

Jawaharlal Nehru krishi Vishwavidyalaya Jabalpur
Semester Final Theory Examination
Environmental studies and Disaster Management (21-25)

Q1. What do you understand by Natural Resources? Discuss Forest and Food Resources in brief.

Natural Resources

Natural resources are the materials and substances obtained from nature that are useful to humans for survival and development. They provide food, water, energy, shelter, and raw materials for industries.

Classification of Natural Resources

1. Renewable Resources – Can be replenished naturally (e.g., forests, water, solar energy).
2. Non-Renewable Resources – Available in limited quantities and cannot be replaced quickly (e.g., coal, petroleum, natural gas).

Forest Resources

Forests are important renewable natural resources that cover large areas with trees and vegetation.

Importance of Forests

Provide timber, fuelwood, fodder, fruits, and medicines.
Maintain ecological balance.
Prevent soil erosion and floods.
Absorb carbon dioxide and release oxygen.
Provide habitat for wildlife and biodiversity.

Problems Associated with Forest Resources

Deforestation due to agriculture and urbanization.
Overgrazing and forest fires.
Loss of biodiversity.
Climate change and soil degradation.

Conservation of Forest

Afforestation and reforestation.
Social forestry and agroforestry.
Controlled grazing.
Sustainable forest management.

Food Resources

Food resources include all sources that provide food for humans, mainly from agriculture, livestock, fisheries, and forestry.

Sources of Food

1. Agriculture – Cereals, pulses, fruits, and vegetables.
2. Livestock – Milk, meat, eggs.
3. Fisheries – Fish and other aquatic foods.
4. Forest Products – Fruits, nuts, mushrooms, honey.

Problems Related to Food Resources

Rapid population growth.
Land degradation and soil erosion.
Excessive use of fertilizers and pesticides.
Water scarcity.
Food wastage and unequal distribution.

Sustainable Management of Food Resources

Adoption of organic farming.
Efficient irrigation methods.
Integrated nutrient and pest management.
Conservation of soil and water.
Reduction of food wastage.

Q2. What is an Ecological Pyramid? Describe its various types with examples.

Ecological Pyramid

An ecological pyramid is a graphical representation of the relationship between different trophic levels in an ecosystem. It shows the number, biomass, or energy present at each trophic level, with producers forming the base and top consumers at the apex.

The concept of ecological pyramid was proposed by Charles Elton in 1927; therefore, it is also called the Eltonian Pyramid.

Types of Ecological Pyramids

1. Pyramid of Numbers

This pyramid represents the number of organisms present at each trophic level.

Example (Grassland Ecosystem)

Producers: Grass (largest number)
Primary consumers: Grasshoppers
Secondary consumers: Frogs
Tertiary consumers: Snakes
Top consumers: Hawks

Characteristics:

Usually upright in grassland ecosystems.

Can be inverted in tree ecosystems where one tree supports many insects and birds.

2. Pyramid of Biomass

This pyramid represents the total dry weight (biomass) of organisms at each trophic level.

Example (Forest Ecosystem)

Trees possess the maximum biomass.

Herbivores have less biomass.

Carnivores have the least biomass.

Characteristics:

Upright in terrestrial ecosystems.

Inverted in aquatic ecosystems because phytoplankton have less biomass than zooplankton.

3. Pyramid of Energy

This pyramid represents the flow of energy through different trophic levels.

Example

Producers capture solar energy.

Herbivores obtain a part of this energy.

Carnivores receive even less energy.

Characteristics:

-Always upright.

-Energy decreases at each trophic level due to loss as heat.

-Based on the 10% Law proposed by Raymond Lindeman, according to which only about 10% of energy is transferred to the next trophic level.

Example:

Producers = 10,000 kcal

Primary consumers = 1,000 kcal

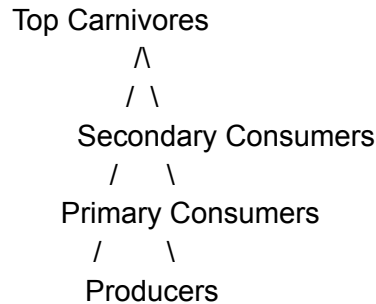
Secondary consumers = 100 kcal

Tertiary consumers = 10 kcal

Importance of Ecological Pyramids

1. Explain trophic structure of ecosystems.
2. Show energy transfer among organisms.
3. Help understand ecosystem productivity.
4. Indicate ecological balance and food-chain efficiency.

Diagram



Q3. What are the causes of loss of biodiversity and methods to conserve biodiversity?

Biodiversity

Biodiversity refers to the variety of living organisms, including plants, animals, and microorganisms, present in an ecosystem, region, or on Earth.

Causes of Loss of Biodiversity

1. Habitat Loss and Fragmentation

Destruction of forests for agriculture, industries, roads, and urbanization.
Reduces living space for organisms.

2. Overexploitation

Excessive hunting, fishing, logging, and collection of biological resources.
Leads to decline and extinction of species.

3. Pollution

Air, water, and soil pollution adversely affect plants and animals.
Pesticides and industrial wastes damage ecosystems.

4. Invasive Alien Species

Introduction of non-native species that compete with native species for food and habitat.

Example:¹ Water hyacinth in Indian water bodies.

5. Climate Change

Global warming, altered rainfall patterns, and extreme weather events affect species survival.

6. Population Growth and Urbanization

Increasing human population demands more land and resources, leading to habitat destruction.

Methods of Biodiversity Conservation

A. In-situ Conservation

Conservation of species in their natural habitats.

¹

Methods:

National Parks
Wildlife Sanctuaries
Biosphere Reserves
Sacred Groves

Examples:

Kanha National Park
Bandhavgarh National Park

Advantages:

Protects entire ecosystems.
Allows natural evolution and adaptation.

B. Ex-situ Conservation

Conservation of species outside their natural habitats.

Methods:

Zoos
Botanical Gardens
Seed Banks
Gene Banks
Tissue Culture

Examples:

Seed storage of crop varieties.
Conservation of endangered animals in zoos.

Importance of Biodiversity Conservation

1. Maintains ecological balance.
2. Preserves genetic diversity.
3. Provides food, medicine, and raw materials.
4. Supports ecosystem services such as pollination and nutrient cycling.
5. Ensures sustainable development for future generations.

Flow Chart

Causes of Biodiversity Loss → Habitat Loss
→ Overexploitation
→ Pollution
→ Invasive Species

Q4. What is Pollution? Discuss the causes, effects and control measures of Water and Soil Pollution.

Pollution: Pollution is the undesirable change in the physical, chemical, or biological characteristics of the environment that adversely affects living organisms and natural resources.

1. Water Pollution: Water pollution is the contamination of water bodies such as rivers, lakes, ponds, and groundwater by harmful substances, making water unfit for human use and aquatic life.

Causes of Water Pollution

1. Discharge of industrial effluents.
2. Domestic sewage and wastewater.
3. Agricultural runoff containing fertilizers and pesticides.
4. Oil spills and dumping of waste.
5. Religious and human activities in water bodies.

Effects of Water Pollution

1. Spread of water-borne diseases such as cholera, typhoid, and dysentery.
2. Reduction in dissolved oxygen affecting aquatic organisms.
3. Eutrophication due to excess nutrients.
4. Death of fish and aquatic plants.
5. Contamination of drinking water sources.

Control Measures of Water Pollution

1. Proper treatment of sewage before discharge.
2. Treatment of industrial effluents.
3. Judicious use of fertilizers and pesticides.
4. Prevention of waste dumping into water bodies.
5. Public awareness and strict implementation of pollution control laws.

2. Soil Pollution: Soil pollution is the degradation of soil quality due to the accumulation of harmful chemicals, wastes, and pollutants.

Causes of Soil Pollution

1. Excessive use of chemical fertilizers and pesticides.
2. Disposal of industrial and municipal wastes.
3. Mining and quarrying activities.
4. Oil spills and hazardous chemicals.
5. Plastic and non-biodegradable wastes.

Effects of Soil Pollution

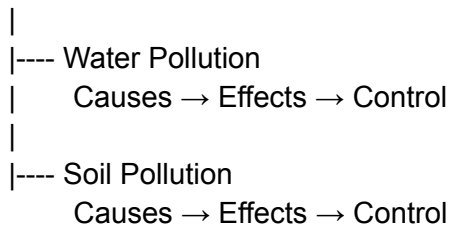
1. Loss of soil fertility and productivity.
2. Reduction in crop yield.
3. Destruction of beneficial soil microorganisms.
4. Entry of toxic substances into the food chain.
5. Health hazards to humans and animals.

Control Measures of Soil Pollution

1. Use of organic manures and biofertilizers.
2. Integrated Pest Management (IPM).
3. Proper disposal and recycling of wastes.
4. Reduced use of chemical fertilizers and pesticides.
5. Afforestation and soil conservation practices.

Diagram

Pollution



Q5. Write short note on;

1. Acid Rain: Acid rain is rainfall having a pH lower than 5.6 due to the presence of acidic gases such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in the atmosphere.

Effects:

Damages crops and forests.
Acidifies lakes and rivers.
Corrodes buildings and monuments.

Control Measures:

Reduce industrial emissions.
Use cleaner fuels and pollution-control devices.

2. Hotspots of Biodiversity: Biodiversity hotspots are regions with exceptionally high species richness and a large number of endemic species that are under threat of habitat loss.

Characteristics:

High biodiversity.
High degree of endemism.
Significant habitat destruction.

Examples in India:

Western Ghats
Eastern Himalaya

Importance: Conservation of hotspots helps protect a large number of species.

3. Nuclear Disaster: A nuclear disaster is an accident involving the release of radioactive materials from nuclear reactors or weapons, causing environmental and health hazards.

Effects:

Radiation sickness and cancer.

Genetic mutations.

Long-term environmental contamination.

Examples:

Chernobyl disaster

Fukushima Daiichi nuclear disaster

4. Greenhouse Effect: The greenhouse effect is the warming of the Earth's atmosphere due to gases such as carbon dioxide (CO₂), methane (CH₄), and water vapor trapping heat.

Importance:

Maintains Earth's temperature suitable for life.

Harmful Effects of Excess Greenhouse Effect:

Global warming.

Climate change.

Melting of glaciers and rising sea levels.

5. Ecological Succession)

Ecological succession is the gradual and orderly change in species composition of an ecosystem over time, leading to a stable community.

genui{"biology_genetics_evolution_ecology_learning_block_staging":{"type_id":"ECOLOGICAL_SUCCESSION_STAGES","locale_override":"en-IN"}}Types:

1. Primary Succession – Starts on bare land without soil.

2. Secondary Succession – Occurs where a community previously existed.

Example: Development of vegetation on barren land after a volcanic eruption.

Result: Formation of a stable climax community.

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Q6. Enlist the Natural Resources. Discuss Land Degradation and its Causes.

Natural Resources: Natural resources are materials and substances obtained from nature that are useful for human beings and other living organisms.

Major Natural Resources

1. Forest Resources
2. Water Resources
3. Land Resources
4. Mineral Resources
5. Food Resources
6. Energy Resources (Solar, Wind, Coal, Petroleum, etc.)

Land Degradation: Land degradation is the decline in the quality, productivity, and usefulness of land due to natural and human activities. It reduces the land's capacity to support plant growth and maintain ecological balance.

Causes of Land Degradation

1. Soil Erosion

Removal of top fertile soil by water and wind.
Leads to loss of soil fertility.

2. Deforestation

Cutting of forests for agriculture, industries, and urbanization.
Increases soil erosion and loss of biodiversity.

3. Overgrazing

Excessive grazing by livestock damages vegetation cover.
Exposes soil to erosion.

4. Mining and Quarrying

Disturbs land surface and destroys vegetation.
Causes soil and water pollution.

5. Excessive Use of Fertilizers and Pesticides

Degrades soil quality.
Affects beneficial soil microorganisms.

6. Waterlogging and Salinization

Improper irrigation leads to accumulation of salts in soil.
Reduces crop productivity.

7. Urbanization and Industrialization

Conversion of agricultural land into residential and industrial areas.
Generates waste that pollutes soil.

8. Shifting Cultivation

Repeated clearing and burning of forests degrade soil fertility.

Effects of Land Degradation

Loss of soil fertility.

Reduced agricultural productivity.

Desertification.

Loss of biodiversity.

Environmental imbalance.

Control Measures

1. Afforestation and reforestation.

2. Controlled grazing.

3. Soil conservation practices.

4. Proper irrigation and drainage.

5. Sustainable agricultural practices.

6. Reclamation of degraded lands.

Diagram

Land Degradation



Soil Erosion

Deforestation

Overgrazing

Mining

Salinity

Urbanization



Loss of Fertility & Productivity

Q7. Explain the Structure and Functions of an Ecosystem. Describe the Cropland Ecosystem with a Flow Chart.

Ecosystem: An ecosystem is a functional unit of nature in which living organisms (biotic components) interact with each other and with the non-living environment (abiotic components).

Structure of an Ecosystem

The structure of an ecosystem consists of two main components:

1. Abiotic Components (Non-living)

Sunlight

Air

Water
Soil
Temperature
Minerals and nutrients

2. Biotic Components (Living)

a) Producers (Autotrophs)

Green plants that prepare food by photosynthesis.

Example: Wheat, rice, grasses.

b) Consumers (Heterotrophs)

Primary consumers: Herbivores (cow, goat, insects)

Secondary consumers: Carnivores (frog, snake)

Tertiary consumers: Top carnivores (hawk, eagle)

c) Decomposers

Bacteria and fungi.

Decompose dead organic matter and recycle nutrients.

Functions of an Ecosystem

1. Productivity

Production of organic matter by plants through photosynthesis.

2. Energy Flow

Transfer of energy from producers to consumers through food chains.

3. Nutrient Cycling

Continuous circulation of nutrients between living and non-living components.

4. Decomposition

Breakdown of dead organisms and waste materials by decomposers.

5. Maintenance of Ecological Balance

Supports life and maintains environmental stability.

Cropland Ecosystem (Agro-Ecosystem)

A cropland ecosystem is a man-made terrestrial ecosystem developed for agricultural production.

Components of Cropland Ecosystem

Abiotic Components

Soil
Water
Sunlight
Fertilizers
Temperature

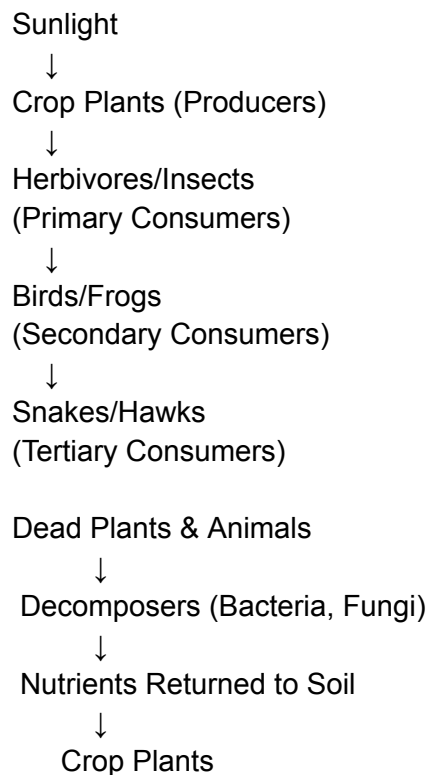
Biotic Components

Producers: Crop plants (wheat, rice, maize)
Consumers: Insects, rodents, birds, livestock, humans
Decomposers: Bacteria, fungi, earthworms

Characteristics

Human-controlled ecosystem.
Less biodiversity than natural ecosystems.
High productivity due to irrigation, fertilizers, and improved crop varieties.

Flow Chart of Cropland Ecosystem



Q8. What do you understand by Family Welfare Programme Management? Explain some Family Welfare Programmes.

Family Welfare Programme Management

Family Welfare Programme Management refers to the planning, organization, implementation, monitoring, and evaluation of activities aimed at improving the health, nutrition, and well-being of families. It focuses on population stabilization, maternal and child health, family planning, and reproductive healthcare services.

Objectives

1. Improve maternal and child health.
2. Promote family planning and population control.
3. Reduce infant and maternal mortality rates.
4. Ensure reproductive and child healthcare.
5. Improve the quality of life of families.

Family Welfare Programmes

1. Family Planning Programme

Launched in 1952 in India.

Promotes small family norms.

Provides contraceptive methods such as condoms, oral pills, IUCDs, and sterilization.

2. Reproductive and Child Health (RCH) Programme

Provides healthcare services to mothers and children.

Includes antenatal care, safe delivery, immunization, and nutrition support.

3. Janani Suraksha Yojana (JSY)

Encourages institutional deliveries.

Provides financial assistance to pregnant women.

Aims to reduce maternal and infant mortality.

4. Universal Immunization Programme (UIP)

Protects children against vaccine-preventable diseases.

Includes vaccines for polio, measles, tuberculosis, diphtheria, etc.

5. Integrated Child Development Services (ICDS)

Provides supplementary nutrition, health check-ups, immunization, and preschool education to children and mothers.

6. Mission Indradhanush

Aims to achieve full immunization coverage for all children and pregnant women.

Importance of Family Welfare Programmes

Control population growth.

Improve maternal and child health.

Reduce mortality rates.
Promote healthy families and communities.
Enhance social and economic development.

Flow Chart

Family Welfare Programmes



Family Planning



Maternal & Child Health



Immunization



Nutrition & Health Care



Improved Quality of Life

Q9. Describe Biodiversity and Discuss its Importance.

Biodiversity: Biodiversity refers to the variety and variability of living organisms present on Earth, including plants, animals, microorganisms, and the ecosystems in which they live.

The term biodiversity includes diversity at three levels:

1. Genetic Diversity

Variation of genes within a species.

Example: Different varieties of rice, wheat, and mango.

2. Species Diversity

Variety of different species present in an ecosystem.

Example: Different species of plants, animals, and microorganisms in a forest.

3. Ecosystem Diversity

Variety of ecosystems such as forests, grasslands, deserts, wetlands, and aquatic ecosystems.

Importance of Biodiversity

1. Ecological Importance

Maintains ecological balance.

Supports nutrient cycling and energy flow.

Helps in pollination and decomposition.

2. Economic Importance

Provides food, fuel, fodder, fiber, timber, and medicines.

Supports agriculture, forestry, and fisheries.

3. Scientific and Educational Importance

Source of genetic material for crop improvement and research.

Helps in scientific studies and innovations.

4. Environmental Importance

Conserves soil and water resources.

Regulates climate and atmospheric gases.

Prevents soil erosion and floods.

5. Social and Cultural Importance

Many plants and animals have religious, cultural, and aesthetic value.

Enhances recreation and ecotourism.

6. Medicinal Importance

Many medicines are obtained from plants and microorganisms.

Biodiversity serves as a source of new drugs.

Threats to Biodiversity

Habitat destruction

Deforestation

Pollution

Overexploitation

Climate change

Invasive alien species

Conservation of Biodiversity

In-situ conservation: National parks, wildlife sanctuaries, biosphere reserves.

Ex-situ conservation: Zoos, botanical gardens, seed banks, gene banks.

Diagram

Biodiversity



Genetic Diversity

Species Diversity

Ecosystem Diversity



Ecological Balance

Economic Benefits

Environmental Protection

Q10. What do you mean by Pollution? Describe the causes and control measures for different types of pollution.

Pollution; Pollution is the undesirable change in the physical, chemical, or biological characteristics of the environment that adversely affects living organisms and natural resources.

Types of Pollution, Causes and Control Measures

1. Air Pollution

Causes

Industrial emissions.

Vehicle exhaust.

Burning of fossil fuels and crop residues.

Forest fires.

Control Measures

Use of clean fuels.

Installation of filters and scrubbers in industries.

Afforestation.

Promotion of public transport.

2. Water Pollution

Causes

Discharge of industrial effluents.

Domestic sewage.

Agricultural runoff containing fertilizers and pesticides.

Dumping of wastes into water bodies.

Control Measures

Treatment of sewage and industrial waste.

Controlled use of fertilizers and pesticides.

Prevention of waste disposal into rivers and lakes.

Public awareness programs.

3. Soil Pollution

Causes

Excessive use of chemical fertilizers and pesticides.
Industrial and municipal wastes.
Plastic and non-biodegradable materials.
Mining activities.

Control Measures

Use of organic manures and biofertilizers.
Proper waste management.
Recycling of wastes.
Reduced use of agrochemicals.

4. Noise Pollution

Causes

Automobiles and traffic.
Industrial machinery.
Loudspeakers and construction work.

Control Measures

Use of silencers and soundproofing.
Restriction on loudspeakers.
Plantation of trees as noise barriers.
Maintenance of vehicles and machinery.

5. Thermal Pollution

Causes

Discharge of hot water from industries and thermal power plants into water bodies.

Control Measures

Cooling ponds and cooling towers.
Recycling of heated water before discharge.

Effects of Pollution

Human health problems.
Environmental degradation.
Loss of biodiversity.
Reduced agricultural productivity.
Climate change and global warming.

Flow Chart

Pollution

↓
Air Pollution → Control Measures
Water Pollution → Control Measures
Soil Pollution → Control Measures
Noise Pollution → Control Measures
Thermal Pollution → Control Measures
↓
Environmental Protection

22-23

Q11. What do you mean by Biodiversity? Discuss various methods to conserve Biodiversity.

Biodiversity; Biodiversity refers to the variety of living organisms, including plants, animals, microorganisms, and the ecosystems in which they live. It includes genetic diversity, species diversity, and ecosystem diversity.

Biodiversity can be conserved by two main methods:

1. In-situ Conservation

In-situ conservation means conserving organisms in their natural habitats.

Methods

National Parks
Wildlife Sanctuaries
Biosphere Reserves
Sacred Groves

Examples

Kanha National Park
Bandhavgarh National Park

Advantages

Protects entire ecosystems.
Maintains natural evolutionary processes.
Conserves a large number of species together.

2. Ex-situ Conservation

Ex-situ conservation means conserving organisms outside their natural habitats.

Methods

Zoos

Botanical Gardens
Seed Banks
Gene Banks
Tissue Culture and Cryopreservation

Advantages

Protects endangered species from extinction.
Facilitates breeding and research programs.

Other Measures for Biodiversity Conservation

1. Afforestation and reforestation.
2. Control of pollution.
3. Sustainable use of natural resources.
4. Prevention of overexploitation of wildlife.
5. Environmental education and public awareness.
6. Strict implementation of conservation laws.

Importance of Biodiversity Conservation

Maintains ecological balance.
Preserves genetic resources.
Provides food, medicines, and raw materials.
Supports sustainable development.
Protects endangered species.

Flow Chart



Q12. Discuss !

A- What are the Causes of Ozone Layer Depletion?

Ozone Layer Depletion

Ozone layer depletion refers to the thinning of the ozone layer present in the stratosphere, which protects life on Earth from harmful ultraviolet (UV) radiation.

Causes of Ozone Layer Depletion

1. Chlorofluorocarbons (CFCs)

Released from refrigerators, air conditioners, aerosol sprays, and foam products.

Chlorine released from CFCs destroys ozone molecules.

2. Halons

Used in fire extinguishers.

Contain bromine, which rapidly destroys ozone.

3. Carbon Tetrachloride

Used as an industrial solvent and in chemical manufacturing.

Contributes to ozone destruction.

4. Methyl Chloroform and Methyl Bromide

Used in industries and agriculture as fumigants.

Release ozone-depleting substances into the atmosphere.

5. Nitrogen Oxides (NOx)

Produced by aircraft, industries, and fertilizers.

React with ozone and reduce its concentration.

Effects of Ozone Depletion

Increased UV radiation reaching Earth.

Skin cancer and eye cataracts.

Reduced crop productivity.

Damage to marine ecosystems.

B- Enlist Three Natural Resources and Describe the Importance of Water Resources.

Three Natural Resources

1. Forest Resources

2. Water Resources

3. Land Resources

Importance of Water Resources

Water is one of the most important natural resources essential for life and development.

Importance

1. Drinking and Domestic Use – Required for drinking, cooking, cleaning, and sanitation.

2. Agriculture – Essential for irrigation and crop production.

3. Industrial Use – Used in manufacturing, cooling, and processing industries.

4. Hydroelectric Power Generation – Water is used to produce electricity.
5. Ecological Balance – Maintains aquatic ecosystems and supports biodiversity.
6. Transportation and Fisheries – Rivers and lakes support transport and fish production.

Q13. Define Solid Waste. Discuss its Impact on Environment and Remedial Measures.

Solid Waste; Solid waste refers to unwanted and discarded solid materials generated from households, industries, agriculture, commercial establishments, and institutions.

Examples

Domestic garbage
Plastic waste
Paper and cardboard
Glass and metal scraps
Agricultural residues
Industrial wastes

Impact of Solid Waste on Environment

1. Soil Pollution ;Dumping of solid waste degrades soil quality and fertility.
2. Water Pollution ; Leachates from waste dumps contaminate surface and groundwater.
3. Air Pollution ;Burning of waste releases harmful gases and particulate matter.
4. Health Hazards ;Waste attracts flies, mosquitoes, and rodents, spreading diseases such as cholera, typhoid, and malaria.
5. Harm to Wildlife ; Animals may ingest plastic and other wastes, leading to injury or death.
6. Aesthetic and Environmental Degradation ; Open dumping creates unpleasant surroundings and foul odors.

Remedial Measures (Control Measures)

1. Reduce, Reuse, Recycle (3Rs)
Minimize waste generation and encourage recycling.
2. Proper Waste Segregation
Separate biodegradable and non-biodegradable wastes at the source.

3. Composting

Convert biodegradable waste into organic manure.

4. Sanitary Landfills

Dispose of waste safely in engineered landfill sites.

5. Incineration

Controlled burning of waste to reduce volume.

6. Public Awareness

Educate people about proper waste management practices.

7. Ban on Single-Use Plastics

Reduce plastic pollution through regulations and alternatives.

Flow Chart

Solid Waste



Soil Pollution

Water Pollution

Air Pollution

Health Hazards



Segregation → Recycling → Composting



Safe Disposal & Clean Environment

Q14. What are the differences between Natural and Man-made Disasters? Give Examples.

Introduction ; A disaster is a sudden event that causes extensive damage to life, property, and the environment. Disasters are broadly classified into natural disasters and man-made disasters.

Natural Disasters ; Natural disasters are caused by natural phenomena and environmental processes beyond human control.

Examples

Earthquake

Flood

Cyclone

Drought

Tsunami

Landslide

Characteristics

Occur naturally.

Difficult to prevent completely.

Cause loss of life, property, and natural resources.

Man-made Disasters ; Man-made disasters are caused by human activities, negligence, technological failures, or accidents.

Examples

Industrial accidents

Chemical leaks

Nuclear accidents

Oil spills

Fire accidents

War and terrorism

Characteristics

- Result from human actions.

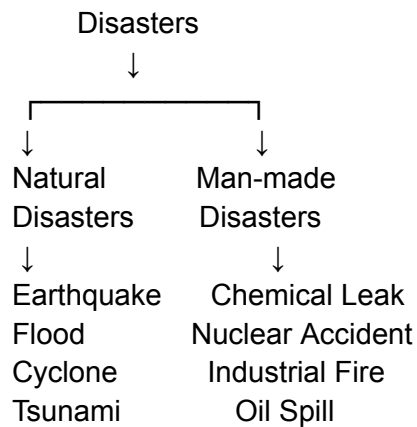
- Mostly preventable through proper planning and safety measures.

- Cause environmental pollution and economic losses.

Differences Between Natural and Man-made Disasters

Natural Disasters	Man-made Disasters
Caused by natural forces	Caused by human activities
Examples: Earthquake, flood, cyclone	Examples: Chemical leak, nuclear accident, fire.
Cannot be completely prevented	Mostly preventable
Occur naturally without human intervention	Occur due to negligence or technological failure.
Cause damage to life, property, and environment	Cause damage to life, property, environment, and industries.

Diagram



Question 15 : Write short note on-

1. Rainwater Harvesting ; Rainwater harvesting is the process of collecting and storing rainwater for future use.

Importance

Recharges groundwater.
Reduces water scarcity.
Minimizes soil erosion and runoff.

Methods

Rooftop rainwater harvesting.
Storage tanks and recharge pits.

2. Eutrophication ; Eutrophication is the excessive enrichment of water bodies with nutrients (mainly nitrogen and phosphorus), leading to excessive growth of algae.

Causes

Agricultural runoff containing fertilizers.
Domestic sewage and detergents.

Effects

Algal blooms.
Decrease in dissolved oxygen.
Death of aquatic organisms.

3. Environment Protection Act ; The Environment (Protection) Act, 1986 was enacted by the Government of India in 1986 to protect and improve the environment.

Objectives;

- Control pollution.

- Protect environmental quality.
- Coordinate environmental protection activities.

Importance ; Provides legal measures for environmental conservation.

4. Pyramid of Energy ; The pyramid of energy shows the flow of energy through different trophic levels of an ecosystem.

Features ;

- Energy decreases from producers to top consumers.
- Only about 10% of energy is transferred to the next trophic level.
- It is always upright.

Example ; Producers → Herbivores → Carnivores

5. Endemic Species ; Endemic species are plants or animals that are naturally found only in a particular geographical region and nowhere else in the world.

Characteristics;

Restricted distribution.

Highly vulnerable to extinction.

Example; Lion-tailed Macaque, Nilgiri Tahr

Importance; Contribute to unique biodiversity of a region.

Q16. What do you understand by Natural Resources? Enlist their various types. Discuss Forest Resources in brief.

Natural Resources: Natural resources are the materials and substances obtained from nature that are useful for the survival and development of human beings and other living organisms.

Types of Natural Resources

1. Renewable Resources – Resources that can be replenished naturally.

Examples: Forests, water, solar energy, wind energy.

2. Non-renewable Resources – Resources available in limited quantities and cannot be replaced quickly.

Examples: Coal, petroleum, natural gas, minerals.

Major Natural Resources

Forest Resources

Water Resources

Land Resources

Mineral Resources
Food Resources
Energy Resources

Forest Resources: Forest resources include all useful products and services obtained from forests. Forests are one of the most important renewable natural resources.

Importance of Forest Resources

1. Provide timber, fuelwood, bamboo, and paper.
2. Supply medicinal plants, fruits, fodder, and other forest products.
3. Prevent soil erosion and floods.
4. Maintain ecological balance and climate.
5. Absorb carbon dioxide and release oxygen.
6. Provide habitat for wildlife and conserve biodiversity.
7. Support the livelihood of forest-dependent communities.

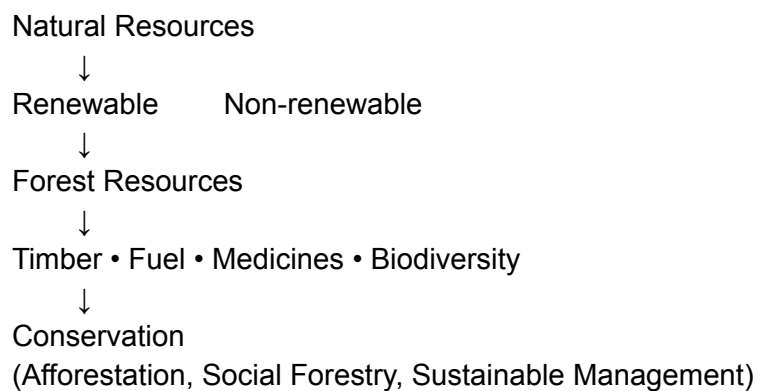
Problems Associated with Forest Resources

Deforestation.
Overgrazing.
Forest fires.
Illegal cutting of trees.
Urbanization and industrialization.

Conservation of Forest Resources

1. Afforestation and reforestation.
2. Social forestry and agroforestry.
3. Sustainable forest management.
4. Prevention of illegal logging.
5. Public awareness and people's participation in forest conservation.

Flow Chart



Q18. Explain the Values of Biodiversity.

Biodiversity: Biodiversity is the variety of living organisms, including plants, animals, microorganisms, and the ecosystems in which they live.

Values of Biodiversity

1. Consumptive Use Value: Resources are used directly by humans.

Examples: Food, fuelwood, fodder, medicinal plants, fruits, and timber.

2. Productive Use Value: Biological resources are commercially used and sold.

Examples: Timber, paper, silk, honey, rubber, medicines, and fisheries.

3. Ecological (Ecosystem Service) Value: Maintains ecological balance.

Prevents soil erosion.

Helps in pollination, nutrient cycling, climate regulation, and water conservation.

4. Social and Cultural Value : Many plants and animals have religious, cultural, and traditional importance.

Example: Peepal tree, Tulsi plant, and cow are culturally important in India.

5. Ethical (Existence) Value: Every living organism has the right to exist.

Humans have a moral responsibility to conserve biodiversity for future generations.

6. Aesthetic and Recreational Value: Biodiversity provides natural beauty and opportunities for tourism and recreation.

National parks and wildlife sanctuaries attract visitors and promote ecotourism.

7. Option Value: Conserving biodiversity ensures that species may be useful in the future for food, medicines, and scientific research.

Importance of Biodiversity

Maintains ecological balance.

Provides food, medicine, fuel, and raw materials.

Conserves genetic diversity.

Supports agriculture and industries.

Promotes sustainable development..

Flow Chart

Values of Biodiversity



Consumptive Use Productive Use

Ecological Value Social Value

Ethical Value Aesthetic Value

Option Value



Sustainable Development

Q19. What is Pollution? Describe the Control Measures of Air Pollution.

Pollution: Pollution is the undesirable change in the physical, chemical, or biological characteristics of the environment due to the addition of harmful substances, making it unsafe for living organisms and the environment.

Air Pollution; Air pollution is the contamination of the atmosphere by harmful gases, smoke, dust, and particulate matter that adversely affect human health and the environment.

Control Measures of Air Pollution

1. Use of Clean Fuels: Use CNG, LPG, biogas, and renewable energy instead of coal and diesel.

2. Industrial Pollution Control: Install electrostatic precipitators, filters, and scrubbers in industries to remove pollutants.
Treat industrial emissions before releasing them into the atmosphere.

3. Vehicle Pollution Control: Regular maintenance and servicing of vehicles.
Use catalytic converters.
Promote public transport, carpooling, cycling, and electric vehicles.

4. Afforestation: Plant more trees to absorb carbon dioxide and release oxygen.
Prevent deforestation.

5. Control of Open Burning: Avoid burning crop residues, garbage, and plastics.
Adopt scientific methods for waste disposal.

6. Use of Renewable Energy: Promote solar, wind, and hydro energy to reduce dependence on fossil fuels.

7. Public Awareness: Educate people about the harmful effects of air pollution.
Encourage community participation in pollution control.

8. Enforcement of Environmental Laws: Strict implementation of pollution control standards by government agencies.
Regular monitoring of industrial and vehicular emissions.

Effects of Air Pollution

Respiratory diseases such as asthma and bronchitis.

Eye and throat irritation.

Acid rain.

Global warming and climate change.

Damage to crops and buildings.

Flow Chart

Air Pollution



Industrial Emissions

Vehicle Exhaust

Burning of Fossil Fuels



Control Measures



Clean Fuels • Afforestation • Pollution Control Devices

Public Transport • Renewable Energy • Environmental Laws

Q20. Write short note on;

A. Significance of National Parks: National Parks are protected areas established by the government to conserve wildlife, forests, and natural ecosystems.

Significance of National Parks

1. Conserve Biodiversity – Protect endangered plants, animals, and their natural habitats.
2. Maintain Ecological Balance – Help preserve ecosystems and support environmental stability.
3. Promote Research and Education – Provide opportunities for scientific research and environmental education.
4. Support Ecotourism – Encourage nature tourism and create awareness about wildlife conservation.
5. Protect Natural Resources – Prevent deforestation, hunting, and habitat destruction.

Examples: Kanha National Park

Bandhavgarh National Park

B. Wasteland Reclamation: Wasteland reclamation is the process of restoring degraded, barren, or unproductive land so that it can be used for agriculture, forestry, or other productive purposes.

Methods of Wasteland Reclamation

1. Afforestation – Planting trees and grasses to improve soil quality.
2. Soil and Water Conservation – Contour bunding, terracing, and check dams to prevent erosion.
3. Use of Organic Manures and Fertilizers – Improves soil fertility and productivity.
4. Proper Irrigation and Drainage – Controls waterlogging and salinity.

5. Control of Overgrazing – Protects vegetation and prevents land degradation.

C. Value Education: Value Education is the process of imparting moral, ethical, social, and cultural values to develop good character, responsible behavior, and a positive attitude in individuals.

Objectives of Value Education

1. Develop honesty, discipline, and responsibility.
2. Promote respect, cooperation, and compassion towards others.
3. Build moral and ethical values for good citizenship.

D. Women Welfare Programme: Women Welfare Programmes are government schemes and initiatives aimed at improving the health, education, safety, employment, and social status of women.

Major Women Welfare Programmes

1. Beti Bachao Beti Padhao – Promotes the education and protection of the girl child.
2. Pradhan Mantri Matru Vandana Yojana – Provides financial assistance to pregnant and lactating women.
3. One Stop Centre Scheme – Offers support and protection to women facing violence.

E. Nuclear Accidents: Nuclear accidents are unexpected events at nuclear power plants or during the handling of radioactive materials that release harmful radiation into the environment.

Causes

1. Reactor malfunction or technical failure.
2. Human error or negligence.
3. Natural disasters such as earthquakes and tsunamis.

Examples: Chernobyl disaster
Fukushima Daiichi nuclear disaster