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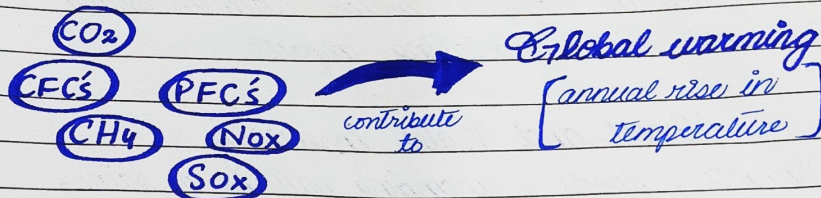
Environmental Sciences

— Q 3(a) —

Why global warming is considered as a threat to humanity?

Global warming is an increase in average Temperature of Earth. The major cause of global warming is anthropogenic sources while only few natural sources contribute to global warming.

The overall increase in Temperature recorded since 1800 till now is about 1.1°C and is expected to rise approximately 1.4°C in 2050.



Gaseous emissions

Global warming: A threat to humanity

Global warming has become a talk of the town during the span of past fifty years.

Global warming is a potential threat to humanity and even biodiversity.

Health Impacts

Global warming has severe health implications. A global rise in temperature has reversed weather patterns, resulted in extreme heat, increased infectious diseases (water-borne like dengue/malaria), air borne diseases, respiratory infections.

Extreme Weather patterns

Global warming has caused extreme weather patterns for instance: reversal of monsoon season, increased span of summers, extreme heat waves, cloud burst phenomena recently took place in Pakistan which claimed many lives and had devastating impacts.

Food and Water insecurity

Droughts, floods, changing patterns of rain, reversal of monsoon winds, heat waves and changing climate has severely affected agriculture and crop production resulting in food and water insecurity, leading to hunger and malnutrition.

Rise in Sea level and migration

Extreme rise in sea level is recorded which is resulting in floods, and forcing the inhabitants to migrate and vacate coastal areas.

Wildfires

Increased heat waves triggers wildfires in forests. Mostly wildfires in Amazon forests are due to extreme heat waves which resulted in widespread loss of trees and high death toll of animals.

Loss of Infrastructure

Heavy rainfall and floods cause damage to buildings, where people who lose their haven desperately seek shelter to survive in extreme conditions.

Case point: August, 2025 floods in Pakistan

Threat to Biodiversity

The animal species are prone to extinction due to global warming. It is a threat to biodiversity causing biodiversity loss.

These are some of the factors that proves 'global warming is a risk to humanity'. It is a serious issue which needs to be addressed. Different agreements and conferences are endeavoring to minimize the impacts of global warming by introducing environment sustainability. The issue needs a serious attention of the world leader.

(b) —

Define biodiversity. Explain its causes and effects and give suggestions to counter.

Biodiversity is the variety of all life on Earth, encompassing the differences in genes, species and the ecosystems they form.

Levels of Biodiversity

Genetic Diversity

Variety within a single species

Species Diversity

The number and abundance of different species in an area.

Ecosystem Diversity

Variety of habitats, communities, and ecological processes.

The main causes of biodiversity loss are:

Habitat destruction and fragmentation

It is mainly driven by converting natural habitats like forests and wetlands for agriculture, logging, urban development and infrastructure, disrupting the natural habitats of animals and species.

Overexploitation

It includes overhunting, overfishing and overharvesting of plants and animals for food, medicine.

Pollution

Contamination of air, water and land ~~part~~ is causing biodiversity loss in birds, animals and marine species.

Climate change

Rising temperatures and changing weather patterns force species to migrate, adapt or extinct.

Effects Of Biodiversity loss.

- Impacts on ecosystem stability
- Accelerated extinction of species.
- Widespread diseases
- Conflict between humans and wildlife
- Threatened food security and medicinal resources
- Many species have become extinct.
- Survival of the fittest: the one successful to outcompete shall survive and lead.

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Suggestions to Counter biodiversity loss

- support habitat protection
- fight climate impacts
- Avoid chemicals and pesticides
- Reduce pollution
- Support conservation groups

— Q.5a —

Explain the salient features of National Sanitation Policy of Pakistan.

Pakistan's national Sanitation Policy of 2006 provides a framework for improving sanitation by focusing on safe excreta disposal, solid/liquid waste management, hygiene protection aiming to achieve these goals by 2025.

Salient features

- Broad guidelines for federal, provincial, and local governments to develop strategies for sanitation.
- Core focus on sanitation and safe disposal of human excreta using washrooms, eliminating trash and open defecation and solid waste management.

Health and hygiene promotion to avoid diseases and promote safe health and hygiene practices.

Institutional Framework aims to develop effective institutional and financial systems to take proper measures and purchase equipments for better results.

Integrated Planning links sanitation with water supply, housing, and urban/regional planning.

Case point 'Sutra Punjab' scheme launched by Chief Minister Maryam Nawaz for promotion of hygienic and safe environment.

Challenges in NSP implementation

- Implementation Gaps: difficulty in shifting from policy to action.
- Criticized for promoting commercialization over fundamental public health rights.
- Economic budget not sufficient enough.

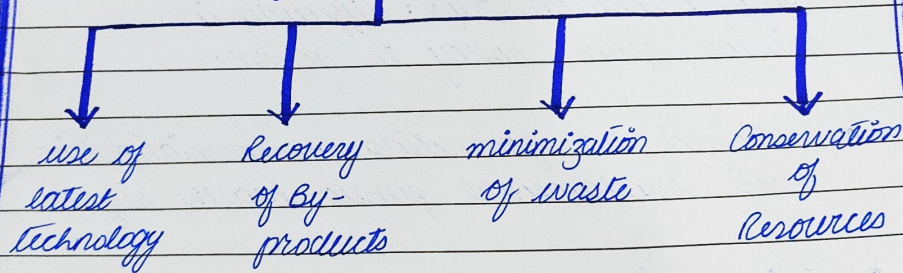
- Outdated framework: some reports call the policy outdated, failing to sufficiently protect sanitation workers and address modern needs.

—(b)—

What is EIA? Explain its processes and differences between EIA and SEA

- Environmental Impact Assessment is the study of probable alterations in biophysical and socio-economic characteristics of the environment that may occur due to a proposed action e.g. "an industrial project".
- It was established in 1970 and abbreviated as (EIA)

main objectives of EIA



• Processes in EIA

Project Proposal

consideration of alternatives and selection of preferred approach

Screening

determining whether EIA is necessary

Scoping

in order to address the issue

Baseline data collection

collecting data on environment.

Impact prediction

forecasting changes in the environment.

Impact Assessment

evaluation and significance of identified impacts

Mitigation

measures to reduce adverse impacts or enhance positive change.

Environmental impact statement

required information related to environmental impact

EIS Review

by competent authority

EIA follow-up

monitoring, auditing of impacts and environmental management.

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EIA

is reactive to development proposal

is used to assess the effect of a proposed development on the environment and socio-economic conditions

Relates to a specific project

has a narrow perspective and includes a high level of detail

has a well-defined beginning and end and focuses on informing a specific decision at a particular point of time

SEA

is pro-active and informs development proposals

is used to assess the effect of existing environmental and socio-economic conditions on development opportunities / constraints

relates to areas, regions or sectors of development

wide perspective and includes a low level of detail to provide a vision and overall framework

is a process aimed at the development of a sustainability framework to inform continuous decision-making over a period of time.

— Q 4a —

What are technological options available to counter air pollution? Explain.

Air pollution is defined as the addition of toxic substances that deteriorate the quality of air.

Following are the technological options to counter air pollution.

Clean Energy Technologies

The dependency on renewable energy resources like solar, wind and hydroelectric power can reduce air pollution to a large extent.

Electrical Vehicles (EVs)

EVs are electrically charged vehicles which produce zero emissions. EVs electronic E buses are also introduced by CM Punjab Maryam Nawaz which is a good initiative to control the air pollution and more vehicular emissions.

Air purification Systems

Wet scrubbers and electronic precipitators can remove pollutants from the environment.

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Vehicle Emission Control
EV buses and catalytic converters, particulate filters can cut off air pollution.

Carbon capture and storage
CCS technologies can capture CO₂ emissions from industrial sources and can store them underground, reducing green house gas emissions (GHGs).

Green Infrastructure
Urban planning like green roofs, green walls and urban forestry can help to absorb air pollutants.

These are few steps that can help to curb the environmental (air) pollution.

—(b)—

How can Pakistan adapt to climate change? Give challenges and opportunities

Climate change is a global issue and the developing countries like Pakistan and India, Bangladesh are at the verge of havoc. Pakistan

only contributes to 1% of global emissions but is at 2nd most endangered countries regarding climate change.

Adaptation Strategies

- Renewable energy transition: investing in solar and wind power to meet 60% of energy needs by 2030.
- Sustainable energy and agricultural methods
- Developing green infrastructure and forestry
- Data and technology: by using GIS, remote sensing to predict climate disasters before hand.
- Sustainable policy frameworks.
- Empowering local communities (vulnerable groups) in adaptation.

Challenges

- Economic disparity
- implementation hurdles
- lack of awareness to environment dangers
- Vulnerability due to temperature rise

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- lack of data and technology

Opportunities

- Green growth promotion
- Tree plantation
- International assistance
- Job creation in energy sectors (specially renewable)

Q 6a
Write short note on any 4:

(a) Population Explosion

Population explosion is a rapid increase in a population. due to increased birth rates and low death rates further leading towards crisis such as: resources strain and depletion, food insecurity, pollution, energy crisis, poverty and unemployment.

Solution: awareness and education regarding family planning, Economic development, policy and management, resource availability and conservation.
For example: by adopting china's one-child policy it can be helpful in controlling population explosion

—(b)—

Food insecurity

Food insecurity means lacking access towards the availability of safe, hygienic and nutritious food for a healthy life.

- Moderate level of food insecurity: skipping meals, reduced quality/quantity.
- Severe level: running out of food, hunger, going days without eating.

Impacts: malnutrition, stunted growth, weak immunity.

Solutions: economic empowerment, sustainable agriculture, ensure availability of food to everyone, curb climate issue, provide job opportunities.

—(c)—

Water logging and Salinity

It occurs when the soil becomes saturated with water, raising the water table close to the surface and reducing soil quality.

- Salinity is the high concentration of salts in the soil.

Solution: proper drainage, crop selection, irrigation management, fallowing.

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Solution of water logging: improving drainage, roadways or permeable paving, french drains and trenching, artificial drainage.

—(d)—

Energy Crisis

It is a disruption or shortage in energy supply that can't meet the demand of people.

Causes: supply shortages, increased demand, low production, geopolitical issues, economic issues, infrastructure problems.

Solutions: Efficiency, more production, policy and address the causes of energy crisis