

TEST: 02

General Science

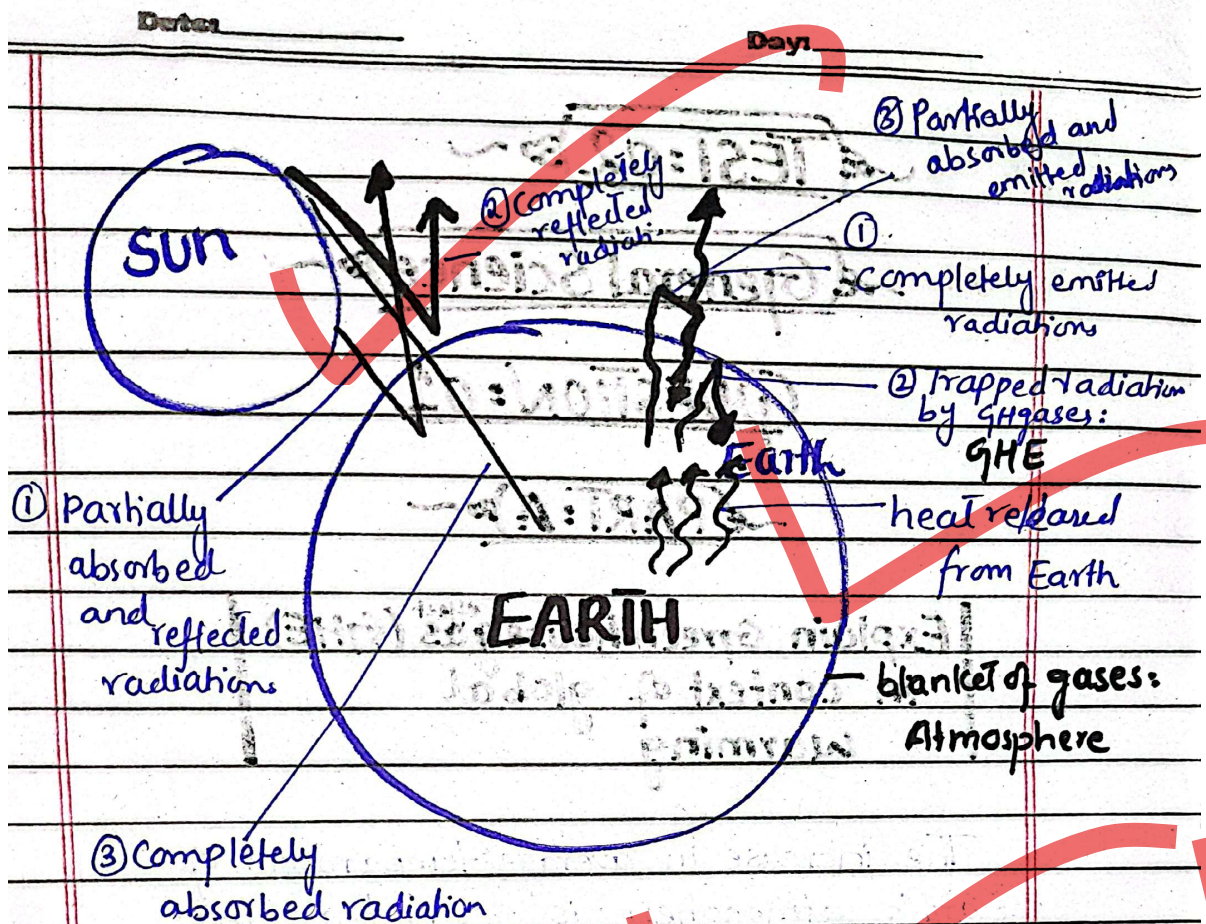
QUESTION: 01

(PART: A)

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Explain Greenhouse^{effect} gas (GHE) in context of global warming

The increase in average temperature of Earth's atmosphere is termed as the **Global Warming**. The sun which is ultimate source of energy for the planet Earth in which we live. The sun provides energy in form of radiations (mainly Ultraviolet radiations). Some of these radiations are absorbed by the gases present in the upper atmosphere. Some of these radiations are reflected and some are fully absorbed. The absorbed radiations are emitted out of the Earth's atmosphere in form of heat (**Infrared radiations**). These IR radiations when travelled in the upper atmosphere are absorbed by certain gases present there. Those gases which absorb or emit the heat radiations in Earth's atmosphere leading to increase in average temperature of atmosphere are called **Greenhouse gases**.



GREEN HOUSE Effect

(II. Green House Effect: Driver of Global Warming)

Gases	GWP (Global Warming Potential) (100 Year Time Horizon)	Atmospheric Lifetime (years)
CO ₂	1	100
CH ₄	25	12
Nitrogen containing gas	298	114
SF ₆	22800	3200

CO₂ is taken as the measure scale by the United States Environment Protection Agency to check the increase in global average temperature. As after the industrial revolution in late 17th century, the level of CO₂ gas in atmosphere has increased drastically leading to the more trapping of heat inside the Earth's atmosphere instead of emitting it out. This trapping of heat has drastically elevated the temperature of Earth's atmosphere.

The average temperature of planet Earth was 16°C in 1880 which is now elevated to 17°C $\pm$ 0.03°C in 21st century.

— World Meteorological Organization (WMO)

The Global Warming Potential (GWP) of CO₂ indicates the contribution of CO₂ in global warming. 1 molecule of CO₂ require 100 years to degrade down. Similarly, the methane gas (CH₄) has the ^{more} potential of trapping heat inside the Earth's atmosphere that is 25-36 times greater than that CO₂.

1 Methane gas molecule = 25-36 times more efficient in trapping heat than CO₂ single molecule.



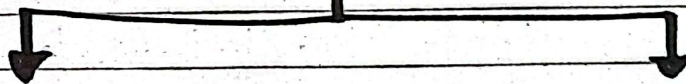
(PART: B)

~(QNO:1)~

What are vitamins? Give its types, sources and deficiency

Human body is dependent on the energy requirement for proper functioning and growth. The body's energy is fulfilled by the nutrients, minerals, vitamins, etc. Vitamins which are organic compounds required by the human body in very small amounts for normal growth, metabolism, immunity and overall health. Vitamins are broadly classified into two types depending on their availability in body. Moreover, the deficiency of vitamins in body disrupts the normal functioning of body which requires to fulfil body's vitamin deficiency through their respective sources.

(i) Types of Vitamins



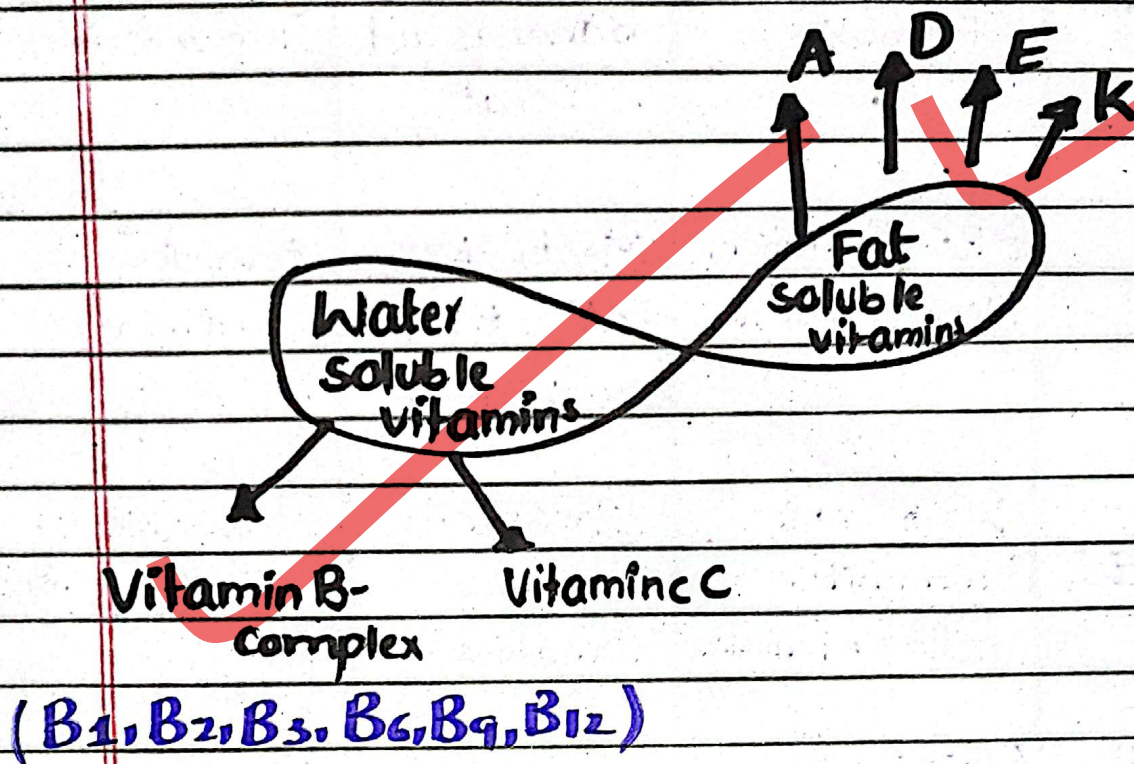
Water-Soluble vitamins

- (Vitamins that are soluble in water)
- Not stored in body except B₁₂
- Excess of these vitamins

Fat soluble vitamins

- Vitamins that are soluble in fats and oils
- Stored in liver and fatty tissues
- Excess intake may

may cause toxicity.



(iii) Vitamins: Sources, Functions and Deficiency Disorders

Vitamin	Main Function	Sources	Deficiency Disorders
Vitamin A (Retinol)	Vision, Healthy Skin, Immunity	Carrot, Milk, Butter, Egg Yolk, Green Vegetables	Night Blindness, Xerophthalmia
Vitamin B₁ (Thiamine)	Energy Metabolism, Nerve Function	Whole grains, pulses, nuts	Beriberi
Vitamin B₂ (Riboflavin)	Cell growth, Energy Release	Milk, eggs, green vegetables	Cracks at mouth corners, sore tongue
Vitamin B₃ (Niacin)	Digestion, Nervous System	Meat, fish, groundnuts	Pellagra (dermatitis, diarrhea, dementia)

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Vitamin B₆ (Pyridoxine)	Protein metabolism, hemoglobin Formation	Cereals, bananas and Meat	Anemia, Nerve disorders
Vit-B₁₂ (cobalamin)	RBC formation, Nervous System	Meat, liver, Milk, Eggs	Pernicious Anemia
Vit-C (Ascorbic Acid)	Wound healing, Immunity, Collagen Formation	Citrus Fruits, Guavas Tomatoes	Scurvy (Bleeding gums)
Vit-E (Tocopherol)	Antioxidant, reproductive health	Vegetable oils, Nuts, Seeds	Muscle Weakness (rare)
Vit-K	Blood clotting	Green leafy vegetables	Excessive Bleeding
Vit-D (calciferol)	Calcium Absorption, Bone Health	Sunlight, fish, liver oil, milk	Rickets (children), osteomalacia (Adults)

Vitamins are essential micronutrients that play a vital role in maintaining physical and mental health. A balanced diet containing adequate vitamins, prevents deficiency diseases.

Q No: 01 (PART: C)

Define optic fibre and describe its importance

The optical fibre as the name itself suggests that the fibre that carries information from one point to another in form of light pulses. The word optical is derived from "optics" which shows that study of properties of light and its propagation.

(i) Definition of Optical Fibre:

The strands of optically pure glass as thin as a human hair that carries digital information over long distances. Optical fibres carry information from one point to another in form of light pulses along a hollow glass tube or fibre.

(ii) Principle of optical Fibre's Operation:

The field of fibre optics depends upon "Total Internal Reflection" of light rays travelling through it.

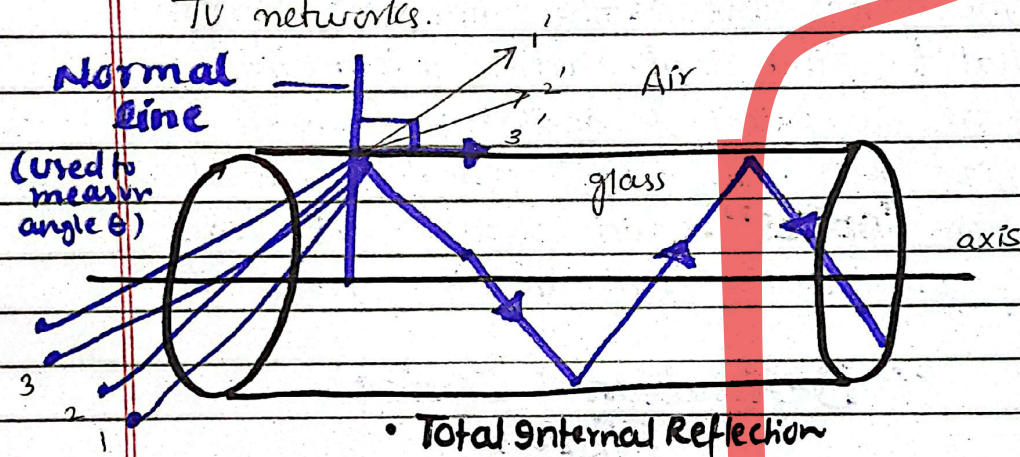
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(iii) Importance of Optical Fibres

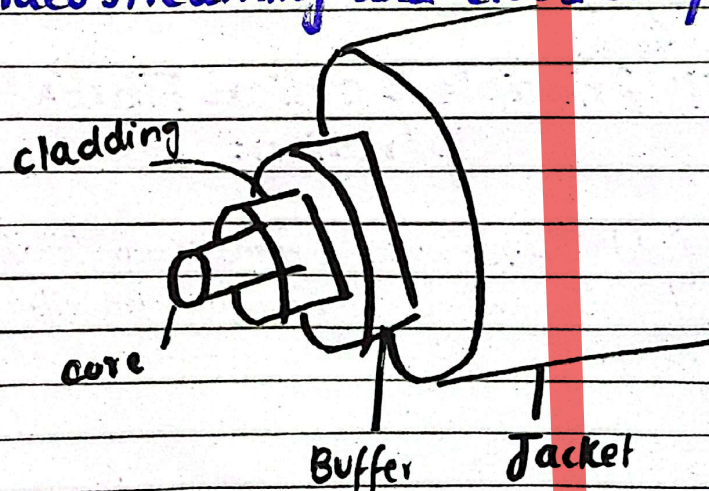
(1) High Speed Communication:

Bundles of such fibres can transmit data at very high speeds making them essential for internet, telephone and cable TV networks.



(2) Large Bandwidth of Optical Fibre:

They can carry a large amount of data simultaneously, supporting modern high-data demand services such as **video streaming and cloud computing.**



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(3) Low Signal Loss:

Light signal suffer very low attenuation, allowing transmission over long distances without frequent amplification.

(4) Immunity to Electromagnetic Interference:

Unlike copper wires, optical fibres are not affected by electrical noise, ensuring clear and secure communication.

(5) Lightweight and Thin:

Optical Fibres are smaller and lighter than metal cables, making installation easier and more cost effective.

(6) Medical Applications:

Used in endoscopy, laser surgeries, and medical imaging to view internal organs without invasive procedures.

(7) Industrial and other Uses:

Employed in sensors, automation and laser systems for accurate measurements.

(8) Secure Data Transmission:

Optical Fibres are difficult to tap, making them ideal for secure communication in defense and banking sectors.



(Q No: 01)

(PART: D)

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

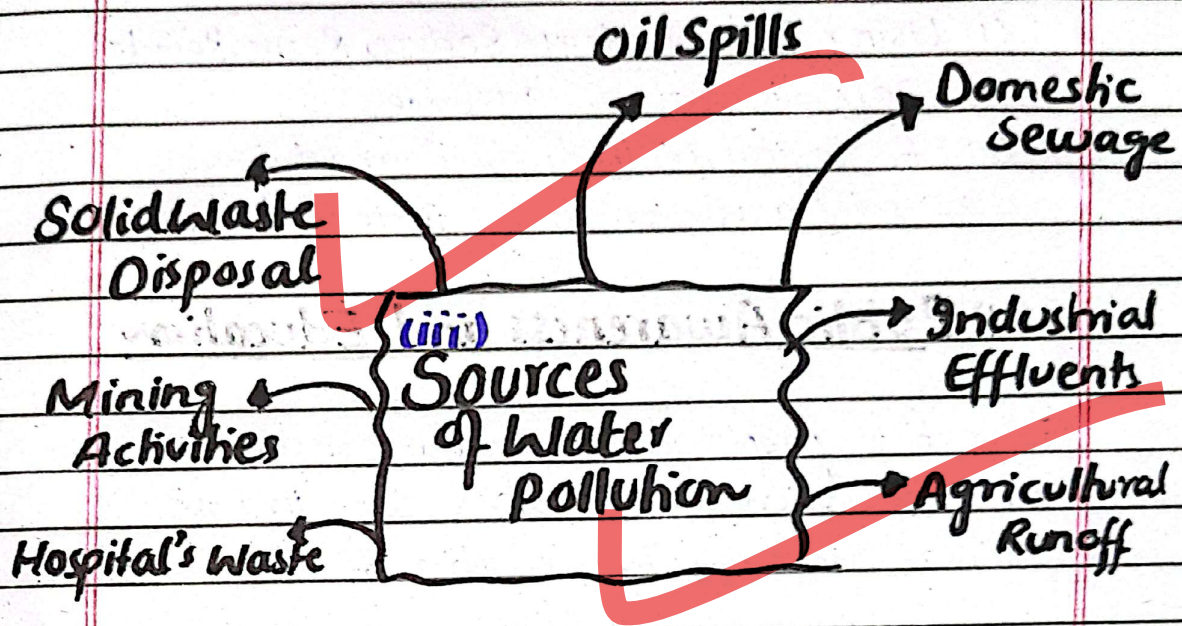
Any unwanted change in the natural setting of Earth's atmosphere is termed as pollution. Similarly, when such pollution exists in water bodies it is defined as **Water Pollution**.

(i) Water Pollution: Definition

Water Pollution is the contamination of rivers, lakes, oceans, groundwater, or other water bodies by harmful substances. These substances make water unsafe for drinking, agriculture, aquatic life and other purposes.

(ii) Types of Water Pollution

Physical Pollution	Chemical Pollution	Biological Pollution	Thermal Pollution
(Changes in physical characteristics of water i.e., color, temperature, turbidity due to solid waste and suspended materials)	(changes in chemical composition due to adding harmful chemicals i.e., acids, pesticides, etc.)	(Contamination by micro-organisms)	(Discharge of hot water from industries or power plants reduces O_2 levels in water.)
		Radioactive Pollution (Addition of radioactive substances containing waste into water)	



(iv) Controlling Measures of Water Pollution

(1) Treatment of Sewage and Industrial Waste:

Wastewater should be treated before entering water bodies through chemical means or by using filters in front of sewage line.

(2) Use of Eco-friendly Products:

Biodegradable products including detergents and reduced use of harmful chemicals can alleviate the potential harmful effects of polluted water.

(3) Proper Solid Waste Management:

- (i) Using 3R's strategy (Reduce, Reuse, Recycle)
- (ii) Safe disposal of garbage
- (iii) Biological Methods of degradation of solid waste or use of incinerators.

(4) Public Awareness and Education

Educating people about water conservation and pollution preservation can impose positive effect on the reduction of water pollution.

(5) Control of Agricultural Chemicals

The limited use of fertilizers and pesticides and adoption of organic farming are the important mitigation strategies for controlling the water pollution.

(v) Conclusion:

Water pollution is a serious environmental problem that threatens human health and aquatic ecosystem. Effective control requires individual responsibility, government action and sustainable practices.



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~(QUESTION: 03)~

~(PART: a)~

What are effects of global warming on Pakistan? And propose suggestion

The concern regarding the increase in the average global temperature is due to the effect of global warming. Global warming has not only imposed its deleterious impacts on Pakistan but also raised the concern in Europe.

2024 is defined as the fifth consecutive year, showing temperature upward graph.

~SwissRe-Report 2024~

(I) Effects of Global Warming IN Pakistan

(1) Humanitarian Crisis instigated by Global Warming

The 2025 floods that are due to the changing patterns of climate, has resulted into 1063 deaths with 1009 people severely injured.

~NDMA Report 2025~

(ii) Social Inequalities emerging from Global Warming

The Global warming has resulted into the melting of glaciers and icecaps. These melting of glaciers and icecaps has resulted into severe monsoon rains and floods. The flood of 2025 shows the severity of global warming to the world.

As per the NDMA (National Disaster Management Authority) report 2025,

"~~For~~ Communities settling near the riverine areas faces the ^{huge} economic burden, as displacement of more than 2 Million people has surfaced in Pakistan as a result of climate induced 2025 floods."

(iii) Agricultural sector Disruptions:

The increase in temperature round the world has impacted the working hours of laborers. As in Pakistan, 41% of employment is based on agriculture. With increase in climate induced disasters and average global temperature, output of agricultural sector will be at stake.

(iv) Infrastructure Loss:

The expansion of roads and bridges due to increase in the heat of Earth has resulted in the collapse of

bridges and infrastructure.

(V) Economic Burden on Fragile Economy of Pakistan:

Disasters that are induced by the change in global temperature will impose huge burden on the fragile economy of Pakistan. It is evident by the fact that,

30 Billion \$ was reported as potential economic loss in floods of 2022 in Pakistan
—Economic Survey of Pakistan (2023)

(VI) Suggestions for Mitigating Impact of Global Warming

- (1) Early Warning Systems like of Japan
- (2) Resilient Infrastructure according to the demand of environmental calamities.
- (3) Public Awareness and Campaigns through social media, print media and formal education system.
- (4) Enforcement of environmental mitigation laws i.e., Montreal Protocol.
- (5) Raising Voice for climate Funds at international level.

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(PART: B)

What is importance of
balanced diet ----

Balanced Diet:

A balanced diet is defined as the diet that provides all essential nutrients i.e., carbohydrates, proteins, fats, vitamins, minerals, water, and fibre in adequate amounts and proper proportions to maintain good health and normal body functions.

(I) Importance of Balanced Diet

(1) Source of Energy:

Balanced diet is a source of energy in terms of carbohydrates, proteins and lipids supplies. These are needed for daily life activities and metabolic processes.

(2) Supports Growth and Development:

Proteins, minerals, and vitamins help in proper growth, tissue repair and development, especially in children.

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(3) Strengthens Immune System:

Vitamins (A, C, D) and minerals (zinc, iron) enhance resistance against diseases.

(4) Improves Mental Health:

Supports brain function, concentration and emotional well-being.

(5) Prevents deficiency Diseases

Adequate intake of nutrients prevents vitamins and mineral deficiency disorders.

VIII) Disorders due to unbalanced Diet

