soil pollution in reference to the following. Identify and explain some methods for remediating soil contaminated with heavy metals. 05

