Mock Test Series Batch-2
CSS-2025 (October 2024)
GK-I (General Science & Ability) Test-2
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INSTRUCTIONS
*SOLVE Any **TWO** of the following questions*
ALLOCATE 40 minutes to each question
ANSWER all parts of the question
ASSIGN proportionate weightage to each part
*Each question carries **TWENTY** marks*

Test 2
Question 1

A) Explain the working of human heart. (5)

B) Why Global warming is a threat? (5)

C) Why liver is considered as a chief chemist of the body? (5)

D) Explain the GHE. (5)

Question 2

A) Write a short note on enzymes. (5)

B) Explain the filtration of blood. (5)

C) Explain Air pollution & give its controlling measures. (5)

D) Write a short note on remote sensing. (5)

Question 3

A) What is Dengue? Give its preventive measure. (5)

B) Explain the waste disposal methods. (5)

C) Explain the working of Mobile phone. (5)

D) Explain the following: (5)
  i.   Cell Wall
  ii. Cell membrane
  iii. Plastids

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GSA

Question 2:

(a) Enzymes:

Introduction:

Enzymes are defined as "Proteinaceous substances present in the human body which perform the function of catalyzing metabolic reactions taking place in the body."

Enzymes speed up chemical reactions and in their presence metabolic activities become millions of times faster. Examples of enzymes include pepsin, amylase, cellulase and urease etc.

Working of enzymes:

Enzymes are highly substrate specific. The model of their working is called lock and key Model. They fit a substrate just as a key fits a specific

lock.

Active site of an enzyme is the part which actually takes part in a chemical reaction, whole enzyme does not become attached to a substrate.
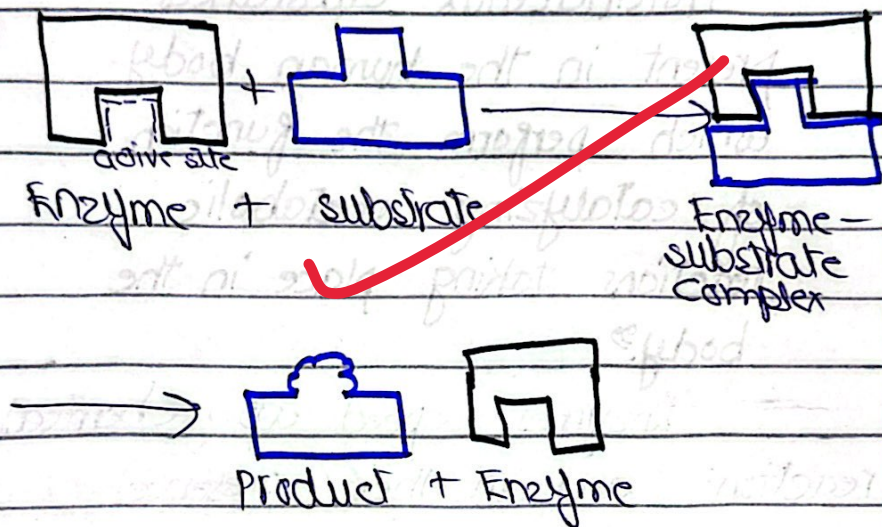

Figure 1: Lock and key model

Once an enzyme has catalyzed a reaction, it becomes available for taking part in another reaction

Apoenzyme and Holoenzyme:
The nonprotein part of an enzyme is called a cofactor. The protein part alone is called an

apoenzyme. The protein part along with the cofactor makes holoenzyme.

Factors that affect enzyme activity are

1. Temperature
2. pH
3. Substrate concentration

Uses of enzymes:

1. Enzymes help in digestion in human body. e.g. Pepsin digests proteins, amylase digests sugar and lipase ~~suga~~ digests lipids etc.

2. Enzymes are involved in almost all the metabolic pathways of the body e.g. glycolysis.

3. Enzymes find uses in industries like

(a) paper industry
(b) food industry
(c) Agroprocessing
(d) Rubber industry etc.

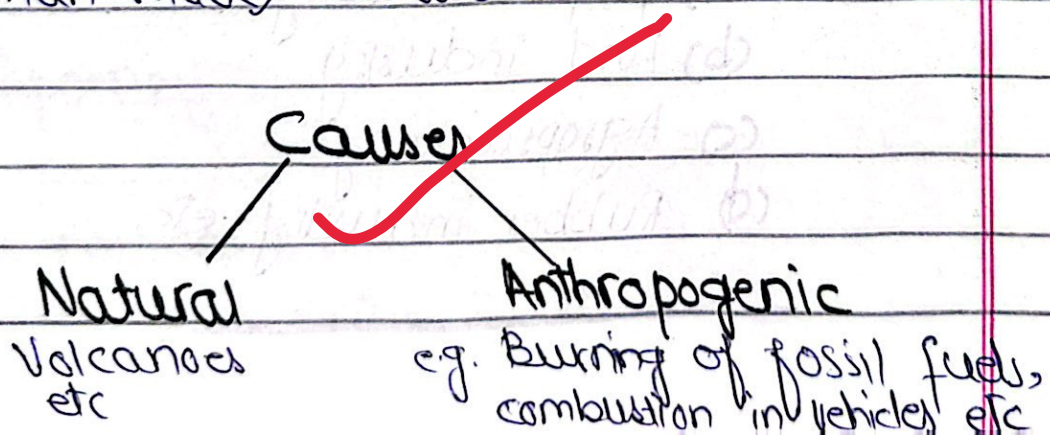(c) Air pollution and its controlling measures:

Introduction:

Air pollution is defined as

"Any modification or degradation of physical, chemical and or biological properties of air which is harmful for humans and other organisms."

Two types of air pollutants pollute the air. These are primary pollutants like SO_2 and NO_x etc and photochemical secondary pollutants like photochemical smog.

Sources of air pollution:

Air pollution is caused by natural as well as anthropogenic (man made) causes.

Causes

Natural
Volcanoes etc

Anthropogenic
e.g. Burning of fossil fuels, combustion in vehicles etc

Effects of air pollution:

Air pollution affects land and water as well.

1. Air pollutants like SO_2 and NO_x become reason of acid rain causing buildings and fertile lands to destroy.

2. Air pollutants accompanied by rain modify the characteristics of soil when that rain falls on the ground.

3. Air pollution causes diseases in humans like

   (a) Irritation of eyes and throat
   (b) Respiratory difficulty
   (c) Dizziness

4. Air pollutants like CO_2 and CH_4 cause global warming. In the long run rapid climate change ensues which poses an existential threat to humans.

Controlling Measures for Air Pollution:

1. Source control is the way forward if air pollution is to be controlled.

2. A shift towards renewable energy sources is required.

3. Use of fossil fuels as an energy source should be reduced.

4. Devices like catalytic convertors and scrubbers should be used in by vehicles and industries to check the emission of pollutants like SO_2.

5. Adherence to protocols like Kyoto Protocol should be ensured.

(d) Short note on remote sensing:

Introduction:

Remote sensing is defined as

"The process of collecting, analyzing, manipulating and managing the data related to inaccessible areas through

the use of sensors and an illumination source.

Components of remote sensing:

1. **Illumination source:**

   A source to illuminate the target is the first component, sun is used as an illumination source.
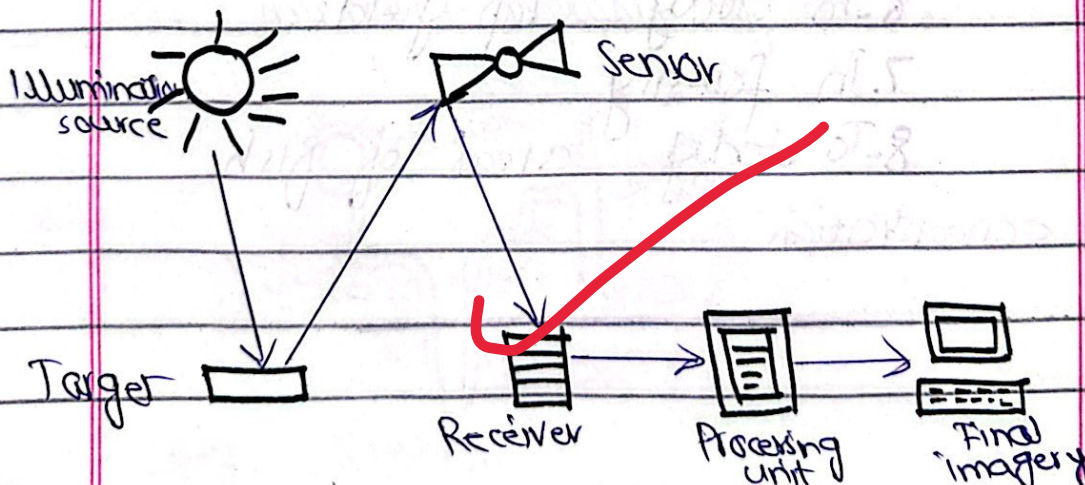
2. **Target:**

   Light radiation interacts with the atmosphere and illuminates the target.

3. **Sensors:**

   Emitted or reflected energy is sensed by sensors like satellites.

4. **Receiver unit:**

   Sensors send this information to receiver unit.

Illumination source — Sensor — Target — Receiver — Processing unit — Final imagery

5. Processing unit:
It processes the obtained data.

6. Final imagery:
Final imagery is obtained and stored for further use.

Uses of remote sensing:
1. To study the topography of Earth
2. To study geological structures of Earth.
3. To obtain information regarding disaster struck areas.
4. To study impact of wars e.g. Pre and post war imagery from Gaza.
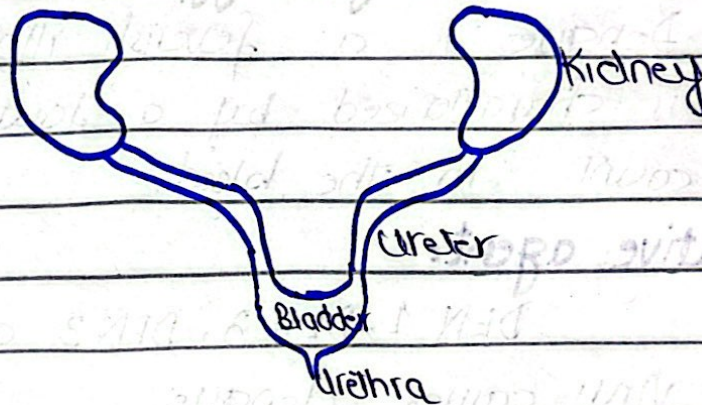5. To view relatively inaccessible areas of Earth.
6. To study crop yields.
7. In forestry.
8. To study areas of fish concentration

(b) **Filtration of blood:**

Blood is filtered by the kidneys which remove the nitrogenous wastes of the body through excretory system.

— Kidneys are bean shaped organs which filter blood.

Nephrons:

They are the basic units of kidneys which perform the function of blood filtration through an intricate network of tubules.
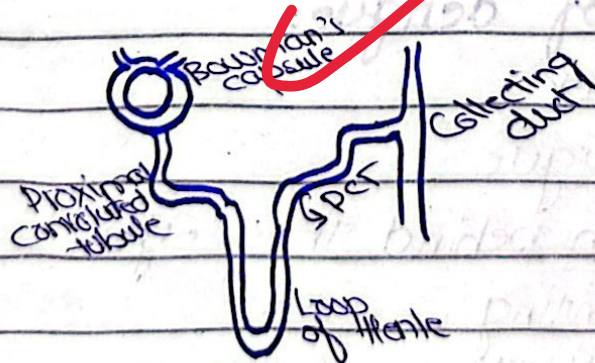

fig: Nephron

Discuss in more detail and relate your headings to the qs statement

Question 3:

(a) **Dengue and its preventive measures:**

Introduction:

Dengue is defined as "A viral infectious illness caused by one of four strains of dengue virus and transmitted through the vector Aegis aegypti."

Dengue is a feverish illness which is characterized by a low platelet count in the blood.

Causative agent:

DEN 1, DEN 2, DEN 3 or DEN 4 virus causes dengue.

Transmission:

Dengue is transmitted when an infected female mosquito Aegis aegypti bites a healthy person.

Symptoms of dengue:

1- Fever
2- Fatigue
3- Pain behind the eyes
4- Vomiting
5- Nausea

6. Problems in blood coagulation
7. Muscle and joint pain etc

Preventive measures:
1. Vector control is the way forward to prevent dengue from spreading.
2. Habitats for mosquitoes should be destroyed.
3. Aegis mosquito is active during day time. Preventive measures like window screens, mosquito repellents and full sleeved clothes should be enforced.
4. Staying indoor in the early morning and before dusk proves helpful.
5. Water containers should be regularly emptied.
6. Spraying insecticides also helps in prevention.
7. Unplanned urbanization should be discouraged.
8. Wastes should be properly disposed off.

(b) Explanation of waste disposal methods:

Introduction:

These methods are employed to properly gather, transport, process and eventually dispose off waste products. These methods are institutionalized and supervised. In addition they require trained staff. Some of the waste disposal methods are:

1. Solid Waste Management
2. Landfill Method
3. Incineration
4. Open dumping
5. Composting

1. Solid Waste Management:

"It is the supervised process of collection, recovery and disposal of solid wastes, and is properly institutionalized."

Steps:

1- Collection: Collection from houses, hospitals and industries etc is done.

2. Transport: Wastes are transported to a central facility through vehicles.

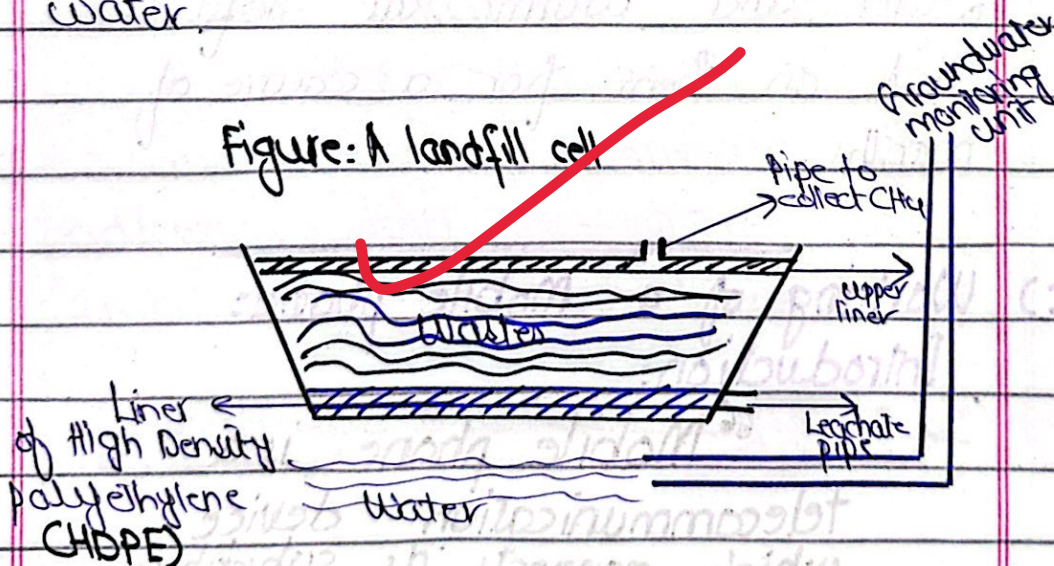**3. Recovery:** Recyclable waste is separated and recovered.

4. Disposal: Finally, the wastes are disposed off.

2. Landfill Method:

"Landfills are properly designated areas where wastes are disposed and then covered to avoid contact with surroundings."

Landfill cells:

Acres long landfill cells are lined properly to avoid leachate from the cell contaminating ground water.

Figure: A landfill cell

Liner of High Density Polyethylene (HDPE)

Water

Pipe to collect CH₄

Groundwater monitoring unit

upper liner

Leachate pipe

Wastes

3- Incineration:

"It is the burning of solid wastes at temperatures as high as 1000°C to reduce the volume of waste."

4. Open dumping:

"Open dumping is a highly discouraged method of disposing wastes. Wastes are dumped in open plains."

5- Composting:

"It is the use of biological agents like bacteria and worms which degrade wastes biologically."

Wastes are mixed with water and worms are left to act on them for a course of months.

(c) Working of a Mobile phone:

Introduction:

"Mobile phone is a telecommunication device which connects its subscribers through networking."
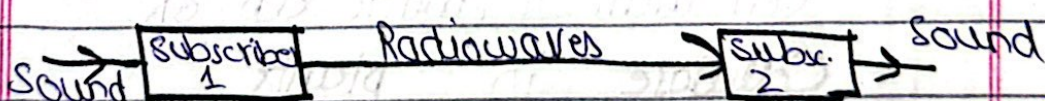
Working of a mobile phone:

1. Law of conservation of energy is the working principle of a mobile phone. Energy can be converted from one form to another but cannot be destroyed.

2. Mobile phone uses radiowaves for its working. These waves are electromagnetic waves having greatest wavelengths but lowest energy and frequency.

3. Networking of mobile phones is cellular. Mast and base stations receive and trasport data, and carry out modulation respectively.

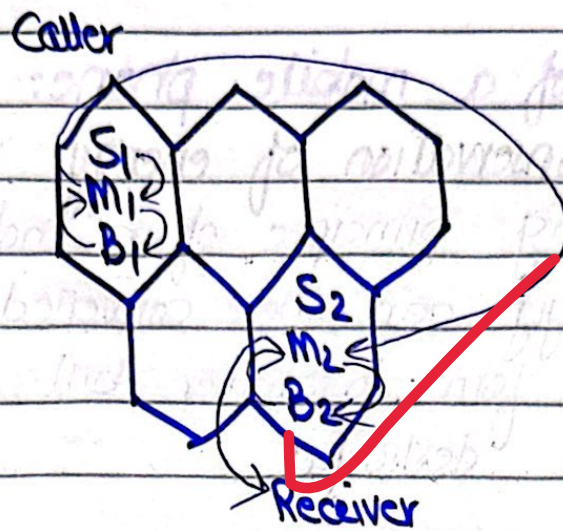4. Sound energy is converted into radiowaves and then again into sound waves to transmit data.

Sound → | Subscriber 1 | ── Radiowaves ── ⟩ | Subr. 2 | → Sound

Fig: Cellular networking of a mobile phone.

(d) Introduction:

Cell wall, cell membrane and plastids are components of cells of organisms. Following is their explanation:

Cell wall:

"Cell wall is the outermost covering of plant, fungal and microbial cells, but it is absent in animal cells."

Cell wall is made up of

Cellulose in plants
Chitin in fungi
Peptidoglycan in Bacteria.

It gives cells their shape and protects from mechanical trauma.

Cell Membrane:

Cell membrane is defined as "The outermost covering in animal cells but second outermost in plant, bacterial and fungal cells which is mostly involved in cellular transport of materials across the cell."

Structure:

It has a lipid bilayer made of phospholipids with proteins embedded in between. Its structure can be explained by Fluid Mosaic Model.

Glycan part

Phospholipids

Embedded proteins
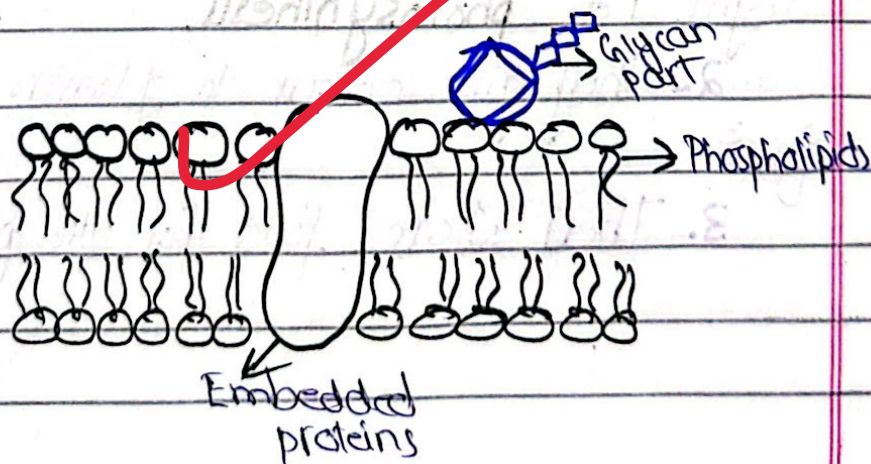
Functions:

1- It controls the transport of molecules across the cell.
2- It is selectively permeable.
3- It allows propagation of nerve impulses.
4- Phagocytosis (cell eating) and pinocytosis (cell drinking) take place through cell membrane.
5. It maintains the concentration gradient.

Plastids:

"They are double membrane bound organelles present only in plant cells."

Functions:

1. They allow synthesis of food and energy in the presence of light i.e. photosynthesis.
2- They give colour to flowers and fruits.
3. They store food for the plant.

Types:
1. **chloroplast**: It contains the green pigment chlorophyl involved in photosynthesis.
2. **Chromoplast**: They give colour to petals of flowers and fruits.
3. **Leucoplast**: They store food for roots of plants.

Good answers!!!