

Question #2

a) Water pollution, types, and measures

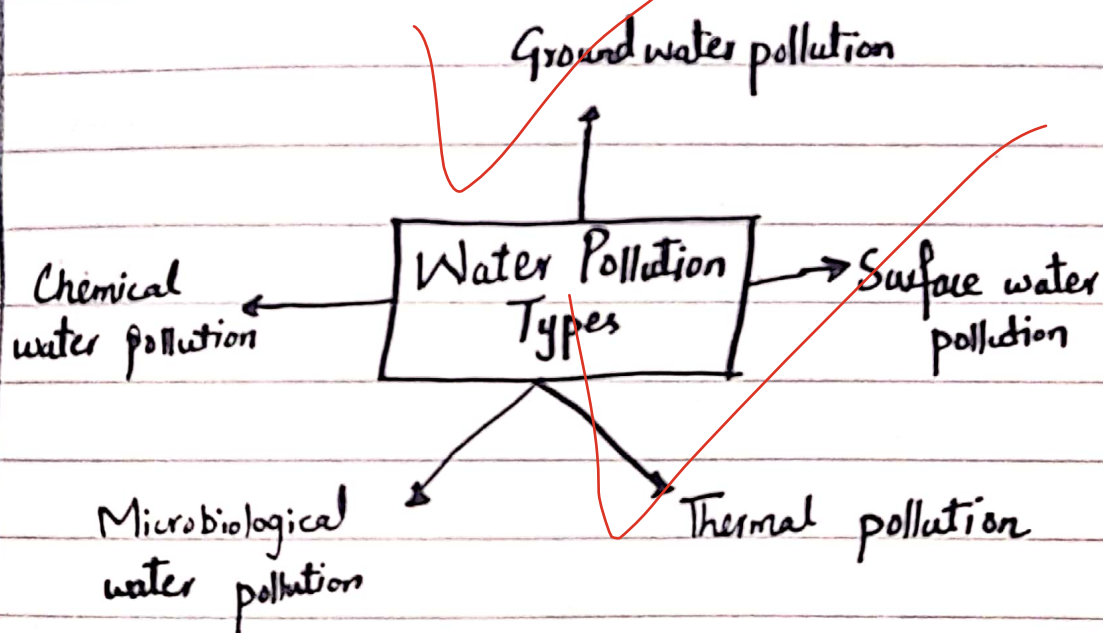
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↳ Definition of Water Pollution

"When harmful substances, often chemicals or micro-organisms, contaminate a stream, river, ocean, lake, aquifer, or other water body, degrading water quality and rendering it toxic to humans and the environment is called water pollution."

~ World Health Organization

↳ Types of Water pollution



i) Ground water pollution

Groundwater is the water that fills the spaces between soil, sand, and rock underground. When pollutants seep into this water, they contaminate this underground water supply. It is called groundwater pollution.

ii) Surface water pollution

It is a type of water pollution, in which harmful substances enter visible bodies of water, such as rivers, ponds, lakes, oceans, and reservoirs, ultimately contaminating these water bodies.

iii) Microbiological water pollution

It is a form of water pollution in which disease causing microorganisms, like bacteria, viruses, and parasites, enter water sources, as a result, contaminate them.

↳ Measures to control water pollution

i) **Chemical treatment.** In this treatment, water pollution is treated with chemicals like chlorine. ^{water tanks} Hospitals and swimming pools are often treated through this method.

ii) **Bioremediation.** In this method, micro-organisms, like bacteria and fungi, are used to degrade or detoxify organic pollutants in water.

iii) **Phytoremediation:** In this method, plants are used to absorb, stabilize, or degrade contaminants that are present in water.



b) Cell and difference between plant, animal, and micro-organismic cell

↳ Cell

"Cell is the smallest functional unit of life, present in all living organisms. It was first discovered by Robert Hooke."

Cell theory Says

all living organisms
are made up of
cells.

Cells are
produced from
pre-existing cells.

Cell is a
basic unit
of life.

→ Difference between plant, animal, and micro-organismic cell

Plant cell

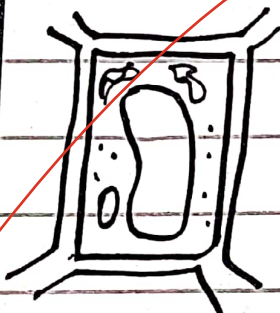
Cell wall present

One large vacuole

Nucleus is present

Large in size

Circular DNA



animal cell

No cell wall

Small or no vacuole

Nucleus is present

Small in size

Circular DNA



Microorganismic cell

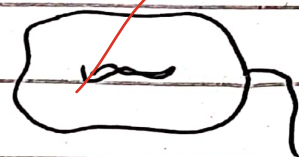
Some micro-organisms like
bacteria and fungi have
cell wall but protozoa
do not have cell wall

Small vacuole

Nucleus absent in bacteria

Microscopic in size

Dispersed genetic material



c) Process of food digestion in human body

The digestion of food in human body is done through the process of digestion in which food is broken down into small, absorbable nutrients. It involves several organs working together. These steps are discussed below.

i) Mouth helps in mechanical and chemical breakdown

It is the initial step, in which through chewing food breaks into small pieces. Then the saliva through amylase enzyme in mouth begins breaking down. Finally, the tongue forms the food into bolus and pushes it to Throat.

ii) Esophagus

Food moves down the esophagus through a motion called peristalsis. Esophagus only facilitates the movement of bolus towards stomach. No actual digestion occurs here.

iii) Stomach

The stomach mixes food with gastric juices. It churns the food into a semi-liquid called chyme through hydrochloric acid and pepsin enzymes.

iv) Small intestine

It is three parts duodenum, Jejunum, and ileum, each with specific function. In duodenum, most of the chemical digestion occurs. And in jejunum and ileum, there are thin finger like projects called villi which absorb nutrients.

v) Large intestine

In large intestine, absorption of water and electrolyte takes place. And the remaining waste become feces.

vi) Rectum and anus

It is a last step, in which feces are stored in rectum and expelled through the anus by excretion during defecation.

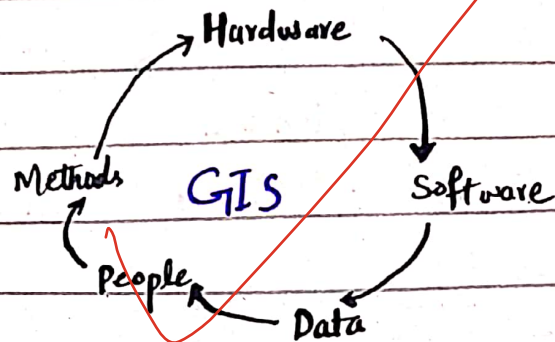
d) GIS and its environmental applications

Definition of GIS

GIS stands for Geographic Information System. It is a computer based tools that examines the spatial relationships, patterns, and trends in geography. GIS store, analyze, and

visualize data for geographic positions
on Earth's surface.

↳ Component of GIS



↳ Environmental Applications of GIS

i) GIS tracks air pollution, water quality, and soil contamination and identify pollution hotspots.

ii) It helps in mapping forests, minerals, water bodies, and wildlife habitats for planning sustainable use of natural resources.

iii) It also predicts and maps areas prone to floods, earthquakes, storms, etc.

iv) GIS also monitors deforestation, urbanization

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and agricultural expansion to support
conservation strategies.

v) Lastly, GIS also helps in assessing how
proposed projects will affect the environment,
which is helpful in EIA.

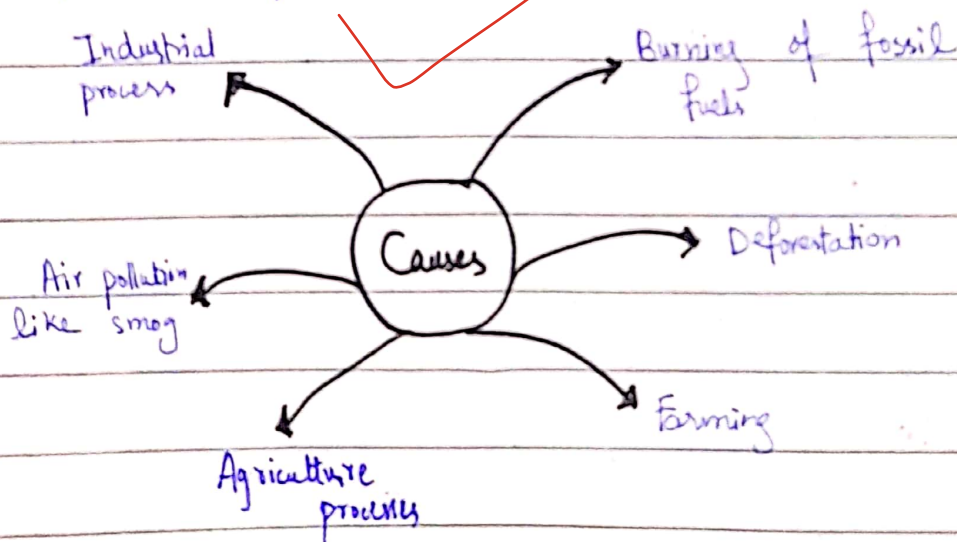
Question #1

Enhanced GHE in context of global warming

↳ Definition

The enhanced Greenhouse Effect (GHE)
refers to the increase in Earth's
natural greenhouse effect due to higher
concentration of greenhouse gases, like CO_2 ,
 CH_4 , and N_2O , released due to human
activities.

↳ Causes of enhanced GHE



↳ Role of enhanced GHE in global warming

i) Due to enhanced GHE, the average global temperature rises. as it does not allow GHGs to escape from Earth's surface.

ii) This rise in temperature of Earth's atmosphere is called global warming.

↳ Effects of enhanced GHE

i) It causes rise in global temperatures above 2°C .

ii) Due to it, the glaciers and ice-caps are melting.

iii) It also increased the frequency of floods, heatwaves, and droughts.

iv) It caused shifts in climate pattern.



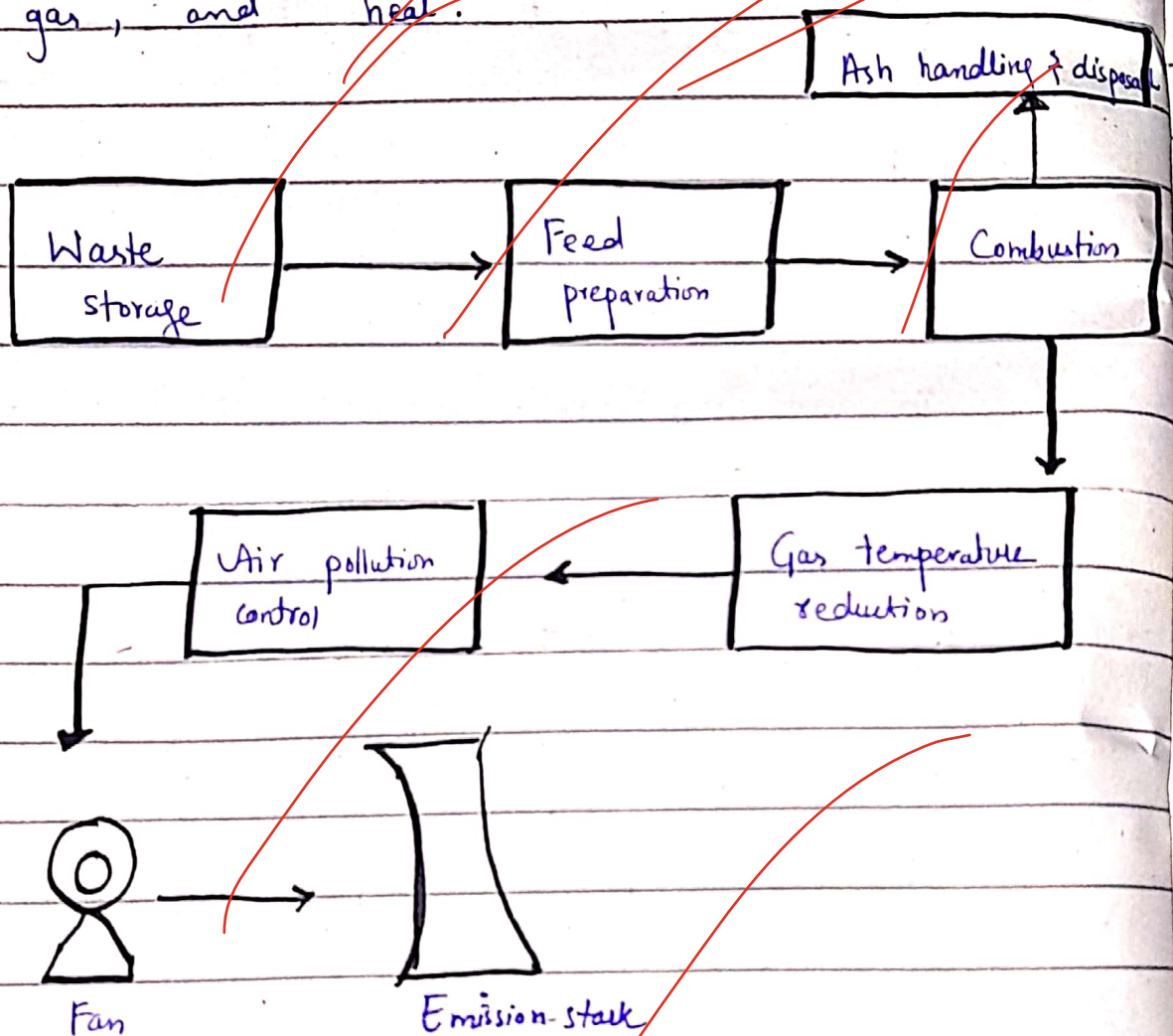
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c) Waste disposal techniques

There are various waste disposal techniques. Some of them are discussed below.

i) Incineration

It is a process in which waste is burned at high temperatures to reduce its volume and convert it into ash, gas, and heat.



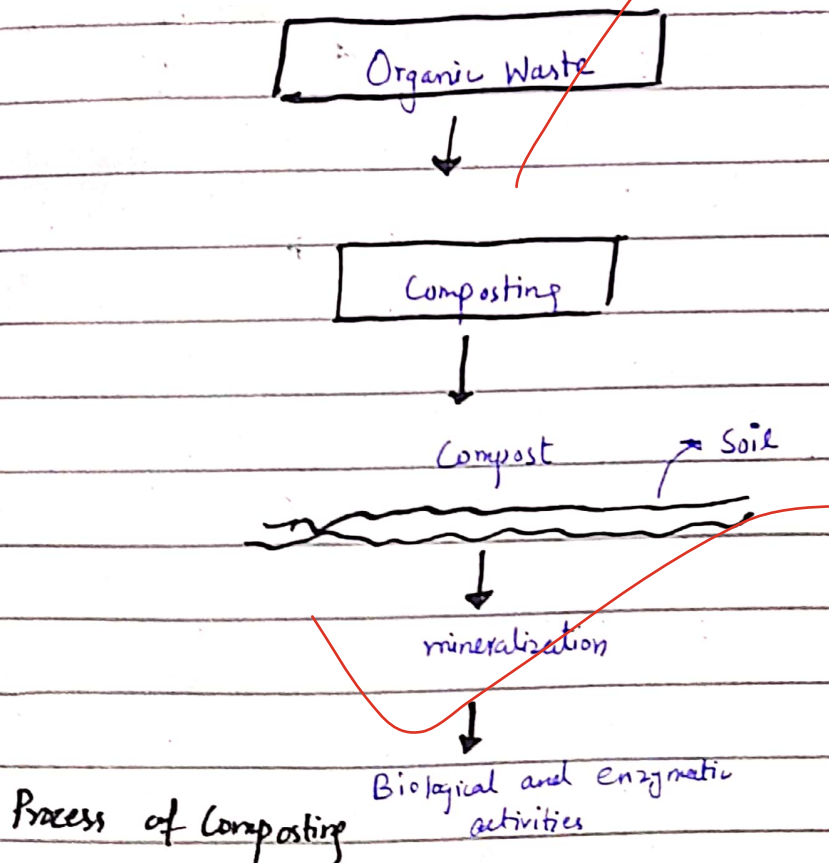
Process of incineration

ii) Landfilling

Landfilling is the engineered, final disposal of waste in lined cells designed to isolate waste from soil, groundwater, and air with systems for leachate treatment.

iii) Composting

Composting is aerobic biological conversation of segregated waste into stable compost for soils. In it, micro-organisms, primarily bacteria and fungi, break down the organic waste in the presence of oxygen, water, CO_2 , and nitrogen sources.



in Biomethanation

It is a microbial process that converts organic material into biogas under anaerobic conditions. This process is also known as anaerobic digestion.

Process of biomethanation

