

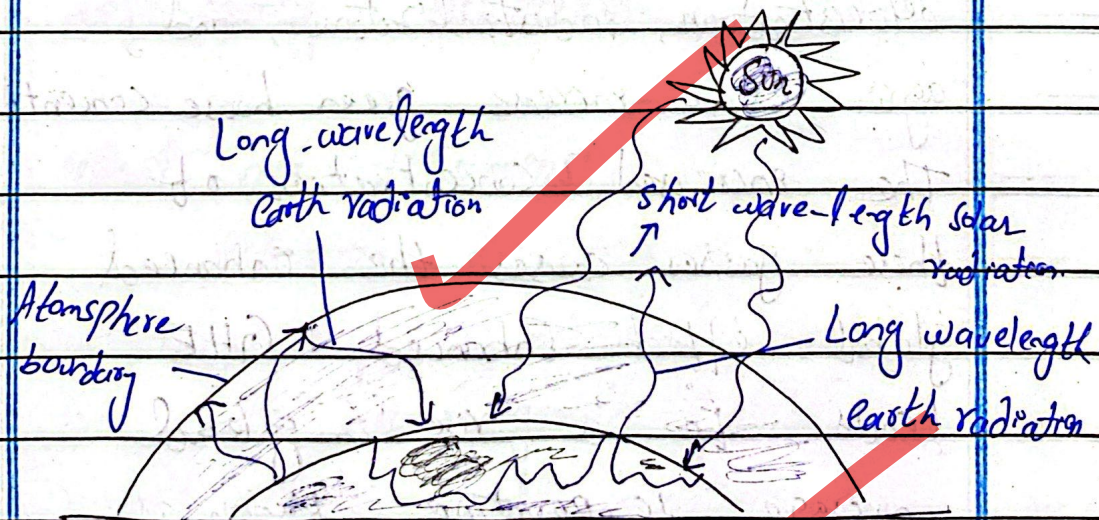
Question No #01:

(d)- Explain GHE in Context of global warming.

I- Green House Effect (GHE):

The Greenhouse Effect (GHE) is a natural process that helps to maintain Earth's temperature by trapping heat into atmosphere.

II- Green House Effect in the Context of Global Warming:



• Global warming Potential Diagram

Solar radiation from the sun reaches the Earth, part of it is reflected back into space, while the rest is absorbed by the Earth's surface. The absorbed energy is long wave radiation. -I

Green house gases such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and water vapour absorb this outgoing heat. These gases re-radiate heat back towards the Earth's surface, warming the lower atmosphere. -II

Human activities like burning fossil fuels, deforestation, industrialization, and agriculture increase green house concentration.

The increased concentration of these gases causes the enhanced global effect. Enhanced GHE leads to a rise in global average temperature, known as global warming.

III- Impacts of Global warming:

Global warming results in melting glaciers and ice caps, sea-level rise, heatwaves, altered rainfall patterns and extreme events. Thus, while Green house Effect is essential for life, its human-induced intensification is the main cause of present-day global warming.

b- What are vitamins? Give its types, functions, sources and deficiency disorders.

I- What are vitamins:

Vitamins are organic micro-nutrients required in small amounts for the normal growth, metabolism, immunity and overall maintenance of the body. They do not provide energy but act as regulators of bio-chemical reactions.

II Types of vitamins:

Vitamins are broadly classified into two main types

Types of vitamins

Fat-soluble vitamins



These vitamins dissolve in fats and are stored in liver and fatty tissues.

Water-soluble vitamins



These vitamins dissolve in water and are not stored in large amounts.

Fat-soluble vitamins

→ Vitamin A
→ Vitamin B
→ Vitamin E
→ Vitamin K

Water-soluble vitamins

→ Vit B Complex
→ Vitamin C

III- Functions, Sources, and Deficiency Disorders of Vitamins:

Sr#	Vitamin	Functions	Source	Deficiency
1	Vitamin A (Retinol)	Vision, Healthy Skin, immunity	Carrots, Spinach, milk egg yolk	Night blindness Xerophthalmia
2	Vitamin B ₁ (Thiamine)	Carbohydrate metabolism, nerve function	Whole grains, legums, nuts	Beriberi
3	Vitamin B ₂ (Riboflavin)	Energy Production, healthy skin	Milk, eggs, vegetables	Cheilosis, glossitis
4	Vitamin B ₃ (Niacin)	Energy metabolism, nervous sys function	Meat, fish, Peanuts	Pellagra
5	Vitamin B ₁₂ (Cobalamin)	Red blood cells formation, nerve function	Meats eggs milk	Pernicious anemia

Sr#	Vitamin	Functions	Source	Deficiency
6	Vitamin C (Ascorbic Acid)	Collagen formation wound healing Immunity	Citrus fruits guava, green vegetables	Scurvy
7	Vitamin D (Calcified)	Calcium & Phosphorus absorption Bone health	Sunlight fish oil, eggs Yolk	Rickets Osteomalacia
8	Vitamin E (Tocopherol)	Anti-oxidant protects cell membrane	vegetables oil, nuts seeds	Muscle weakness infertility
9	Vitamin K	Blood Clotting	Green leafy, cabbage, Liver,	Excessive bleeding

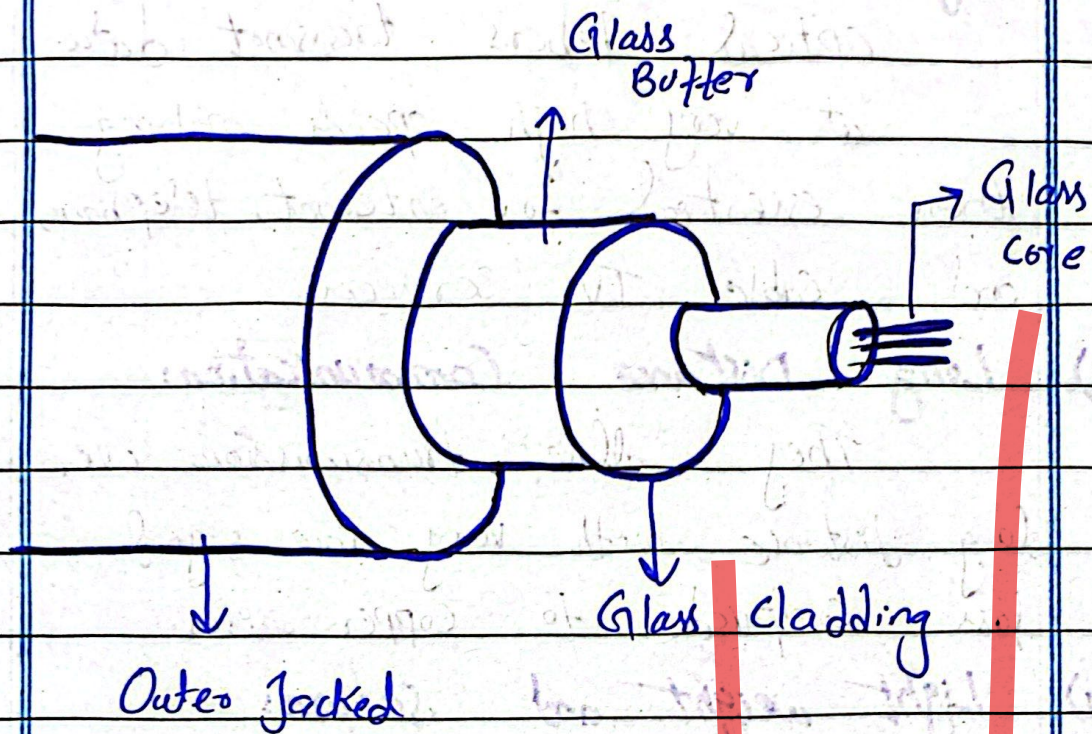
IV Conclusion:

Vitamins are essential for maintaining good health and preventing deficiency diseases. A balanced diet containing fruits, vegetables, cereals, dairy products, and proteins ensure adequate intake of all essential vitamins.

C- Define optic fiber and describe its importance.

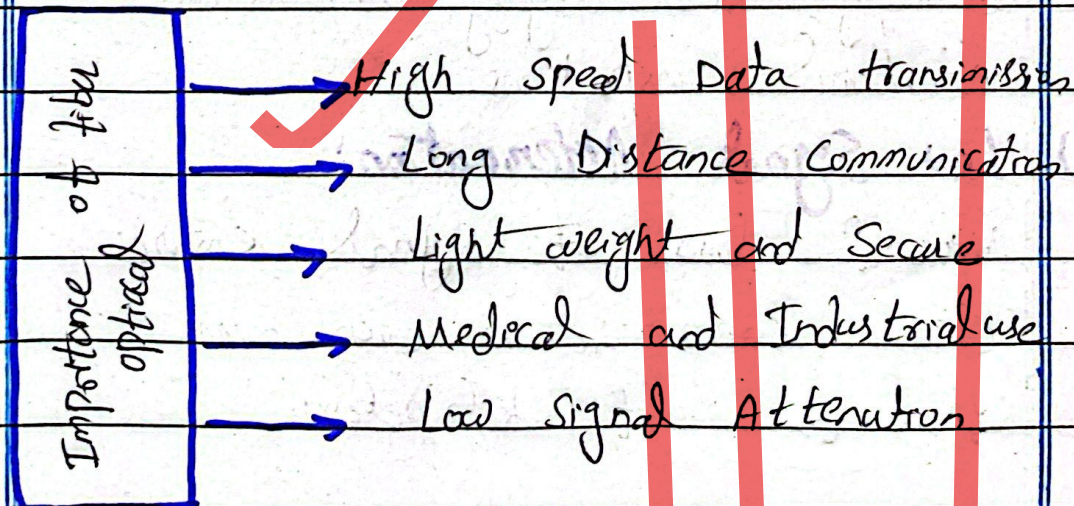
IF What is Optic Fiber:

Optical fiber is a thin, flexible strand of glass or plastic that transmits information in the form of light signals from one point to another. It works on the principle of total internal reflection, in which light continuously reflects within the fiber core, allowing signals to travel long distances with minimal loss.



• Fiber optic cable components Diagram

II Importance of Fiber Optical



i) **High speed Data Transmission:**

Optical fibers transmit data at very high speeds, making them essential for internet, telephone, and cable TV services.

ii) **Long Distance Communication:**

They allow transmission over long distance with very low signal loss compared to copper wires.

iii) **Light weight and Secure:**

They are thinner, lighter, and more secure, making data interception difficult.

iv) **Medical and Industrial Use:**

Optical fibers are used in endoscopy, laser surgery, sensors, and industrial inspections.

v) **Low Signal Attenuation:**

Minimal loss of signal ensures clear communication even over thousands of kilometers.

III- Conclusion:

Due to fast, secure, and reliable data transmission, optical fiber has revolutionized the global communication making a backbone of modern communication.

(D) Define water pollution. Give its types, sources and controlling measures.

I- What is water pollution:

Water pollution is the contamination of water bodies such as rivers, lakes, groundwater, and oceans by physical, chemical or biological substances that degrade water quality and make it harmful for human use, aquatic life, and the environment.

II- Types of water pollution

1. Physical Pollution

- Caused by changes in temperature, turbidity and suspended solids

2. Chemical pollution

- Due to toxic chemicals, heavy metals, acids and pesticides

3. Biological pollution

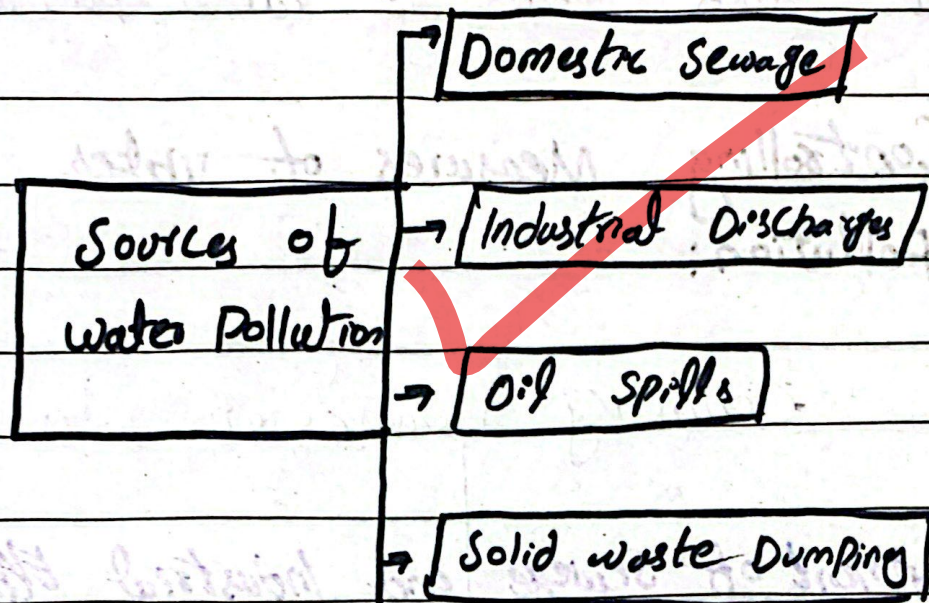
- Caused by pathogens such as bacteria, viruses, and parasites

4. Nutrient pollution

- Excess nutrients cause eutrophication

Types of water pollution

III- Sources of water pollution:



i. Domestic Sewage:

Untreated household wastewater containing organic matter and pathogens become the source of domestic sewage.

ii. Industrial Discharges:

Release of toxic chemicals, heavy metals and acids leads to water pollution.

iii. Oil spills:

Leakages from ships & offshore lead to water pollution.

iv. Solid waste Dumping:

Plastics and garbage disposed into rivers

and lakes lead to water pollution.

IV- Controlling Measures of water pollution:

Controlling Measures of water pollution

Treatment of sewage and industrial effluents:

- Install and operate wastewater treatment plants before discharge.

→ Proper solid waste management

- It prevents dumping of waste into water bodies.

→ Public Awareness:

- Educate communities on water conservation and pollution prevention.

V- Conclusion:

Water pollution threatens sustainable development. Effective control requires scientific treatment methods, strong governance and public participation.

Question #02

Define the following:

- Food Preservatives
- Food Additives
- Food Adulteration
- Food Contamination

I- What is Food Preservative:

Food Preservatives are substances added to food to prevent spoilage caused by micro-organisms, oxidation, or chemical reactions, thereby extending shelf life and maintaining food quality.

II- What are Food Additives:

Food additives are substances intentionally added to food to improve taste, color, texture, flavor, or appearance and to enhance stability during processing and storage.

III- what is Food Adulteration:

Food: adulteration is the deliberate addition or substitution of inferior, harmful, or unnecessary substances in food, or the removal of valuable components, which reduces food quality and safety.

IV- What is Food Contamination:

Food contamination refers to unintentional presence of harmful substances such as micro-organisms, chemicals, or foreign materials, in food, making it unsafe for consumption.

Question #02

How human activities deteriorated the atmospheric conditions and propose controlling measure.

I- Deterioration of Atmospheric Conditions due to Human Activities

The following human activities are mainly cause behind the deterioration of atmospheric conditions.

Human activities responsible for atmospheric conditions

Burning of fossil fuels

Industrial emission

Deforestation

Burning of waste

• Extensive use of coal, oil, gas in power plants, industries and vehicles release large amount of CO_2 , SO_2 and (NO_x) , leading to air pollution & global warming

• Factories emit toxic gases, particulate matter and chemicals, which degrade air quality and contribute to acid rain.

• large scale cutting of forests reduce CO_2 and disturbing the carbon balance.

• open burning of chemical and fertilizers release methane (CH_4) & (N_2O) causing air pollution.

II-

Proposed Controlling measures For Atmospheric Deterioration

These are the following proposed
controlling measures for atmospheric
deterioration.

Controlling Measure for Atmospheric
Deterioration

Use of Renewable
Energy

Control of Industrial
Emissions

Proper Waste
Management

Environmental Awareness
and Laws

i- Use of Renewable Energy:

Shift from fossil fuels
to solar, wind, and hydropower to
reduce greenhouse gas emissions.

ii)- Control of Industrial Emissions:

Installation of filters, scrubbers, and emission control technologies in industries.

iii) Proper Waste Management:

Recycling and scientific disposal of waste instead of open burning.

iv) Environmental Awareness and Laws:

Public awareness campaigns and strict enforcement of environmental protection laws.

III- Conclusion:

Human activities have significantly deteriorated atmospheric conditions, leading to air pollution and climate change. However, sustainable practices, clean energy use, and strong environmental policies can effectively control and improve atmospheric quality.

Question #03

Define Remote Sensing. How remote sensing can help in environmental science.

I- What is Remote Sensing:

Remote Sensing is the science and technology of collecting information about the Earth's surface and atmosphere without direct physical contact, by using sensors mounted on satellites, aircraft, or drones.

These sensors detect and record or emitted electromagnetic radiation from objects, which is then analyzed to identify and monitor various features and processes.

II- How Remote Sensing Helps in Environmental Science

Role of Remote Sensing in Environmental Science

Monitoring Climate Change Weather Forecasting Disaster Management Pollution Detection Water Resource Management

i) Monitoring Climate Change

It helps track changes in global temperature, greenhouse gas concentration, ice melt, and sea level rise.

ii) Weather Forecasting:

It provides real-time data on clouds, storms, rainfalls, and cyclones, improving weather prediction.

iii) Disaster Management:

Used to monitor and assess floods, earthquakes, landslides, droughts, and

volcanic eruptions for early warning and damage assessment.

IV. Pollution Detection:

It detects air pollution, oil spills, and water contamination supporting environmental regulation.

V. Water Resource Management.

It helps in monitoring water quality, surface water distribution, ground water potential and glacier dynamics.

III- Conclusion:

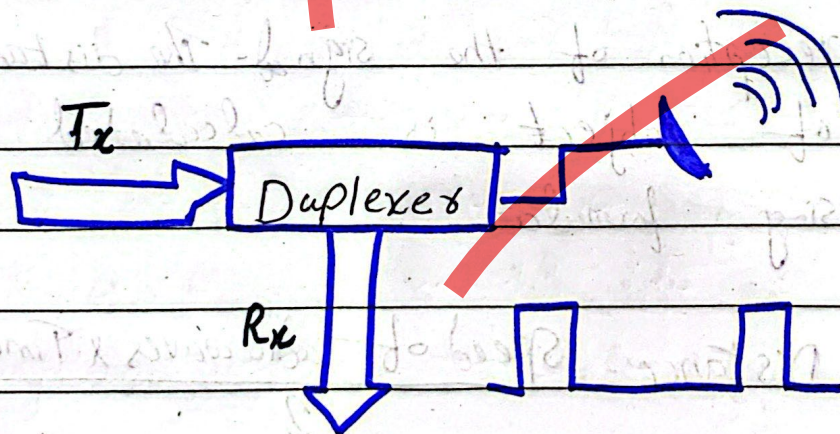
Remote sensing plays a crucial role in environmental science by enabling large scale, continuous and accurate monitoring of natural resource and environmental change. Thus, supporting sustainable environmental management and policy-making.

(D) Explain the working of RADAR.

I- What is RADAR:

RADAR stands for Radio Detection and Ranging. It is a system used to detect the presence, position, distance, speed, and direction of objects by using radio waves.

II- Working Mechanism of RADAR:



1- Principle of RADAR:

RADAR works on the principle of reflection of radio waves and the time delay between transmitted and received signals.

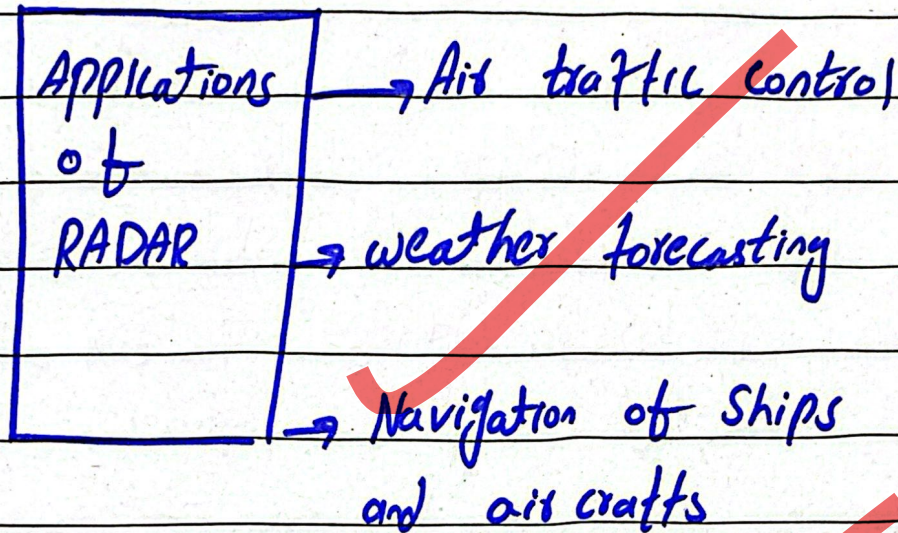
11- Working Mechanism of RADAR:

A RADAR transmitter generates short pulses of high frequency radio waves. They are emitted into space through a transmitting antenna. When the radio waves strike an object, they are reflected back as echoes. The reflected signals are received by a receiving antenna. A receiver and processor measure the time interval between transmission and reception of the signal. The distance of object is calculated using formula:

$$\text{Distance} = \frac{\text{Speed of radio waves} \times \text{Time delay}}{2}$$

The direction of the object is determined from the orientation of antenna. The speed of the object can be measured using the Doppler effect, which analyzes changes in signal frequency.

III- Applications of RADAR



IV- Conclusion:

RADAR is an essential technology that uses radio waves to accurately detect and track objects over long distances, playing a vital role in navigation, defense, and meteorology.