DATE: 22/12/2024 ENV. SCIENCE MOCK:

Question 2:

Industrial revolution paved way towards socio-economic progress in the world? How do you see the far reaching environmental consequences of industrial revolution?

INTRODUCTION:

INDUSTRIAL REVOLUTION: REASON OF SOCIO-ECONOMIC PROGRESS

Industrialization began in early 1900s, with the advancement in knowledge and technology the conventional ways of manufacturing and agriculture were transformed into modern ways. The traditional ways were transisitioned into modern way through scientific invention.

Traditional Ways: —Scientific invention→ Modern ways.

Agriculture: Man power —machines→ Tractors/Tube wells.

Plougling with animals ——→ Modern farming tools.

Industries: Labour ——→ Heavy machineys.

Work units were small mostly in houses ——→ factories and industries for manufacturing goods.

Advantages of Industrial Revolution:

Before the industrial revolution the tools were simple and the productivity was low. When the population increased so does the demand for more food and products. So, to meet those demands and supply gap industrial revolution played important part.

→ The production ability was increased to meet public demand.

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→ Employment was generated.
→ The living standards were increased.
→ The income per capita was increased.
→ Industrialization caused medical revolution as well
→ Agricultural revolution also occured.
→ Economy was enhanced.
→ Globalization occured.
→ Training, skills and education was promoted.

NEGATIVE CONSEQUENCES OF INDUSTRIALIZATION ON ENVIRONMENT:

Although the industrial revolution was good for socio-economic progress, however, the pace at which it occured was so rapid that one major factor, environment, was high neglected during the early years. Due to this negligence now we have major negative consequences of industrial revolution to deal with. For example;

1. AIR POLUTION:

→ The smoke from factories and industries, pollute the air because it contains toxins which are harmful for environment as well as humans.
→ The introduction of CFCs (chlorofluoro carbons) in the atmosphere caused the protective ozone layer to depleta and harmful radiations from the sun can reach the Earth causing plant and human diseases, such as Cancer and chlorosis.

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→ The smoke from cars and transportation is a major cause of air pollution also causing smog in different regions.

2 Water Pollution:

→ Waste and Chemical from the factories and industries are directly dispose of in water bodies causing death of aquatic life and making the water unuseful for humans and animals.

→ Eutrophication due to agriculture run off and wastes from industries is a major effect of industrialization.

→ Acid rain is also a negative consequence of industrial revolution. The pollutants like sulfure, nitrogen enters the atmosphere and reacts with water to form acid rain which is detrimental for soil and inhabitants of Earth as well.

3. Land Pollution:

→ The waste from the factories and industries are openly dumped on the land. Toxins can seep through the soil and be detrimental to plant growth and soils fertility as well.

→ A lot of agricultural land is badly affected by the use of excessive chemicals in fertilizers and insecticides.

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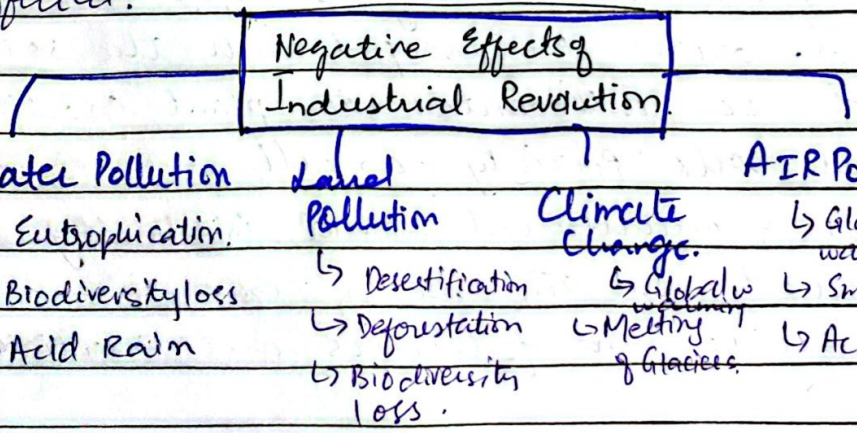
4. Climate Change::

→ The overall effect of rapid industrialization is climate change, triggered by the entering of major green house gases in the atmosphere and trapping the heat inside the Earth's atmosphere. This is also known as Global Warming.

→ The Carbon dioxide is a major green house gese that is released as a burning of fossil fuels like coal and gas. The amount of fossil fuels used in industries and in transport are the major reason of its increase in the atmosphere, contributing in global warming.

5. BIODIVERSITY LOSS:

The consequences of all these pollutions results in major biodiversity loss, which is essential for the sustenance of life but due to rapid change in climate and increasing pollution aquatic as well as terrestrial biodiversity is adversely effected.



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(b) Pakistan is witnessing bad air quality Index in major cities. Discuss the underlying factors & propose way outs.

INTRODUCTION:

Pakistan is facing a severe air quality crisis, particularly in its major cities such as Lahore, Karachi, Faisalabad and some more. The Air Quality Index (AQI) often exceeds safe levels, posing serious health risks to the population and badly impacting the environment. This issue is multifaceted, with a range of underlying causes contributing to the Problem.

UNDER-LYING FACTORS OF BAD AIR QUALITY:

1. Vehicular Emissions

→ Rapid urbanization has led to an increase number of vehicles on roads using excessive amount of fossil fuels.

→ Mostly older and poorly maintained vehicles emit high levels of carbon monoxide, nitrogen oxides and particulate matter

→ Use of low quality fuel further aggravates the problems.

→ Lack of quality public transport so that it can be used instead of personal vehicles, to reduce traffic and burning of fossil fuels.

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2. Industrial Pollution:

→ Unregulated industrial zones discharge pollutants such as sulfur dioxide, heavy metals and volatile organic compounds (VOCs).

→ Brick kilns and steel factories operating without environmental controls are major contributers.

3. Agriculture Practices:

→ Burning of agricultural waste, particularly in Punjab, release significant abbount of green house gases and particulate matter.

4. Construction Activities:

→ Dust from construction sites adds to the particulate matter in urban areas.

→ Lack of proper dust control measures exacerbate the situation.

5. Deforestation:

→ Wide spread deforestation reduces the natural ability to filter air pollutants.

6. Urbanization:

→ Urban sprawl leads to loss of green spaces, further intensifying the air pollution.

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7. Energy Production:

→ Reliance on coal powered plants, and fossil fuels are contributing to the emissions of harmful gases.

→ Lack of investment in renewable energy resources.

WAY-OUTS :-

1- Improving Public Transportation System:

→ Promote electric vehicles (EVs) by offering subsidies and building (EVs) infrastructure.

→ Invest in clean and efficient public transit systems to reduce dependency on private vehicles.

→ Use bio fuels to reduce dependency on fossil fuels.

2. Regulating Industries:

→ Enforce strict emissions controls on industrial units and brick kilns.

→ Transition to cleaner production technologies and use of alternative fuels.

3. Controlling Agricultural Pollution:

→ Provide farmers with alternatives to stubble burning, such as crop residue management and technology.

→ Offer subsidies for adopting sustainable agricultural practices.

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4. Urban Planning

→ Develop urban green belts and parks to improve air filtration.

5. Afforestation:

→ Launch large-scale afforestation campaigns to restore forests and reduce carbon emissions.

6. Promoting Renewable Energy:

→ Shift focus from coal and fossil fuels to solar, wind, and hydropower energy sources.

→ Provides incentives for installing renewable energy systems.

7- Awareness Campaigns:

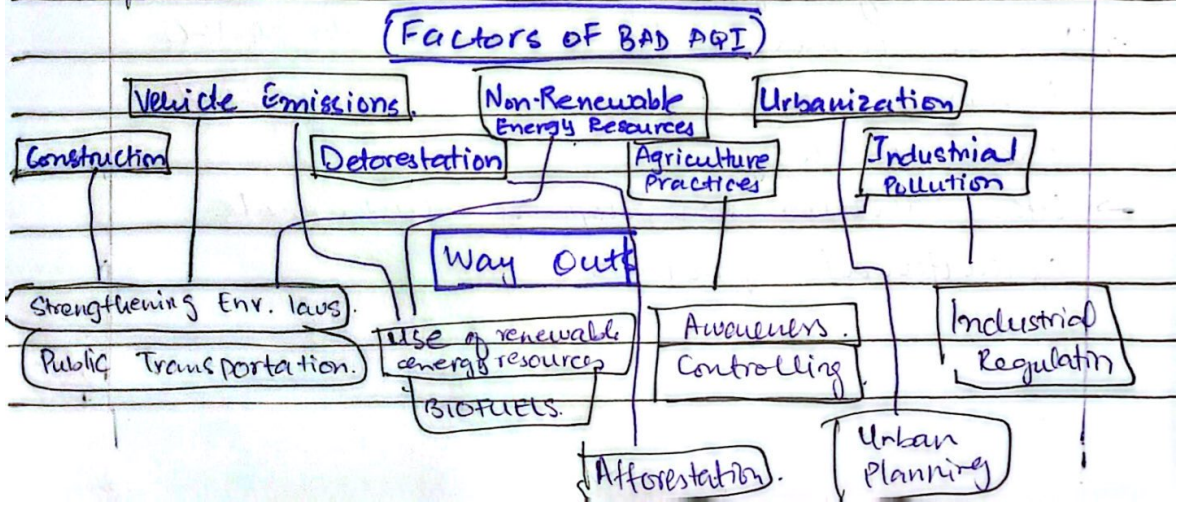
→ Educate the public about the health risks for air pollution and ways to reduce their carbon foot print.

→ Encourage community participation in tree plantation drives and waste management.

8. Strengthening Environmental Laws:

→ Update and enforce environmental regulations to ensure compliance.

→ Penalize violators of emissions standards and reward environmentally responsible practices.



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Question::

What is Climate? Enlist the weather variables and explain the LA-NINA & EL-NINO Phenomenon in context of global climate distribution.

CLIMATE:

Climate refers as the:

"long-term average of weather conditions, including temperature, humidity, wind and precipitation, over a significant period of time"

WEATHER VARIABLES:

The weather variables that contribute to climate are:

1- Temperature.
2- Humidity.
3- Atmospheric Pressure.
4- Precipitation.
   - Rainfall pattern
   - Snow and Hail
5- Wind Direction and Speed.
6- Cloud Cover.
7- Solar radiation.

LA-NINA:

It is a southern oscillation phenomena.

La-nina is characterized by usually cold sea surface temperatures in central and Eastern Pacific Ocean.

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Effects on global Climate:

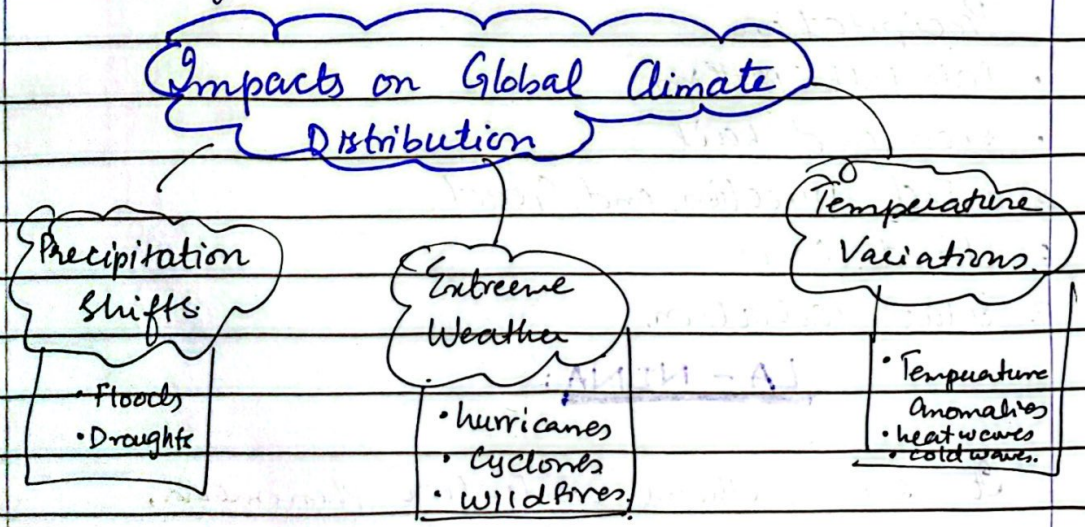
→ Enhances the trade winds.
→ Increased rainfall in South East Asia and Australia.
→ Droughts in South America and parts of the USA.
→ Cooler global temperature overall.

EL-NINO:

It is also a southern oscillation phenomena. El-nino involves usually warm sea surface temperatures in the central and Eastern Pacific Ocean.

Effects on Global Climate:

→ Weakened trade winds.
→ Heavy rainfall and flooding in south America.
→ Droughts in Australia and South East Asia.
→ Warmer global temperatures overall.



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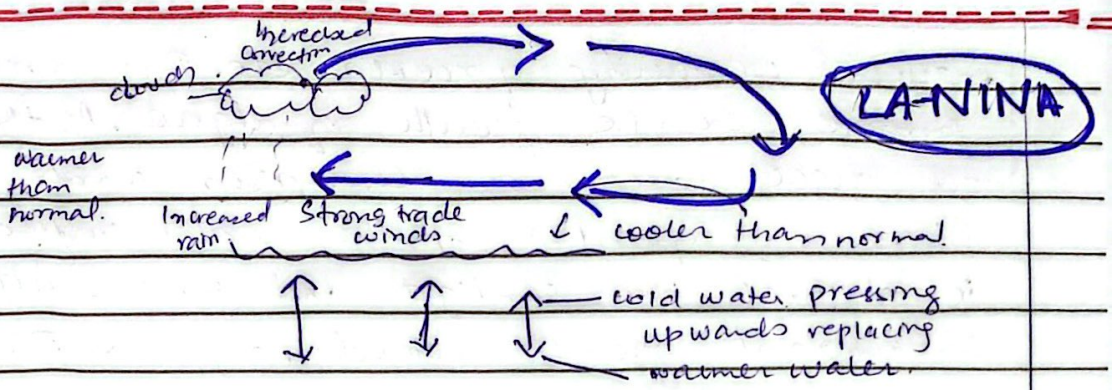

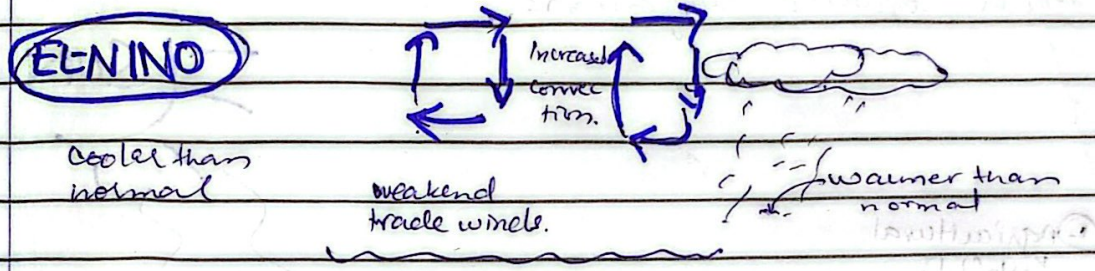

warm surface water flows east →

(b) Define Eutroplication. Explain its process, types and effects & give controlling measures.

EUTROPHICATION:

It is an excessive plant and algal growth in the water bodies due to the increased levels of growth factors likes carbon, nitrogen and phosphorus.

Process of Eutrophication:

It is a process in which water bodies acquires a high amount of nutrients either through agricultural run off & other factors like decomposition of organic

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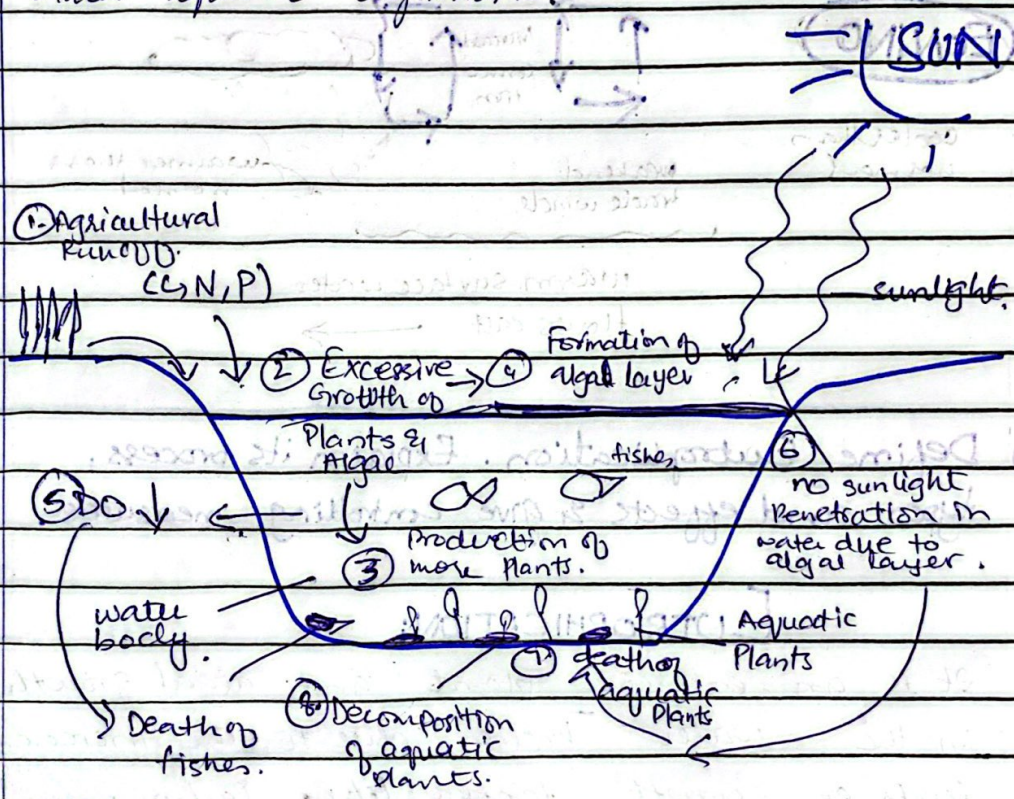
matter, weathering of rockes - etc. This in return promote excessive growth of algae. As the the algae dies and decomposes and forms a deposition on the water surface it obstruct the sunlight and as a result the aquaplant growth retards, depleting the dissolved oxygen causing the death of other aquatic organisms.



TYPES OF EUTROPHICATION:

1. **Natural:**

This type of Eutrophication is occured naturally and is slower as compared to the cultural eutrophication.

2. **Cultural:**

This type of eutrophication is contributed by

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the humans. Most common entry of nutients is through agricultural runoff and is aggravates because of the excessive use of the chemical fertilizers.

EFFECTS OF EUTROPHICATION:

1- **Quality of Water:**

Eutrophication effects the quality of water adversely as it increase the nutrient level to the extent that harms the water quality, decreasing dissolve oxygen. The taste of the water damages and it become pungent.

2- **Aesthetic Value decreases:**

Due to bad smell and high toxin excreted by the algal species the aesthetic value of the water body also decreased

3. **Public Health Risk:**

The water bodies are used to drink water by animal and also used by humans for domestic purposely. The degrading quality will in returned affect the effect the health of both animals and humans.

4. **Biodiversity loss:**

The aquatic species of the water bodies will not survive and the biodiversity of that area will reduce.

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Controlling Measures:

→ Following are some preventative measure to reduce eutrophication of water bodies:

1- Reduce the use of agro-chemicals.
2. Ensuring solid waste management.
3- Developing separate mitigation system for agricultural water run off.
4. Management and treatment of industrial waste.
5- Awareness and education regarding environment and it protections.
6. Implementing process introduced in sustainable development Goals.
7- Penalize and strengthen environmental laws and policies.
8. Strengthen the role of environmental institution.
9- Ecological restoration like adding dissolve oxygen in water, cleaning of algae manually or through technology introduction of species.