

Q No 01
9)

Industrial Revolution

Industrial Revolution significantly spanning the late 18th to 19th century marked a pivotal transformation in human history, transitioning economies from agrarian based system to industrial powerhouse driven by machinery, factories, and mass production. This period characterized by significant technological advancement, social changes, and economic growth.

Phases

First Industrial Revolution (1760-1840)

- Introduction of steam engines, mechanized textile production, and iron making techniques.

Second Industrial Revolution (1870-1914)

- Growth of heavy industries like steel, chemicals, and electricity.

- Expansion of railways

- Telegraph system.

Third Industrial Revolution (1960-2000)

- Shift of digital and electronics
- Rise of computer, the internet, and automated systems.
- Advance in Robotics.

Key Impacts of Industrial Revolution

Increased Pollution

- Burning of coal and fossil fuel introduced large amount of GHGs like CO_2 , CH_4 and SO_2 .
- Industrial waste polluted rivers and lakes.
- Accumulation of solid waste

Deforestation

Expansion of urban areas led to widespread deforestation affecting biodiversity and disrupting ecosystem.

Climate Change

- Steady increase in global temperature, leading to more severe weather patterns and rising sea level.

Resources Depletion

Date: _____

Over extraction of natural resources like minerals, forests and fossil fuels to fuel industries.

Conclusion

The Industrial Revolution transformed society through unprecedented technological and economic progress. However, it also gave rise to critical challenges such as environmental degradation and social inequality, shaping the modern world's priorities and global movements.

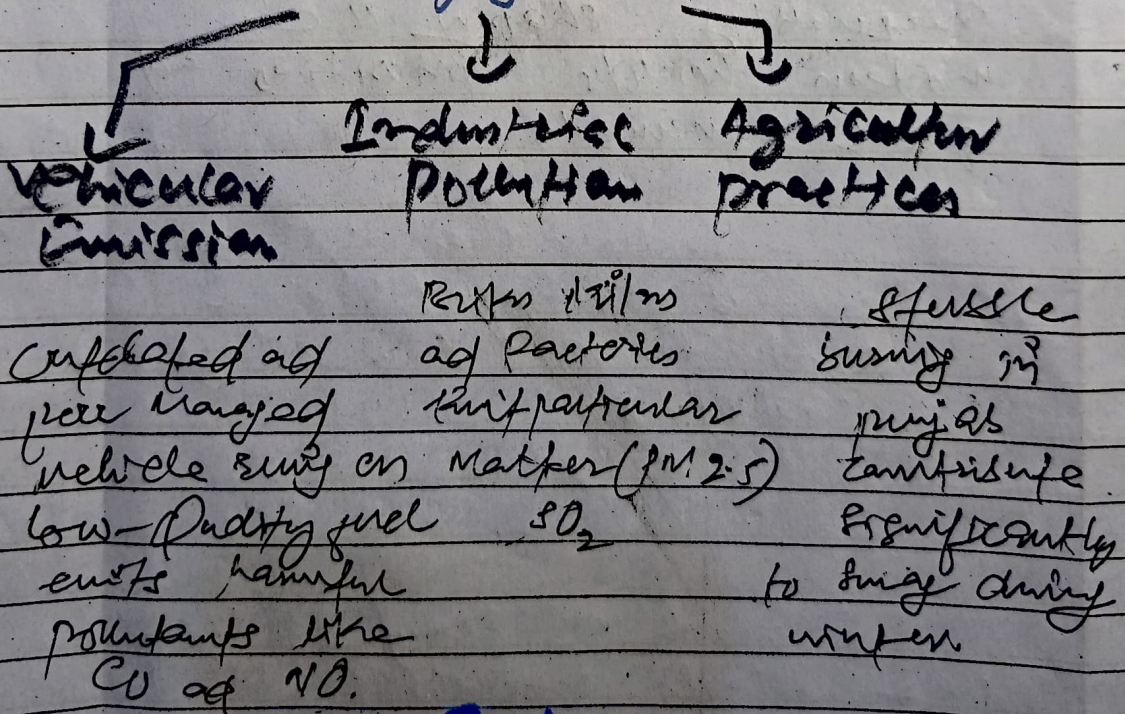
Q. No. 1

(13)

13. AQI Air Quality in Pakistan.

Pakistan's major cities like Lahore, Karachi and Islamabad are experiencing alarmingly poor air - Quality Index levels, posing significant health and environmental threats. The cause are multifaceted but solutions are achievable through targeted interventions.

Underlying Factors



Other Factors

Urbanization
 Construction Activities.

Solutions

Promote
Clean Energy

Improve vehicle
standards

Promote
Industries

Urban
Green Space

Air-Quality
monitoring

Legislative
Measures

Public
Awareness

Conclusion:

Permanently decreasing Air-Quality Index demands urgent action to protect public health and the environment. A multi-stakeholder approach involving the government, industries and the public can mitigate this crisis.

Q. 03

(A)

Climate

Climate refers to the long term pattern or average condition of temperature, humidity, precipitation, wind and other atmospheric condition or factors in a specific region over extended periods typically thirty or more.

It's different from weather which is a short term atmospheric condition and is influenced by factors such as latitude and altitude, proximity to water bodies and ocean current.

Variables

- Temperature
- precipitation
- Humidity
- pressure
- wind
- Cloudiness
- solar Radiation

La Niña vs El Niño

La Niña

La Niña is a opposite phase of El Niño - characterized by cooler than average sea surface temperature in the central and eastern Pacific. It typically occurs after El Niño and lasts for several months.

Global Impacts:

1) Cooler Temperature

Decrease - global average temperature and can lead to cold winters.

2) Altered Rainfall patterns.

— brings more rain and increased flooding, drought - east - Asia, Australia and western Pacific.

3) Stronger Hurricane.

Increased the intensity of Hurricane in the Atlantic.

El Niño

El Niño is a warm-phase of the El Niño Southern Oscillation (ENSO), where surface temperature in the central and Pacific ocean rise above-normal.

Global Impacts

- ① Warmer Temperature
- ② Altered-Rainfall patterns
- ③ Disruption of Marine-Ecosystems
- ④ More-extreme weather

Conclusion

El Niño and La Niña significantly alter climate patterns, these phenomena influence temperature / precipitation, and extreme weather events. Emphasizing the need for collective and effective climate modeling, and preparedness strategies.

Q. 5 Managing (A) Pollution and scientific measures.

Answer

Pollution:-

Pollution refers to the introduction of harmful substances or energy into the environment, causing adverse effects on living organisms, ecosystems, and human living being. It can result from natural events like volcano eruption or human activities like industrial emission, waste disposal.

Types:-

Air-Pollution

Water pollution

Land-pollution

Noise-pollution

Scientific Measures to Control Pollution.

1) Air-pollution Control Techniques

Use electrostatic precipitators, scrubbers or catalytic converters in industries and vehicles to reduce emissions.

ii) Waste water - Treatment.

like sludge-activated system, reverse osmosis to treat industrial or domestic waste.

iii) Solid waste management

Use composting
 Smaller than with energy recovery as waste → energy ie chlorophyll.

iv) Renewable Energy sources.

Transition lead to solar, wind and hydro power to minimise reliance on fossil-fuel.

v) Bio-remediation.

Use micro-organisms or plants to clean-up pollutants from contaminants soil, water or air.

vi) Sustainable Agriculture

vii) Plastic-waste Reduction

viii) Three-R principle

Reduce

Reuse and Recycle

Technique.

ix) Legislation and policy intervention.

Q.5 Environmental Impact Assessment.

EIA:-

Environmental Impact Assessment is a systematic process used to evaluate the potential environmental effects of a proposed project or development before it is approved. The goal of EIA is to ensure that decision-makers have sufficient information about environmental consequences of their decision. The process typically includes a series of steps.

Steps in the EIA process

1) Screening

This step helps decide whether an EIA is necessary and, if so, the level of detail required.

2) Scoping

It involves defining the boundaries of the project, scope of study, and environmental concerns.

iii) Baseline Study

Gather data on the current state of the environment
 Bio-diversity
 water resources
 air - quality.

iv) Impact Assessment.

Identify positive and/or negative impact or effects of the projects.
 short-term as well as long-term effects.

v) Mitigating Measures.

Develop strategies to avoid, minimize impacts and enhance positive one.

vi) Reporting.

Summarize findings, which includes a description of the projects.

vii) Review and Decision Making.

Reviewed by authority, stakeholders and the public to ensure transparency and accountability.

Importance of EIA.

EIA process is crucial for ensuring sustainable development. It plays a pivotal role in balancing economic growth with environmental protection.

protecting Ecosystem and Biodiversity.

Risk-management

Sustainable Development

Cost-effective planning

Promote Alternative Solution.

Conclusion.

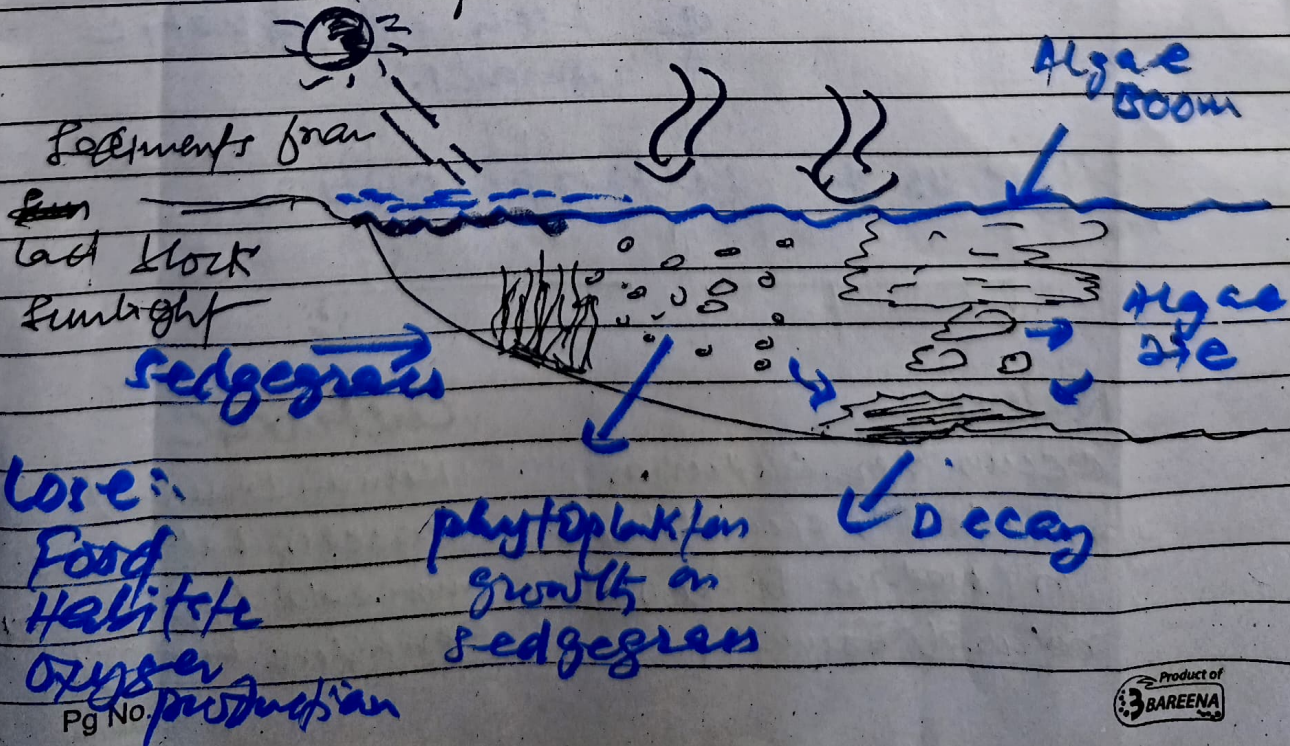
EIA is a vital tool for assessing and managing the environmental impact of development projects. It ensures informed decision-making by identifying and mitigating adverse effects, balancing development needs with environmental protection to promote sustainability.

Q#03
(15)

Eutrophication

Ans: Definition

Eutrophication is the process of decreasing quality of water by which a water body, such as lake, or river becomes overly enriched with nutrients particularly nitrogen and phosphorus. These nutrients promote excessive growth of algae and aquatic plants, leading to various ~~etc~~ ecological imbalance. This phenomenon occurs naturally over time & characterized by human activities called cultural eutrophication.



process of Eutrophication.

Nutrient loading

Such as Nitrogen and phosphorus

↳ Algal Boom Formation
Can cover water surface,
Blocking sunlight.

↳ Decomposition

Algae die and sink to
the bottom, leading
depletion of O_2 .

↳ Hypoxia and dead zone
Reduced oxygen
level create "dead zone"

↳ Fish and plant death

The decline in oxygen
leads to the death
of fish and aquatic
animals.

Types of Eutrophication.

Natural

Occurs over centuries
as nutrients accumulate
in water bodies via
natural sources.

Cultural

Human-Induced
process that occurs
more rapidly due to
agriculture, urban effluents.

Effects of Eutrophication.

- 1) Decreased Bio-diversity
like abrupt Food-chain
- 2) Fish kills
due to low-oxygen level.
- 3) water - Quality degradation
due contaminants from many sources like agriculture runoff
- 4) Economic Impacts
like Fish Industries, tourism and agriculture severely impacted.
- 5) Increased Green-House-Gas Emission.
Release of Methane and Nitrous-oxide

Measures:-

- Reduced Fertilizer use
- Water Treatment
- controls of Industrial discharge
- promote sustainable Agriculture
- Algal bloom - Management
- Restoration of wetlands.

Class Shot Notes

(i) REDD+

Reducing Emission from Deforestation and Forest Degradation.

REDD+ is a global initiative under the UNFCCC, United Nations Framework Convention on Climate Change aimed at Combating climate change by incentivizing developing countries to reduce deforestation and forest degradation.

It includes efforts to enhance forest carbon stocks, sustainable management of forest, and conservation & benefits includes carbon sequestration, biodiversity conservation and support for sustainable livelihoods.

iii) Ecological Restoration.

Biological restoration involves repairing degraded ecosystem to regain their functionality, health and biodiversity. techniques includes, reforestation, wetlands restoration, and soil stabilization. Its goals are to reverse environmental damage caused by human activities, enhance ecosystem services, and support sustainable development.

Example -

Restoring mangroves to combat coastal erosion or creating urban green spaces.

iii) Cartagena protocol.

The Cartagena protocol on Bio-safety adopted in 2000 under the convention on Biological Diversity (CBD) focus on the safe handling, transport, and use of living modified organisms (LMOs) resulting from biotechnology. Its primary goal is to protect biodiversity and human health from potential risks while ensuring sustainable development.

It emphasises the precautionary principle and provides guidelines for transboundary movement and risk assessment.

IV)

OH and S

Occupational Health
and Safety.

Occupational health and safety focuses on providing safe and healthy workplaces by preventing injuries, and accidents.

It involves risk assessments, safety training, and enforcement of standards e.g. PPE use (personal protective equipment).

Effective OH&S practices ensure workers well-being, reduce down-time, and

improve productivity, particularly in industries like construction,

manufacturing, and healthcare.

International standards for OH&S are:

ISO 45001

OSHA

ISO 9001