Mock-5 12-12-2025

Environmental Science

Question No. 1

(a)

Drivers of Climate Change

Drivers are the factors that cause changes in the climate system. (Like biodiversity, carbon cycle, eutrophication).

1. Green-house Gas (GHG) Emission:

The primarily driver of climate change is greenhouse gases which release from burning of coal, oil, and gas. These gases trap heat in the atmosphere and intensifies the green-house effect which cause climate change.

2. Deforestation:

By cutting down trees, the level of CO_2 in the atmosphere increases because deforestation reduces carbon absorption.

3. Industrial and Agricultural Emission:

Harmful gases emission from industries and agriculture pollute the environment, which causes climate change.

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4. Volcanic Eruptions :

Volcanic eruptions also release huge amount of CO_2 and aerosols which heats up the atmosphere cause climate change.

Processes of Climate Change

These are mechanisms through which the drivers alter the climate :

1. Greenhouse Effect:

Greenhouse gases like CO_2, CH_4, CO, NO_2 trap heat in the atmosphere, warming the Earth, due to which the rate of evaporation increases, and pattern of rainfall changes.

2. Ocean - Atmosphere Interaction:

Changes in the ocean currents affect global temperature and rainfall patterns.

3. Melting of glaciers :

Melting of glaciers also contribute to climate change.

(b)

Salient Features of NEP

1. Conservation of Critical Environmental Resources:

National Environmental Policy (NEP) focuses on protecting essential ecosystem such as forests, wild life habitat, wetlands, and fresh water sources.
Prioritizes ecological stability and bio-diversity conservation.

2. Integration of Environmental Concerns in Development:

NEP encourages all sectors (industry, agriculture, transport, energy, etc) to embed environmental considerations into planning and decision-making.

3. Precautionary and Polluter-Pays Principles:

NEP promotes precaution in using natural resources even when scientific certainity is lacking.
Holds polluters financially responsible

for the damage they cause.

4. Decentralization of Environmental Management:

NEP strengthens the role of local bodies in environmental decision-making.

It encourages community-based natural resource management.

5. Enhancing Public Participation:

NEP promotes involvement of citizens, NGOs, and community groups in environmental protection.

It encourages environmental awareness, education, and access to information.

6. Sustainable Resource Use:

NEP encourages sustainable and efficient use of natural resources (land, water, minerals, and forests).

It promotes recycling, waste minimization, and cleaner production practices.

Question No. 3

(a)

Global warming is considered a threat to humanity because it disrupts the natural systems that support life. The main reasons are:

1. Rising temperatures

Rising temperatures increase heat-related illnesses and deaths, reduce worker productivity, and strain energy and water supplies.

2. Extreme weather

Global warming intensifies storms, floods, droughts, wildfires, and heatwaves. These events can destroy homes, infrastructure, crops, and entire communities.

3. Sea-level rise

Melting glaciers and expanding warm oceans lead to rising seas. This threatens coastal cities, freshwater supplies, and

millions of people living in low-lying areas.

4. Food and water insecurity

Changing in rainfall and temperature reduce crop yields, disrupt fisheries, and cause water shortages leading to hunger, higher food prices, and conflicts

5. Ecosystem collapse:

Many species cannot adapt fast enough to rapid warming. Loss of biodiversity harms ecosystem, humans rely for pollination, clean water, and stable climates.

6. Economic damage

Infrastructure repair, disaster response, and agricultural loss cost trillions of dollars, destabilizing economies and increasing inequality.

(b)

Biodiversity

Biodiversity refers to the variety of life on Earth - including plants, animals, micro-organisms, and the ecosystems they form. It is essential for ecological balance and supports human life through food, medicine, clean air, clean water, and climate regulation.

Causes of Biodiversity Loss

1. Habitat Destruction

Deforestation, urbanization, mining and agriculture destroy natural habitats. Forests, wetlands, and coral reefs are most affected.

2. Pollution

Air, water, and soil pollution harm species directly. Plastics waste, chemicals, pesticides, and oil spills are major contributors.

3. Climate Change

Rising temperatures and changing rainfall patterns alter ecosystems. Many species cannot adapt quickly enough.

4. Overexploitation

Overfishing, hunting, logging, and excessive harvesting of plants and animals reduce populations drastically.

Effects of Biodiversity Loss

1. Breakdown of Ecosystems

Loss of pollinators affect food production
Decline in predators leads to overpopulation of certain species.

2. Reduced Food Security

Fewer crop varieties make food systems more vulnerable to pests, diseases, and climate change

3. Economic Loss

Fishing, agriculture, and tourism decline

when ecosystems collapse.

4. Climate Instability

Fewer trees and plants reduce carbon absorption, worsening global warming.

5. Human Health Impacts

Poor water quality, more disease spread, and reduced clean air.

Suggestion to Counter Biodiversity Loss

1. Protect Natural Habitats

Establish and expand protected areas like national parks, wildlife sanctuaries, and marine reserves.

2. Sustainable Use of Resources

Stop overfishing, reduce hunting, and adopt sustainable forestry practices.

3. Reduce Pollution

Implement waste management, reduce plastic use, and control industrial emissions.

4. Reforestation and Afforestation
Plant native trees, restore degraded ecosystems, and encourage community-driven reforestation.

5. Raise Awareness and Education
Educate communities about the importance of biodiversity and how to protect it.

QUESTION NO. 6

Short Notes

(a) **Population explosion**

Population explosion refers to the rapid and extensive growth of the human population in a short period of time. This occurs when the birth rate is significantly higher than the death rate, often due to improved healthcare, better sanitation, and lower morality rates. There are several causes of population explosion

like high birth rate, decline in death rates due to medical advancements, and lack of family planning and awarness. It has effects like overcrowding in cities and rural areas, shortage of resources, and increased unemployment and poverty - these all are due to population explosion. There are solution measures to control population explosion. By promoting family planning and birth control, educating people about population issues, empowering women and encouraging delayed marriages can control population explosion.

(b) Food insecurity

Food insecurity refers to the lack of reliable access to sufficient, safe, and nutritious food to maintain a healthy life. It arises when people cannot afford or access enough food due to poverty, conflicts, natural disasters, or economic instability. It's effects are malnutrition and hunger and reduced productivity and economic growth.

It can be improved by improving agricultural productivity, sustainable food distribution and storage systems, and promoting economic development and poverty alleviation.

(C) Water Logging and Salinity

Water logging occurs when the soil remains saturated with water for long time, preventing air from reaching plant roots. It reduces crop productivity and can damage soil structure. It is caused by excessive irrigation, poor drainage, and high rainfall. Salinity is the accumulation of soluble salts in the soil, which affects plant growth. It is caused by poor drainage leading to rising water table, irrigation with saline water, and also evaporation leaving salt behind. Water logging and salinity reduced crop yield, soil degradation and hindrances to agriculture. Water logging and salinity can be reduced by

proper drainage systems, use of salt-tolerant crops, and efficient irrigation methods like drip irrigation.

Energy Security

Energy security is the reliable and uninterrupted availability of energy sources at an affordable price to meet a nation's economic and social needs. It ensures a stable supply of energy for households, industries, and transportation. There are multiple causes of energy insecurity like dependence on imported fuels, depletion of fossil fuels, and political conflicts and price fluctuations. Energy security is important because it supports economic growth, maintains industrial and domestic activities and ensure national security. There are some policy measures to improve energy security, by promoting renewable energy (solar, wind, hydro), diversifying energy sources, and strategic energy reserves.