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GSA - Test #02

Environmental + IT + Food Science

Question # 01

a) GHE in context of Global Warming

Green House Effect

It is a thermal process by which heats get trapped in atmosphere (troposphere) under the action of Green house gases called green house effect. It is normal and natural process.

Green house gases are all such gases that has the ability to absorb, trap and scatter heat. Now, the normal and natural green house effect has been accelerated and speeded up due to increasing level of green house gases in atmosphere compared to past years, leading to Global Warming called enhanced green

house effect.

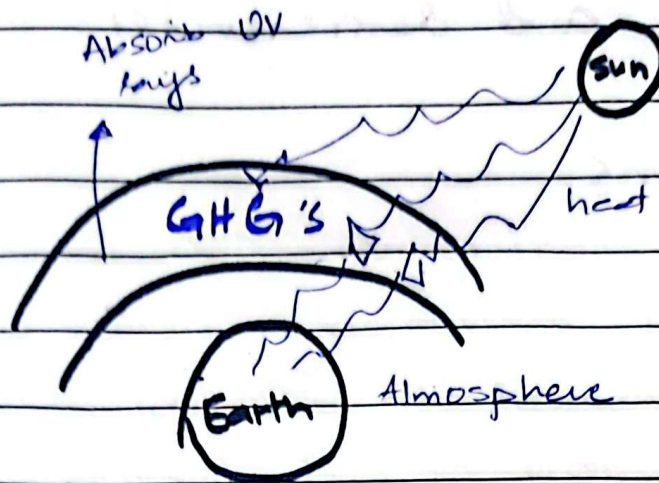
The contribution of green house gases in global warming According to IPCC

|                 |     |
|-----------------|-----|
| Carbon dioxide  | 61% |
| Methane         | 15% |
| CFC's           | 11% |
| NO <sub>2</sub> | 04% |

Remaining 09% by Water Vapours

## Background of Global Warming

Industrial and Agricultural revolutions have contributed tremendously in social, economic, scientific development. But to this revolution the intensity and frequency of human activities within natural setting increased and further increased the risk of Global Warming.



## Current Situation of Global Warming

This is international scientific challenge and political concerns instigated by humans and their lifestyle. Now considered as Global threat.

"Average gradual increase in temperature of earth from 1850-2024 is  $1.2^{\circ}\text{C}$  annually and prediction is can increase from  $1.4-5.8^{\circ}\text{C}$  till 2100."

IPCC

## b) Vitamins, types, functions Sources and deficiencies

### Vitamins

Vitamins are essential micronutrients that are required in less quantity but are very essential for normal functioning of body

### Types

There are two types of Vitamins

Fat Soluble Vitamins

Water Soluble Vitamins

### • Fat Soluble Vitamins

includes A, D, E, K

#### Vitamin A

##### Sources

Obtained from orange  
coloured foods

##### Function

Required for good



Vision, healthy nerves  
and growth process  
Deficiency  
Cause Night Blindness

## Vitamin D

### Sources

From Sunlight, milk  
and dairy products

### Function

Formation of strong  
bones and teeth

### Deficiency

Cause Rickets, Osteo-  
porosis and Osteopenia

## Vitamin E

### Source

Dry Fruits, Nuts  
Almond and seeds

### Function

For healthy skin  
nail and hair

Also slows down  
process of aging

Deficiency

Cause Rapid aging

## Vitamin K

Sources

meat, Cauliflower  
Cabbage

Function

Essential for bone  
healing assist blood  
clotting

Deficiency

Hemorrhagic Disorders  
Excessive bleeding  
Delayed healing

## • Water Soluble Vitamin

Include Vitamin B, C

## Vitamin B

Vit B<sub>1</sub> — Vit B<sub>7</sub> found  
in multiple forms



## Functions

- Essential for growth process
- Formation and maintenance of RBC's
- Immunity of body  
Resist against toxins

## Deficiency

can cause

- Scurvy
- Chiloblasts
- Pyorrhea
- Vitiligo

## Vitamin C

### Sources

Citrus fruits

### Function

Fast healing process  
in body

### Deficiency

Cause Scurvy

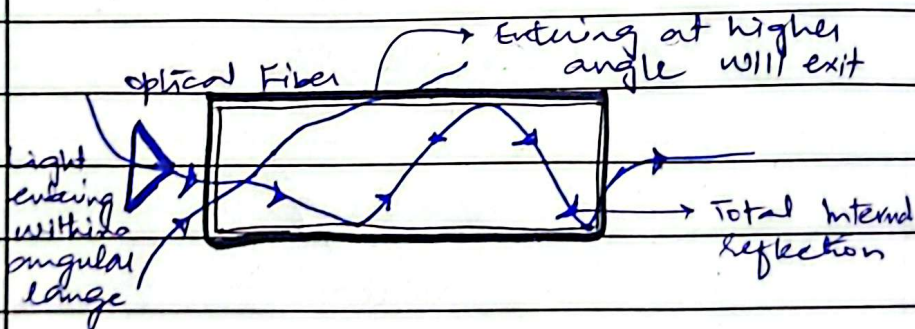
## C) Optic Fibre, Importance

### Definition

Optic fiber is a thin flexible strand of glass or fiber that transmits information in the form of light pulses instead of electrical signal.

### Working Principle

It works on the principle of total internal reflection allowing light to travel long distance with minimal loss.



### Structure of Optical Fiber

Comprise of 03 fundamental



components  
**Core**

Central part that carries  
light signals

**Cladding**

Surrounds the core and  
reflects light back into it

**Coating - Jacket**

Protect fiber from damage  
outermost part.

## **Types of Optical Fiber**

Consist of two types

1. Single Mode Fiber - long  
distance communication,  
high band width
2. Multi-Mode Fiber - short  
distance communication  
that is LANs

## **Importance of Optical Fiber**

### 1. High Data Transmission

Supports very high bandwidth and fast travelling.

### 2. Low Signal Loss

Data can travel long distance without amplification

### 3. Immunity to EMR

No disturbance from electrical or radio signals

### 4. Secure Communication

Difficult to tap or intercept

### 5. Light Weight

Easier installation

Compared to copper cables

### 6. Energy Efficient

Requires less data for data transmission.

## 2) Water Pollution.

### Definition

Contamination of water surface or ground water by physical, chemical, biological substances that alter its chemical, natural qualities, making it harmful for human use, aquatic life and environment.

### Sources of Water Pollution

#### 1. Point Sources

that contact directly with water bodies

— Industrial Effluents

— Sewerage treatment

plant outlet

— Power plants

discharge their waste products into water bodies resulting in water pollution

## 2. Non-Point Sources

Diffused and merged in a way the discharge points are non identifiable

- Agricultural runoff
- Urban storm Water runoff
- Soil Erosion and sediments flowing continuously making it difficult to separate or identify starting points

## 3. Other Sources

Other human activities that are also leading to water pollution

- Domestic Waste Water
- Oil Spills
- Mining Operations
- Solid Waste Dumping

## Types of Water Pollution

There are several types of



water pollution

### 1- Physical Pollution

Suspended Solids in Water bodies, turbidity and temperature changes

### 2. Chemical Pollution

Addition of heavy metals, acids, salts, pesticides and hydrocarbons.

### 3. Biological Pollution

Addition or production of pathogenic bacteria, viruses and protozoa

### 4. Thermal Pollution

Hot Water discharge from power plants affecting aquatic life

### 5. Radioactive Pollution

Nuclear Waste and Medical radioactive substance seeping in Water.

## Control and Prevention Measures

### 1. Treatment of Sewage and Industrial Effluents

Primary, secondary and tertiary treatments before discharge into water.

### 2. Strict Environmental Laws and Monitoring

Enforcement of Water Quality Standards and regulations

### 3. Control of Agricultural Run off

Non-harmful fertilizers or pesticides or their alternatives must be used.



#### 4. Solid Waste Management

Prevent Dumping of Solid Wastes into Water bodies

#### 5. Public Awareness and Education

Treated Water as a natural resource awareness campaigns on it.

### Qa) Effects of Global Warming in Pakistan

"The Era of Global Warming is ended, Now this is the era of Global boiling"

UN-General Secretary Anthony Gaitlin in 2023

As its impacts multi lateral and effect the following major domains of life.

## Impacts or Effects

### 1. Threat to human life

As the increasing temperature is intensifying the summers it increasing threat to life of many organisms.

Some temperature recorded last summer World Wide are

Xining —  $52^{\circ}\text{C}$

London —  $40^{\circ}\text{C}$

Islamabad —  $44^{\circ}\text{C}$

### 2. Global ice loss

This ice loss is not global anymore its started in Pakistan as well resulting in increase

increase in ~~best~~ sea level.

According to report  
Pakistani Glaciers  
are most rapidly  
~~melting~~ melting right now

NASA

This can lead to serious  
Water Scarcity that Pakistan  
is already facing

### 3. Rise In Sea Level

As per the report  
About 08 inches the  
global sea level has  
raised

IPCC

This increase threat to  
people living in coastal  
area, Karachi in case  
of Pakistan. As the  
cities are sinking globally.

#### 4. Agricultural Effects

Chance of Floods are increasing, resulting in food insecurity, agricultural loss & soil erosion.

As per the report the export of Pakistan has reduced

Mango, Rice, Wheat  
upto 40%.

— 2022

#### 5. Weather Patterns Changing

Change in Weather patterns will result in loss and extinction of many organisms and crops.

Because of non-seasonal rainfall.

Due to changing



rainfall pattern there is  
massive loss of vegetables  
in punjab.

**Suggestion — TO Overcome  
this problem**

**i. Increase Forest cover**

By applying the strategies  
of

- Reforestation
- Afforestation

And keeping a strong  
check and balance on  
illegal forest cutting  
global warming can  
be controlled

As per international  
standards almost 25%  
of area of a country  
should be forest area.

## 2. Promotion of Sustainable Urbanization

China has developed Sponge Cities. Pakistan should also ensure effective use of land and promote horizontal society development — make sustainable infrastructure like Japan high weight building earthquake free structures.

## 3. Promotion of Sustainable Transport

Pakistan should promote public transport for better sustainable environment for the future of coming generation in order to make earth a better place to live.

## b) Importance of Balanced Diet

### Definition

Balanced diet is an appropriate portion of all the essential nutrient that needs to be taken in diet as per the requirement of body. This nutrients include Carbohydrate, proteins, fats, Vitamins, minerals and water.

### Importance

#### 1- Proper Growth

Essential for proper growth and development

#### 2. Energy Supply

Carbohydrate and fats supplies energy to body

#### 3. Body Building

Require for body building and repair.

#### 4. Disease Prevention

Strengthen Immune System  
and reduce risk of  
infection

#### 5. Improve Mental Performance

Enhance concentration  
memory and productivity

### Problems Due to Deficiency

#### 1. Malnutrition

Protein - Energy

##### \* Kwashiorkor

Protein deficiency  
cause edema and stunted  
growth

##### \* Marasmus

Deficiency of calories  
cause severe mass or  
muscle wasting

#### 2. Vitamin Deficiency Disease

\* Night Blindness  
Due to Vit A

deficiency  
\* Beri Beri  
Vit B<sub>1</sub> deficiency

\* Scurvy  
Vit C deficiency

\* Rickets  
Vit D Deficiency

### 3. Mineral Deficiency

\* Anemia  
Iron Deficiency

\* Goitre  
Iodine Deficiency

\* Osteoporosis  
Calcium Deficiency

c) Strat and Atmospher  
functions

## Definition

Strat are different layers formed in system due to different composition temperature, intensity and function. All layers of atmosphere have distinct function.

Troposphere

Stratosphere

Mesosphere

Endosphere

## Function of Atmosphere

### 1. Protection from UV

Ozone layer absorb from UV rays

### 2. Regulation of Temperature

Maintain heat balance

through green house effect

### 3. Support life

Supplies oxygen for respiration and  $\text{CO}_2$



for photosynthesis  
4. **Weather and Climate Control**

Enable rainfall, Wind circulation and climate pattern

5. **Water Cycle Regulation**  
Facilitates evaporation, condensation and precipitation

d) **SWM . methods**  
**Definition**

The management consist of mainly solid and semi-solid material that come from different sources

- Industrial Solid Waste
- Municipal Solid Waste
- Agricultural
- Institutional

## Methods

### 1- Open Dumping

Uncontrolled disposal method  
in low lying areas

### 2- Sanitary Land filling

Engineered disposal method  
waste compacted

### 3. Incineration

High temperature burning  
of waste

### 4 Composting

Biological Decomposition  
of organic waste

### 5 Recycling and Reuse

Recovery and reprocessing  
material like paper.

### 6. Biogas Production

Decomposition in  
absence of oxygen