**Q1) Definitions:** 1. Air Pollution – The introduction of harmful substances such as gases, particulates, and biological molecules into the atmosphere, which can cause respiratory diseases, acid rain, and environmental degradation. Major sources include vehicle emissions, industrial activities, and burning fossil fuels. 2. Water Pollution – Contamination of water bodies due to industrial waste, sewage disposal, agricultural runoff, and oil spills, leading to loss of aquatic life and health hazards for humans. 3. Soil Pollution – Degradation of soil quality due to the excessive use of pesticides, industrial waste disposal, and deforestation, affecting agriculture and biodiversity. 4. Renewable Energy – Energy from naturally replenishing sources like solar, wind, hydropower, and biomass. It is sustainable and environmentally friendly, reducing dependence on fossil fuels. 5. Non-renewable Energy – Energy derived from finite resources such as coal, petroleum, and natural gas. These resources take millions of years to form and cause significant environmental damage when burned. 6. Global Warming – The gradual increase in Earth’s temperature due to greenhouse gas emissions from human activities. Effects include rising sea levels, ice cap melting, and extreme weather events. 7. Climate Change – Long-term alterations in temperature, precipitation, and weather patterns, leading to droughts, floods, and ecosystem imbalances. It is primarily driven by human activities. 8. Remediation – The process of removing contaminants from air, water, and soil through biological, chemical, or physical methods to restore environmental balance. 9. Fossil Fuels – Non-renewable energy sources like coal, oil, and natural gas formed from ancient organic matter. Their combustion releases carbon dioxide, contributing to global warming. **Q2) Water Pollution: Sources, Effects, and Remedial Measures** Definition: Water pollution occurs when harmful substances such as chemicals, heavy metals, and pathogens enter water bodies, making them unsafe for consumption and aquatic life. Sources:  Industrial waste: Factories discharge toxic chemicals and heavy metals into rivers.  Agricultural runoff: Pesticides and fertilizers seep into groundwater and lakes.  Sewage and wastewater: Untreated human waste pollutes water bodies.  Oil spills: Petroleum leaks in oceans disrupt marine life. Effects:  Waterborne diseases like cholera and dysentery.  Destruction of aquatic ecosystems.  Contamination of drinking water sources.  Economic losses in fishing and tourism industries. Remedial Measures:  Wastewater treatment plants.  Strict pollution control laws.  Promoting organic farming to reduce chemical runoff.  Oil spill management techniques.

**Q3) Soil Contamination: Sources, Effects, and Remedial Measures** Definition: Soil contamination refers to the presence of toxic chemicals, heavy metals, and pollutants in the soil, reducing its fertility and posing health risks. Sources:  Industrial waste dumping: Chemicals from factories leach into the soil.  Excessive pesticide use: Chemical fertilizers and pesticides degrade soil quality.  Deforestation: Removal of trees leads to erosion and loss of topsoil.  Landfills: Waste decomposition releases toxins into the ground. Effects:  Loss of soil fertility and crop yield reduction.  Contamination of groundwater.  Adverse health effects such as cancer and respiratory diseases.  Destruction of natural habitats. Remedial Measures:  Phytoremediation (using plants to absorb toxins).  Bioremediation (using microbes to degrade pollutants).  Reducing chemical pesticide usage.  Promoting afforestation and soil conservation techniques. **Q4) Air Pollution: Sources, Effects, and Remedial Measures** Definition: Air pollution occurs when harmful substances such as carbon monoxide, sulphur-dioxide, and particulate matter are released into the atmosphere. Sources:  Vehicle emissions: Cars release carbon monoxide and nitrogen oxides.  Industrial emissions: Factories produce sulfur dioxide and particulate matter.  Burning fossil fuels: Coal and petroleum combustion release pollutants.

* Deforestation: Reduces the Earth's ability to absorb CO₂. Effects:  Respiratory diseases like asthma and lung cancer.
* Acid rain, which damages buildings and soil.  Climate change due to greenhouse gas emissions.  Reduced visibility and smog formation. Remedial Measures:  Use of renewable energy sources.  Enforcing stricter emission standards for industries.  Increasing green cover through afforestation.  Public awareness campaigns to reduce pollution. **Q5)Kyoto Protocol**  An international agreement adopted in 1997 to reduce greenhouse gas emissions.  Legally binding for developed nations to cut emissions by a specific percentage.  Introduced carbon trading and Clean Development Mechanism (CDM).  The first phase ran from 2008 to 2012, with mixed success.  Some major polluters, including the US, did not ratify it. **Q6) Paris Agreement**  Adopted in 2015 as a global framework to combat climate change.  Aims to limit global temperature rise to below 2°C (preferably 1.5°C).  All countries must set Nationally Determined Contributions (NDCs).  Encourages climate finance to help developing nations.  Legally binding but no strict enforcement mechanisms.

**Q7) Case Studies on Pollution** 1. Water Pollution – Ganga River (India): Industrial waste and sewage have severely degraded water quality. Remedial measures include the Namami Gange project. 2. Air Pollution – Delhi Smog: Caused by vehicular emissions, stubble burning, and industrial activities. Measures include the Odd-Even Rule for traffic control.

3. Soil Pollution – Bhopal Gas Tragedy (1984): A gas leak from Union Carbide led to contamination, with long-term soil and water pollution. **Q8) Effects of Climate Change on Environment and Human Health**  Rising temperatures and sea levels.  Increased frequency of droughts, floods, and storms.  Health issues such as heat stress, vector-borne diseases (malaria, dengue).  Displacement of coastal populations due to flooding. **Q9) Sustainable Natural Resources Management**  Definition: Efficient use of natural resources to meet present needs without compromising future generations.  Methods: o Conservation of forests and water bodies. o Promotion of renewable energy. o Reducing deforestation and pollution. **Q10) Climate Change Effects on Ecosystems**  Coral bleaching due to rising ocean temperatures.  Altered migration patterns in birds and animals.  Declining agricultural productivity. **Q11) Climate Change and Community Adaptation**  Impacts: Food shortages, displacement, increased health risks.  Sustainable Adaptation: Green infrastructure, climate-smart agriculture, and policy reforms.

**Q12) Difference between Renewable and Non-renewable Resources:- Aspect – Renewable = no renewable :-** Definition - Naturally replenishing energy sources. = Finite energy sources that take millions of years to form. 2) environmental impact - Minimal pollution, ecofriendly. = High pollution, contributes to global warming. 3) Availability - Infinite and sustainable. = Limited and depletable. 4) cost - High initial investment but cost-effective in the long run. = Cheaper initially but expensive due to environmental damage. 5) Example - Solar, wind, hydro, biomass. = Coal, petroleum, natural gas. **Q13) Mitigation vs. Adaptation Strategies for Climate Change. Aspect – mitigation = Adaptation :- 1)** Definition - Efforts to reduce greenhouse gas emissions. = Adjusting to climate change effects. 2) Goal

- Prevent further climate changes. = Reduce vulnerability to impacts. 3)Example - Switching to renewable energy, afforestation. = Building flood-resistant infrastructure, drought-resistant crops. 4) Time frame - Long-term impact = Immediate response. 5) Effectiveness – Global impact = localized impact. **Q14) What are the impacts of climate change on communities, and how can society adapt to these changes sustainably:-** Climate change impacts communities by increasing extreme weather events, health risks, food and water insecurity, economic disruptions, and displacement. Vulnerable populations, especially in coastal and arid regions, are most at risk. To adapt sustainably, society can build resilient infrastructure, promote climate-smart agriculture, conserve water, strengthen health systems, involve communities in decision-making, and implement policies for green energy and sustainable practices. These actions can help reduce risks and foster long-term resilience.