

Mild symptoms:

1. Fever
2. Headache
3. Painful joints and muscles
4. Fatigue
5. Nausea and vomiting

Severe symptoms:

1. Severe bleeding
2. Low blood platelet count
3. Plasma leakage
4. Respiratory distress
5. Abdominal pain

Prevention:

Prevention measures include:

1. Mosquito Control
2. Personal protective equipments
3. Vaccination
4. Vector control programs

(Ans b)

Dark Matter:

Dark matter is an invisible form of matter that does not emit light, absorb or reflect and does not interact with normal matter. It accounts for more than 27% of the universe's mass-energy density.

Properties of Dark Matter:

1. Invisible

It does not interact with light.

2. Collisionless

It does not interact with normal matter.

3. Cold

It moves slowly as compared to normal matter.

4. Stable

It is composed of long-lived or stable particles.

Dark Energy:

Dark energy is a mysterious component that causes the universe expansion to accelerate and makes up approximately 68% of the universe mass energy density.

Properties of Dark Energy:

1. Repulsive:

It causes the expansion of universe to accelerate due to repulsive in nature.

2. Negative Pressure:

It has negative pressure opposite of the normal matter positive pressure.

3. Constant or varying:

Its density may change over time.

Theories about Dark Energy:

1. Cosmological Constant
2. Quintessence
3. Phantom energy

(Ans C)

Mitochondria:

Mitochondria are the membrane bound organelles found in eukaryotic cells, playing a crucial role in generating energy for the cell through cellular respiration.

Structure of Mitochondria:

1. Outer membrane

It is smooth, allowing certain substances to pass through.

2. Inner membrane:

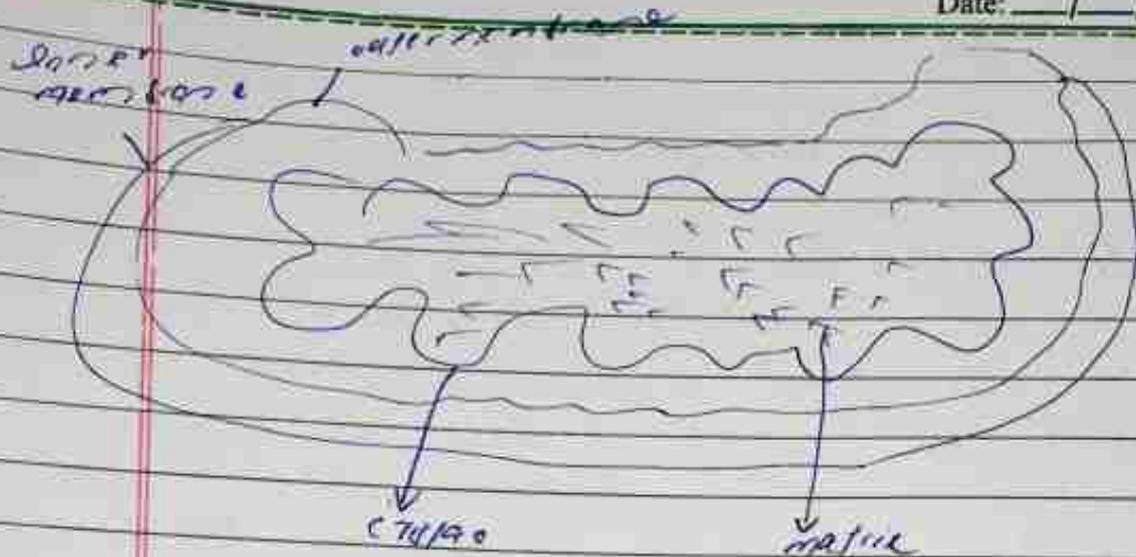
It is folded into cristae, increasing surface area for energy production.

3. Mitochondrial matrix:

Densest compartment, containing enzymes and mitochondria.

4. Cristae

Infoldings of inner membrane, enhancing energy production.



Mitochondria

Functions of Mitochondria:

1. Cellular Respiration:
It converts glucose into ATP the cell's primary energy source.
2. Energy Production:
Mitochondria generate ATP through oxidative phosphorylation.
3. Redox Reactions:
It facilitates in electron transport chains.

Mitochondria as a Power House:

By keeping in view the above functions of mitochondria like energy production, cellular respiration and redox reactions, it acts as a power house of a cell.

(Ans d)

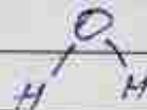
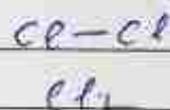
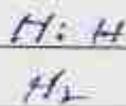
Covalent Bonds:

Covalent bonds are chemical bonds between atoms that share one or more pair of electrons to form a stable molecule.

Types of Covalent Bonds:

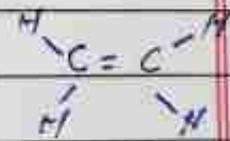
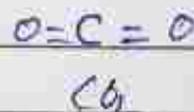
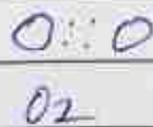
1. Single Covalent Bonds:

One sigma bond exists
eg C-C

H₂O

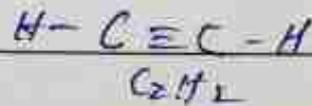
2. Double Covalent Bonds

share two pairs of electrons. eg O₂, CO₂

C₂H₄

3. Triple Covalent Bond:

share three pairs of electrons.
eg N₂, C₂H₂



Factors Affecting Covalent Bond Formation:

1. Atomic radius
2. Electronegativity
3. Valence electrons
4. Orbital overlap



Q. NO. 03

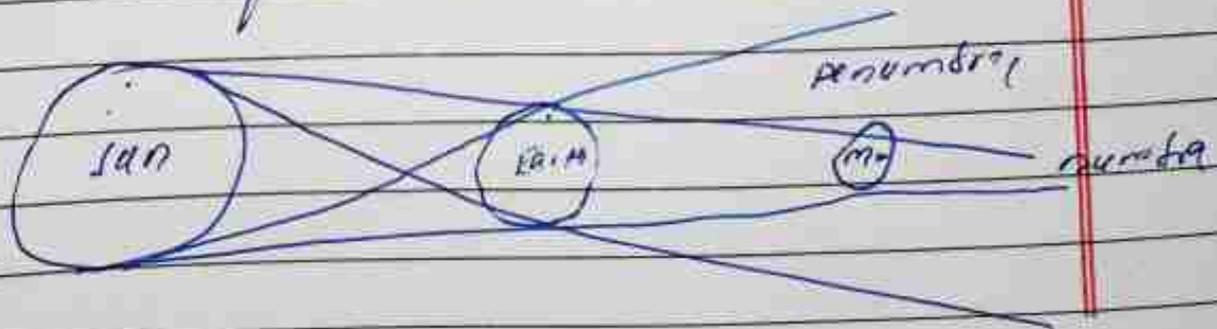
(Ans a)

Lunar Eclipse:

A lunar eclipse occurs when the earth comes between the sun and the moon blocking the sunlight that normally reflects off the moon surface.

Types of Lunar Eclipse:

1. Penumbral Lunar Eclipse
Earth's partial shadow falls on the moon.
2. Partial Lunar Eclipse
Earth's partial shadow falls on the moon.
3. Total Lunar Eclipse
Earth's complete shadow falls on the moon.



Conditions for Lunar Eclipse:

1. Full moon
2. Earth, moon, sun aligned
3. Moon in Earth's umbra or penumbra

Frequency and Duration:

1. Occurs twice a year
2. Total lunar eclipse lasts around 70-100 minutes.

Observing a Lunar Eclipse:

1. Visible from anywhere on the earth's night side.
2. No special equipment needed
3. Safe to observe without eye protection.

(Ans 6)

Enzymes:

Enzymes are biological molecules, typically proteins, that catalyze specific chemical reactions in living organisms.

Enzyme structure:

1. Active site

Specific region where substrate binds.

2. -Substrate-binding

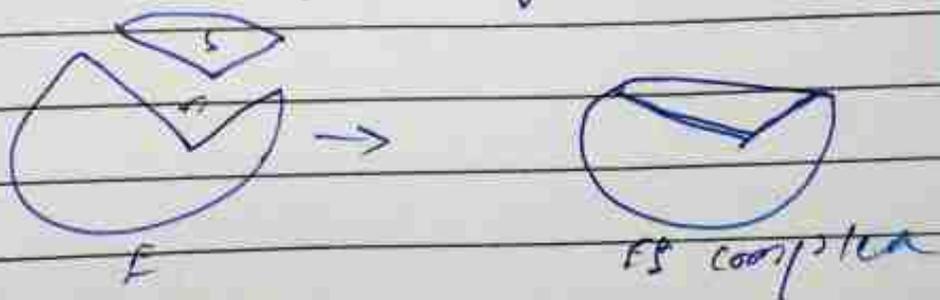
Enzyme-substrate complex formation.

3. Catalytic site

Region where chemical reactions occur.

4. Co-enzymes

Non-protein molecules assisting enzyme function.



Functions of Enzymes with Examples:

1. Amylase

Breaks down starch into sugars.

2. Lactase:

Hydrolyses lactose into glucose and galactose.

3. DNA Polymerase:

Synthesises DNA during replication.

4. Proteases

Breaks down proteins into peptides.

5. Catalase:

Decomposes hydrogen peroxide into water and oxygen.

(Ans c)

Electromagnetic Radiations (EMR):

It consists of waves of electric and magnetic fields that propagate through space carrying energy.

Characteristics of EMR:

1. It consists of electric and magnetic field components.
2. Exhibits both wave like and particle-like behaviour.
3. Travels at speed of light.
4. Frequency and wavelength related by $c = f\lambda$.

EMR Spectrum:

EMR spectrum ordered from low frequency (long wavelength) to high frequency (short wavelength).

Radio waves: long wavelength, low energy, used for communication.

Microwaves: heating and cooking applications

Infrared Radiations: Used for thermal imaging and heating.

Visible light: visible to human eye

UV radiations: tanning, cause chemical reactions

X-Rays: medical imaging, high energy applications

Gamma Rays: nuclear reactions, high energy physics.

Sources of EMR:

Natural: sun, stars, earth

Human made: Radio transmitters, lasers, ovens.

Wavelength



Micro-

Gamma

(Ans 4)

Connections between Earthquakes and Volcanic Eruptions:

Yes, there exists a link between earthquakes and volcanic eruptions:

1. Shared Tectonic Setting:

Both occur at plate boundaries where tectonic plates interact.

2. Magma Movement:

Earthquake can trigger magma movement, leading to volcanic eruptions.

3. Volcanic Arcs:

Subduction zones where can produce both earthquakes and volcanic eruptions.

4. Gas Release:

Earthquake can release gases trapped in magma leading to increased volcanic activity.

SECTION - II

Q. No. 06

(Ans a)

Data:

values = 7, 8, 10, 9, 12

mean = 15

To find:

15 value = ?

Solutions:

$$\text{Mean} = \frac{\text{Sum of values}}{\text{Number of values}}$$

$$15 = \frac{7+8+10+15+12}{5}$$

$$15 \times 5 = 39 + 15$$

$$75 = 39 + 15$$

$$75 - 39 = 15$$

$$\boxed{36 = 15}$$

(Ans b)

Data:

Initial ratio of sugar solution and colored water = 4:3

After addition of 10 litres of colored water = 4:5

To Find: Initial quantity of sugar sol = ?

Solution:

Sugar solution = $\frac{4}{7}$ Coloured water = $\frac{3}{7}$ After 10 litres addition of
coloured waterSugar solution = $\frac{4}{9}$ or $\frac{10}{10}$ Coloured water = $\frac{7}{9}$ or $\frac{10}{10}$

$$\frac{4}{9} \times 10 = \frac{40}{9}$$

Solve quantity

$$\frac{40}{9} - 4$$

$$\frac{40 - 36}{9} = \frac{4}{9}$$

$$\frac{105}{21} = \frac{5}{1}$$

$$\frac{105}{21}$$

(Ans c)

Data:

$$199145 = 12 \text{ cm}$$

To find:

volume of football?

Solution:

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \times 22.14 \times (12)^3$$

$$V = 7234 \text{ cm}^3$$

(Ans d)

$$-10, -8, 6, 40, 102 \quad | \quad 113$$

Q. no. 08

(Ans a)

Data :

$$n = 7$$

To find :

charge = ?

Calculations :

$$\begin{aligned}\text{Charge} &= ₹20 + 4n \\ &= ₹20 + 4(7) \\ &= ₹20 + 28 \\ &= ₹48\end{aligned}$$

(Ans b)

- i) Recipe
- ii) Thyroxine
- iii) Arsee
- iv) Hospital
- v) Therapy

(Ans d)

$$\text{No. of triangles} = \boxed{36}$$

