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Name: Lubna Ejaz

Test : QSA

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Q2

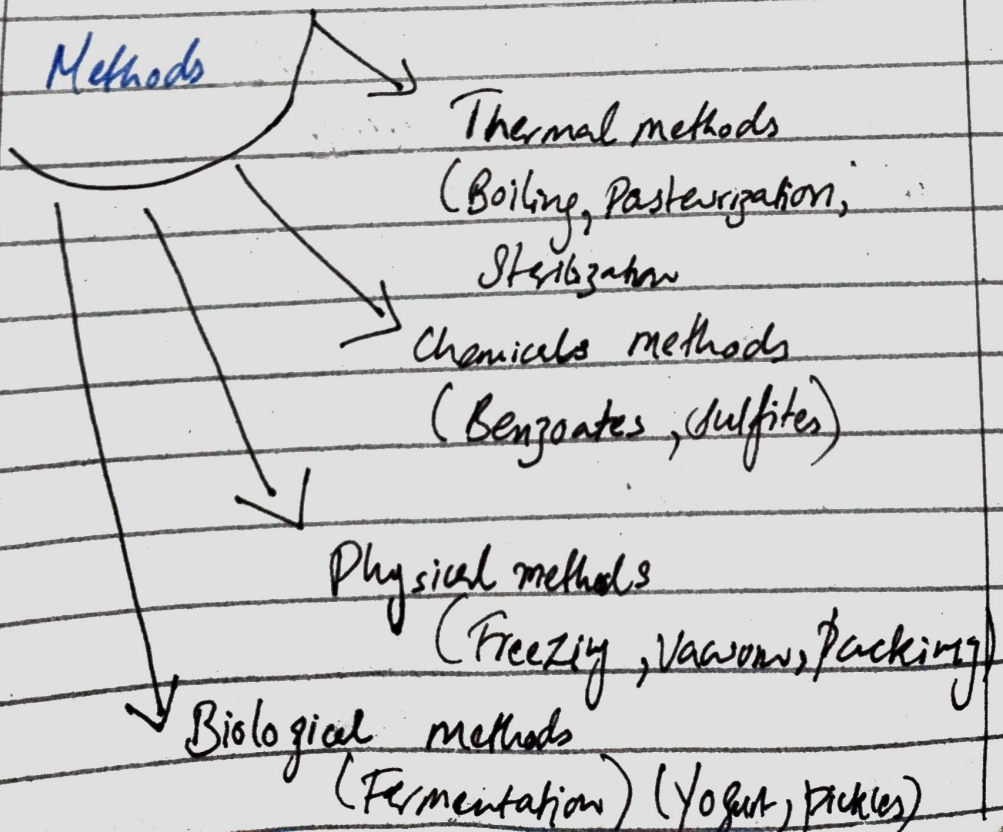
Define

Food Preservatives :

Substance added to food to prevent Spoilage caused by microorganisms or chemical reactions. This increases shelf life.

Examples of Food Preservatives :

Salt, vinegar, sodium Benzoate.



2. Food Additives:

Chemical Substances added to improve taste, color, texture, flavor, appearance

Examples:

1. coloring Agents : Synthetic dyes, Food colors
2. Flavoring Agents : Improve taste e.g. vanilla
3. Stabilizers : Maintain texture e.g. gelatin, Pectin
4. Nutritional Additives : Vitamins and minerals

3 Food Adulteration :

Intentional mixing of cheap, harmful substances to increase quantity, decrease cost and maximize profit
It can

- Spoil quality
- change color
- influence taste
- change pH

4. Food Contamination:
 Accidental pollution of food by
 harmful microorganisms, chemicals or
 foreign substances.

Example: Pesticides on vegetables,
 Mould on bread.

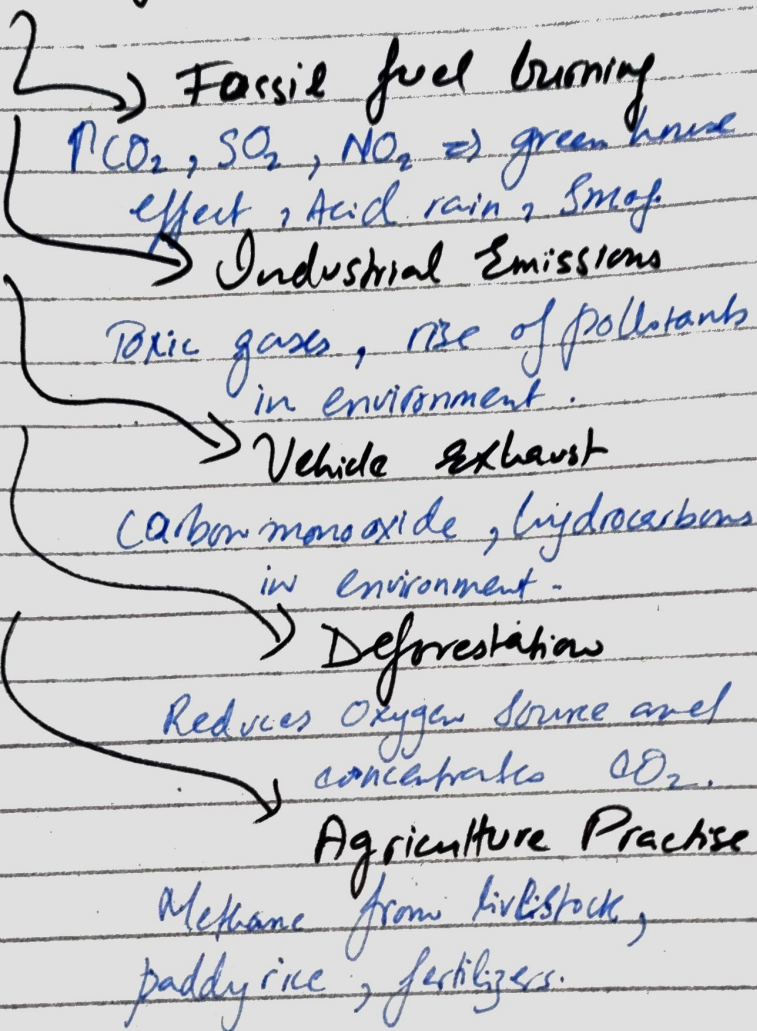
b) Human activities deteriorating
 Atmospheric Conditions &
 Control measures

Human activities like use of
 non-renewable fuel sources,
 deforestation and industrial
 emission have deteriorated the
 conditions of Atmosphere.

Recent statistics of World Bank
 confirm CO_2 pollutant concentration
 have reached 423 ppm.

This has led to rise in
 global temperature and

Causes - by Human Activities



Controlling Measures

Controlling measures are dire demanded off contemporary situations. Rising global temperature, global warming, climate change are asking for stringent control measures.

Controlling Measures

→ Renewable Energy

Solar, wind, hydro.

→ Afforestation / Reforestation

Green belts, trees plantation

→ Emission Control techniques

Scrubbers, filters in factories,

alternative options

→ Waste management

CO₂ disposable system

→ Legislation

Penalties for violating air quality.

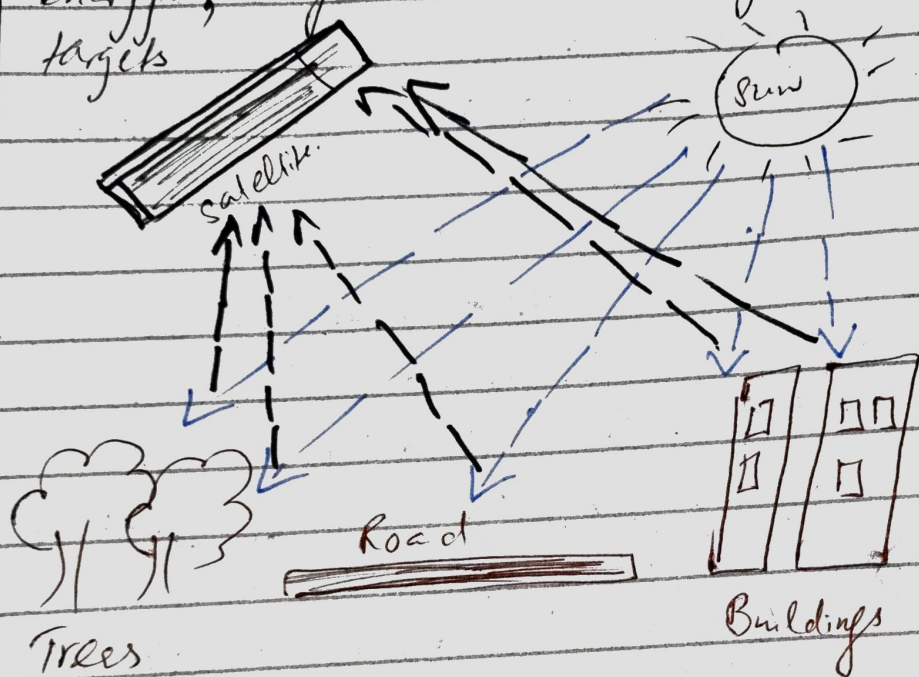
→ Global Commitments.

Align with COP Conference of Party agendas

9) Remote Sensing.

Collection of information about Earth's surface without direct contact, using satellites, drones or air craft.

Remote Sensing is science of gathering information about earth from distance. It works by detecting and measuring energy, reflected or emitted from targets.



Methods :

- Aerial Remote Sensing
(Using drones, taking photographs)
- Satellite-Remote Sensing
(Using sensors on satellite to collect data)
- Ground-Based Remote Sensing
(Using radars or cameras on ground)

Optical Remote sensing use Visible & near infrared and short-wave infrared sensors to form images by detecting

Solar radiation reflected from targets on ground.

Uses in Environment Science.

→ Monitoring climate change & Global warming

→ Detecting deforestation & land-use changes

→ Observing Air & water pollution

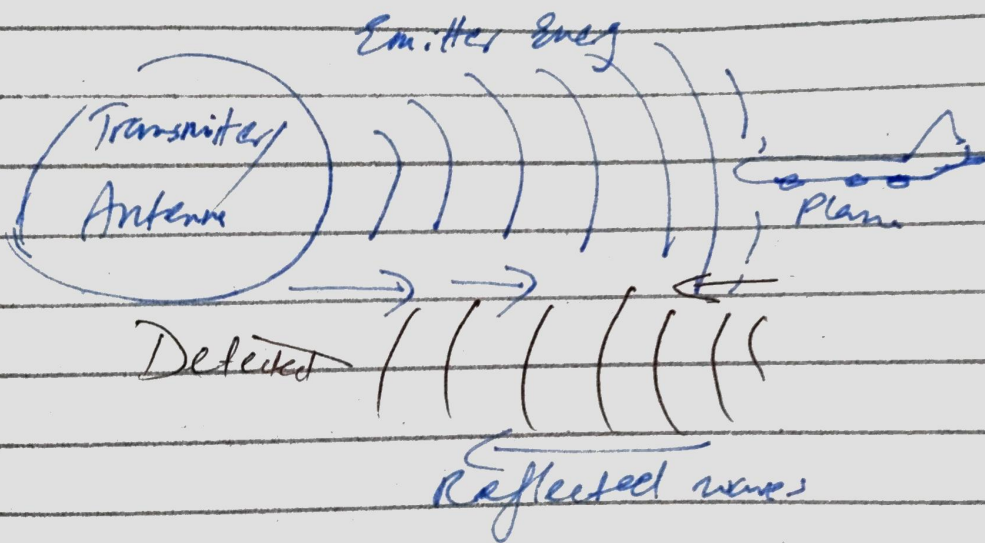
→ Disaster management (floods, earthquakes)

→ Studying water pattern & soil moisture

→ Ocean currents

a) Working of Radar.

Radio Detection and Ranging detects object using Radio waves. Radar send out pulses of radio waves that bounce off objects, then measuring the time it takes for the echoes to return to a receiver, allowing it to calculate distances of objects, direction, speed and shape.



Working Steps

1- Transmission

Radar emits radio waves towards target

2- Reflection: Reflected waves hit the object and reflect back

3- Reception

Reflected Rays received by Radar Antenna

↳ Calculation Time delay between transmission & reception gives distance, speed and position.

Types of Radar

↳ Pulse Radar $\Rightarrow$ Send short bursts of Radio waves

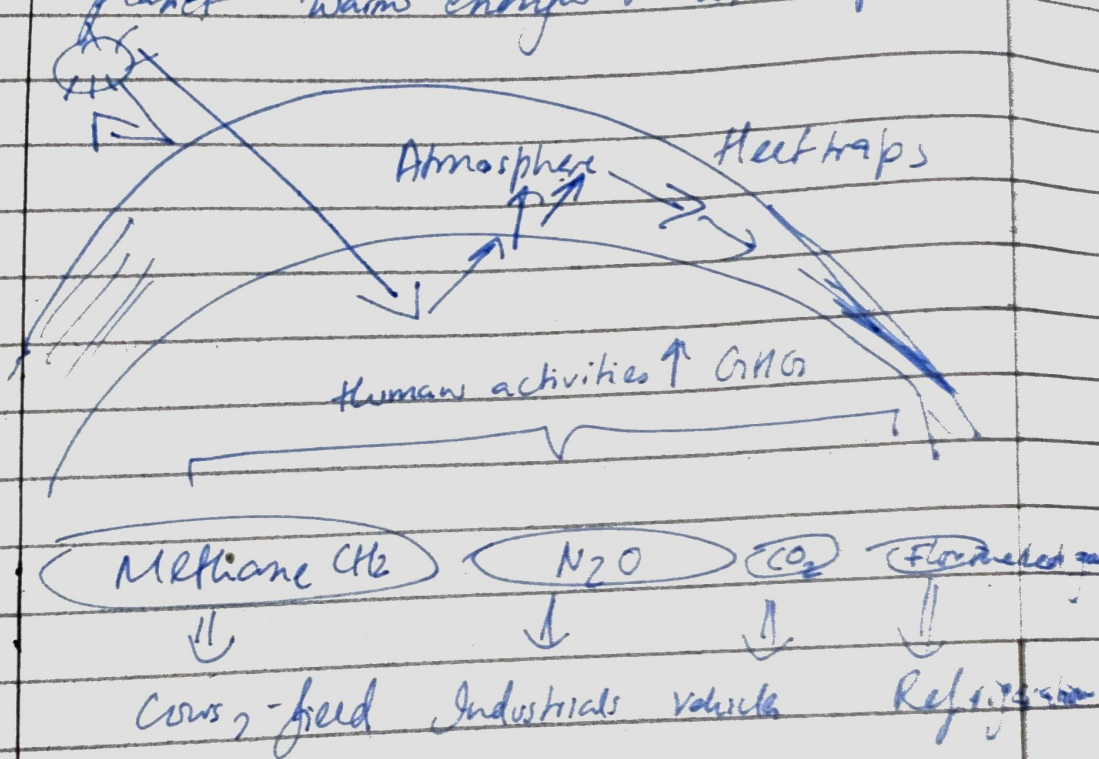
↳ Continuous wave radar $\Rightarrow$ Emit continuous waves, measure doppler shift

↳ Doppler radar: Measure speed of moving objects

↳ Weather Radar $\Rightarrow$ Monitor rainfall, storms, cloud movement.

Q1: GHE

Green house Gas is the natural process by which certain gases in Earth's atmosphere trap heat from sun, keeping planet warm enough to sustain life



Solar Radiation reaches Earth

Earth absorbs Infrared heat

Green house gases (CO_2 , CH_4) trap heat

Excess traps more heat $\Rightarrow$ global warming

Extra production of greenhouse gases from fossil fuel (oil burning)

- Agriculture lands
- Animals
- Industrialization
- Transport/vehicles
- Refrigerators

Results in More heat trap

↓
Increase global warming

- Glacier melt
- Floods
- Heat stroke
- Droughts
- Water stress

Impacts of Global Warming and Climate change

b) Vitamin

Vitamins are organic micronutrients required in small amounts for normal growth, metabolism and health. They cannot be synthesized in sufficient amount in body.

Two Types

Fat Soluble



- o Vitamin D
- o Vitamin E
- o Vitamin K
- o Vitamin A

Water Soluble



- o Vitamin C
- o Vitamin B1
- o Vitamin B2
- o Vitamin B3
- o Vitamin B5
- o Vitamin B6
- o Vitamin B7
- o Vitamin B9
- o Vitamin B12

1) Vitamin A: (Retinol)

Type: It is fat soluble

Source: Liver, carrots

Function: Required for eye vision

Deficiency: Night Blindness.

1. Vitamin E : Tocopherol
Source : Milk, fish oil, oil.
Function : make collagen, skin cells.
Deficiency : Aging, Hemolytic Anemia
3. Vitamin D : Calciferol
Source : Sun, Cod fish
Function : Bone Mineralization
Deficiency : Ricket, malacia.
4. Vitamin K (Mandione)
Source : leafy vegetable, colon (gut)
Function : make clotting factors.
Deficiency : Bleeding unstopable
5. Vitamin C (Ascorbic Acid)
Source : Citrus, Guava
Function : Immunity, Antioxidant
Deficiency : Scurvy.
6. Vitamin B1 (Thiamine)
Source : whole grains, legumes
Function : Energy metabolism, Nerve cell
Deficiency : Beri Beri

7. Vitamin B2 (Riboflavin)

Source : Meat, Milk

Function : Skin health

Deficiency : Skin lesion, cracked lips, cheilosis

8. Vitamin B3 (Niacin)

Source : Fish, meat, nut

Function : Energy metabolism

Deficiency : Pellagra

9. Vitamin B5 : (Pantothenic acid)

Source : Meat, grains

Function : Energy metabolism

Deficiency : Fatigue

10. Vitamin B6 (Pyridoxine)

Source : Meat, Banana, potato

Function : Neurotransmitters

Deficiency : Microcytic Anemia

11. Vitamin B7 : (Biotin)

Source : Egg yolk, dairy

Function : Hair & nail growth

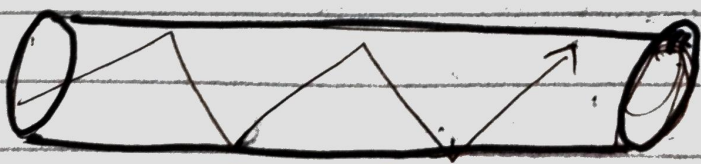
Deficiency : Alopecia

12. Vitamin B9 (Folic Acid)
Source : leafy vegetables.
Function : RBC formation
Deficiency : Pernicious Anemia, Megaloblastic Anemia

13. Vitamin B12 (cobalamine)
Source : Meat, eggs
Function : RBC formation
Deficiency : Pernicious Anemia

Q. OPTIC Fibres.

Optic fibres are thin, flexible, transparent fibres made of glass or plastic that transmit light signal using principle of Total Internal Reflection.



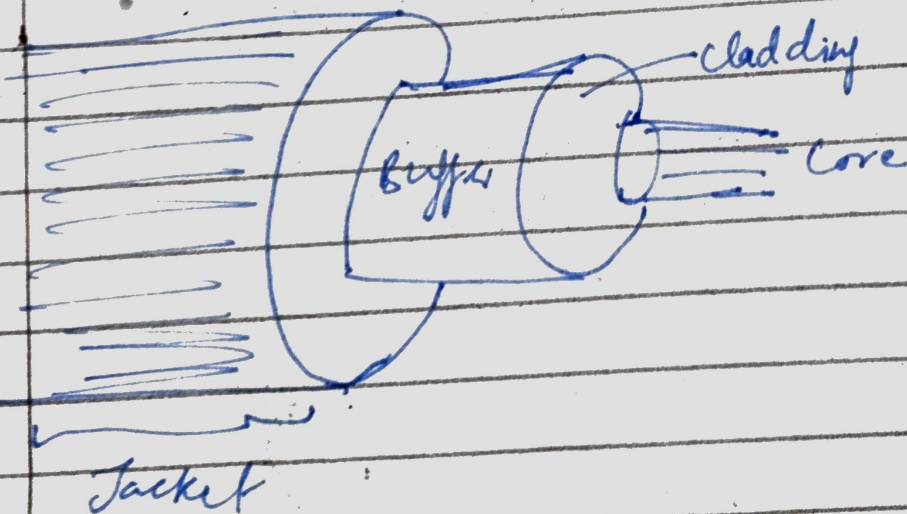
Light is reflected back into core, keeping it contained and guiding it along fiber.

Components of Fibre Optic

- 1- Core : Central part carries light
- 2- Cladding : surrounds core (reflection)
- 3- Buffer coating : Protects cladding
- 4- Jacket : outermost protective layer

Types:

- Single Mode : For long distances
- Multi mode For shorter distances
- Hollow core : Newer types where light travels via air with low latency.



Working

- ① light conversion
- ② Transmission

Advantages:

- Low Signal Loss
- High Bandwidth
- High Speed

Uses

- Telecommunication
- Medical Imaging
- Sensors
- Industrial use
- Military & Security use

d) Water pollution

Introduction of harmful substance into water bodies, making it unsafe for humans, animals and aquatic life.

Sources

- Industrial Effluents
- Agriculture Runoff
- Oil Spill
- Domestic Sewage & Garbage

Types

Chemical Pollution: Heavy metals, pesticides, Acid rain into water

Biological Pollution

Bacteria, Algae blooms in water

Physical Pollution

(Plastic waste, oil spill in water)

Controlling Measures

- 1- Waste-water Management: waste should not be discharged into rivers. Instead disposal system should be regulated.
- 2- Use of Ecofriendly fertilizers: Fertilizers which are natural should be encouraged and seepage should be controlled.
- 3- Public awareness and sanitation program

People should be aware of proper sanitation and consequences of polluting water.

Legislation & Monitoring :

Laws should be formulated to prevent industrial discharge of toxic chemicals into water bodies.

Cleanup programs.

Removing plastics and physical substances with artificial intelligent robot. Should be initiated.
