

Part - II

Q2

a)

Denque Infection:

It is type of viral infection, which is caused by mosquito bite. It is transmitted to human beings through the bite of female mosquito.

Causative Agent:

The female mosquito *Aedes Aegypti* is the causative agent, which transmits dengue viral infection to human beings through its bite.

Variants of Dengue Virus:

There are four variants of Dengue virus (DENV). Each variant has different serotype e.g. DEN-1, DEN-2, DEN-3, DEN-4. This means that person can get infection four times ~~there~~ as there are four different variants.

Symptoms of Dengue Virus

There are numerous symptoms of dengue virus. It includes

- 1) High grade fever
- 2) Severe pain behind eyes.
- 3) Severe pain in bones and joints.

- 4) Sudden onset of Bleeding.
- 5) Rash on the body which last 2-5 days.
- 6) Nausea
- 7) Vomiting
- 8) Lethargy.

Severe Dengue or Haemorrhagic Dengue

It is the severe form of viral dengue infection that can result in death of the patient. In this stage, patients complain of following symptoms:

- 1) Severe bone pain with pain in abdominal region.
- 2) Hepatomegaly.
- 3) Bleeding from different parts of the body.
- 4) Lethargy.

Q

(b) Explain dark matter and dark energy:

Dark Matter:

It is form of energy that does not emit, absorb, or reflect light. It is present in the entire universe.

This energy acts as a **gravitational glue**.

It exerts gravitational impact of galaxies, and galactic planes and galactic clusters.

Fuction:

It keeps the galaxies together through existing gravitational pull.

It is believed that this energy occupies 28 percent of the universe.

Dark Energy:

Definition:

It is a hypothetical form of energy present in the universe. It occupies 68% of the universe.

Anti-gravitational impact:

This energy is responsible for the expansion of the universe. Therefore, it is considered as working against gravitational force.

Expansion of Universe :

Black Dark energy pushes the galaxies and other objects of universe away from the center of the universe.

c) Structure and Function of mitochondria.

Definition of Mitochondria:

It is the most important organelle of the cell. Mitochondria is responsible for manufacturing and utilization of energy of the cell. It is key organelle that produces energy, which is utilized in different metabolic process.

Mitochondria: As a Powerhouse of the cell:

It is known as powerhouse of the cell because it produces ATP (Adenosin Triphosphate). It is the main energy, which is utilized by the cells and the body.

Structure of Mitochondria:

It is bean shaped organelle with following structure

1) Outer Membrane:

Mitochondria consists of outer membrane which protects the organelle.

2) Inner Membrane

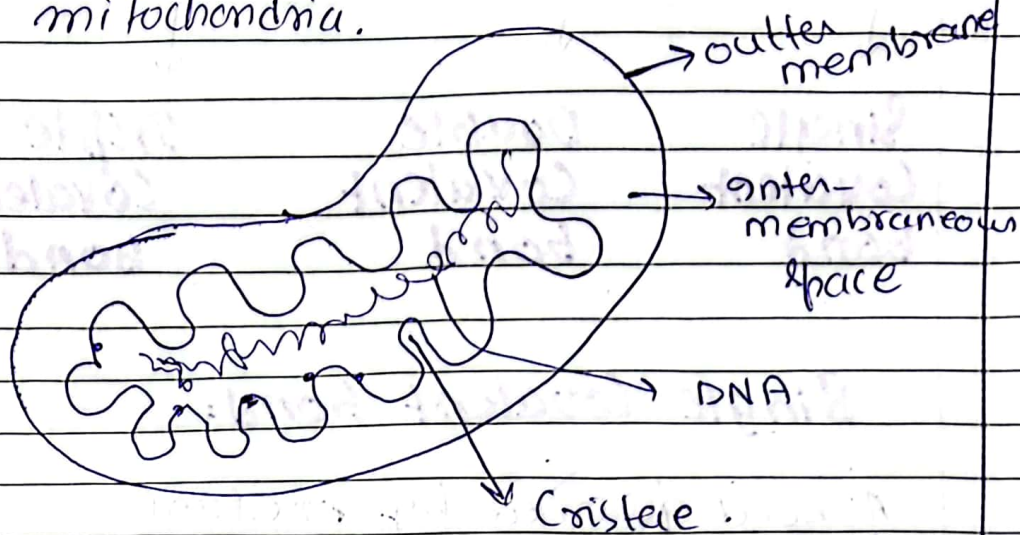
The inner membrane of the mitochondria protects DNA within it.

3) Cristae of mitochondria

These are the inner junctions present in within the spaces of inner membrane. It consists of small filaments.

4) DNA

It is the genetic material present ^{at} the center of mitochondria.



Structure of mitochondria.

Function:

It produces ATP which provides energy to the cell and the body.

(d) Covalent bonds and its types:

Definition of Covalent bonds:

Covalent bonds are the chemical bonds that are formed by the mutual sharing of electrons ~~from~~ between the atoms.

Types of Covalent bonds:

There are three types of covalent bonds formed by the

atoms of the molecules.

Types of Covalent bonds

Single
Covalent
bond

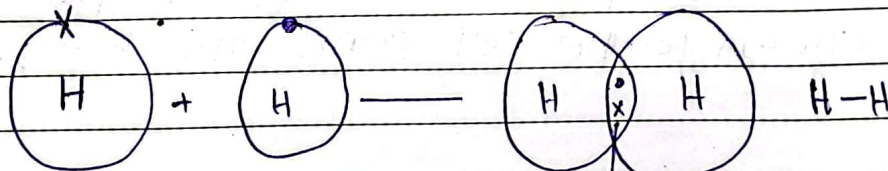
Double
Covalent
bond

Triple
Covalent
bond

Single Covalent bond:

A bond formed by mutual sharing of single electrons of the atoms of the two molecules.

Example: $H-H$



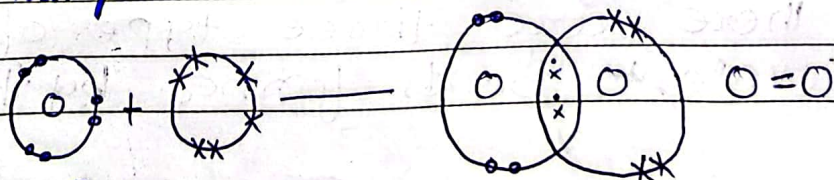
\therefore Hydrogen = 1

\rightarrow This depicts sharing of single electron.

Double Covalent bond

A bond formed by mutual sharing of two electrons of atoms of the molecules.

Example: $O=O$

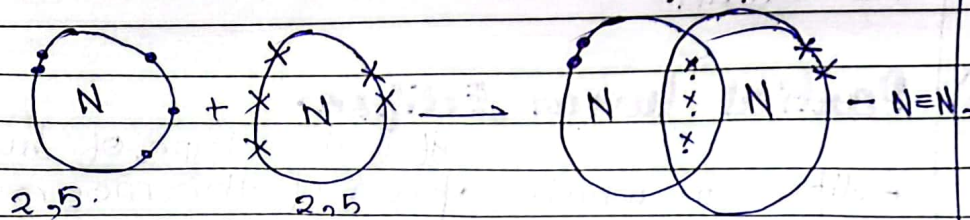


Oxygen = 2, 6

Triple Covalent bond:

A bond formed by sharing of three electrons of atoms of the molecule.

Example: $N \equiv N$



Q3 LUNAR ECLIPSE:

Definition:

It is a phenomenon in which the earth comes between the sun and the moon and it casts the shadow on the surface of the moon because of blocking the sunlight. This forms the lunar eclipse.

Characteristics of lunar eclipse:

- 1) It occurs or can occur two times a year.
- 2) It can be visible from earth during full moon.
- 3) It lasts from few minutes to half an hour.
- 4) It is safe to see lunar eclipse whereas it is dangerous to see solar eclipse.

Types of Lunar Eclipse:

1) Total Lunar Eclipse:

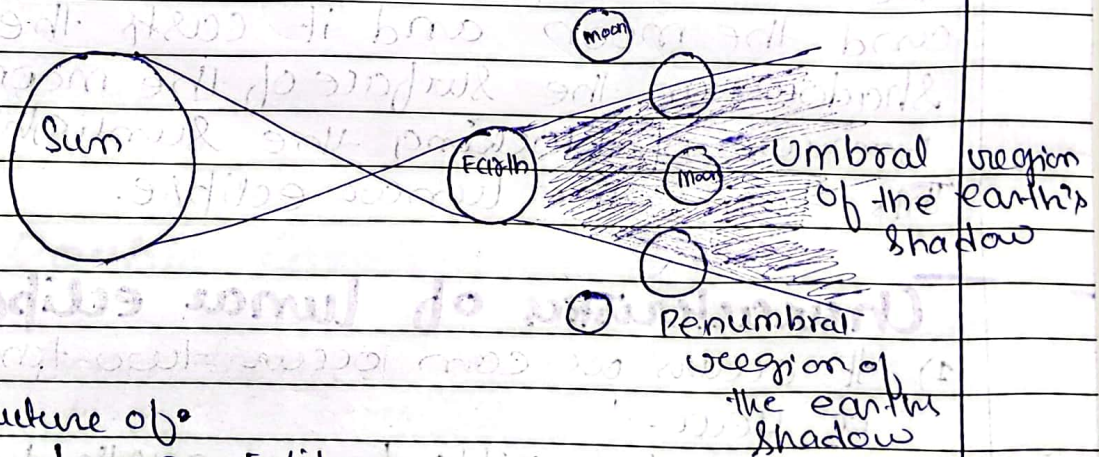
It is the type of lunar eclipse in which the moon enters the region of umbra of ^{earth's shadow} lunar eclipse. It completely obscures the sunlight by the earth.

2) Partial Lunar Eclipse:

It is the type of lunar eclipse in which part of the moon enters the region of umbra of the lunar eclipse earth's shadow.

3) Penumbral Lunar Eclipse:

It is the type of penumbral lunar eclipse in which the moon enters in the penumbral region of the earth's shadow.



(b) FUNCTIONS OF ENZYMES:

ENZYMES:

Definition:

Enzymes are proteins, which are used as catalyst; henceforth, they speed up the process of chemical reaction.

Functions of Enzymes based on their types:-

1) Digestive Enzymes:

These are the enzymes that are used for digestion of the food in living organisms.

For example: Protease enzymes are used for digestion of proteins and lipase are used for the breakdown of fats and lipids.

2) Enzymes used in detergent industry:

Enzymes are used in detergent industry for the formation of detergents.

For example: Amylase and lipase are the enzymes that are used in formation of detergents.

3) Enzymes used in bio-molecular process:

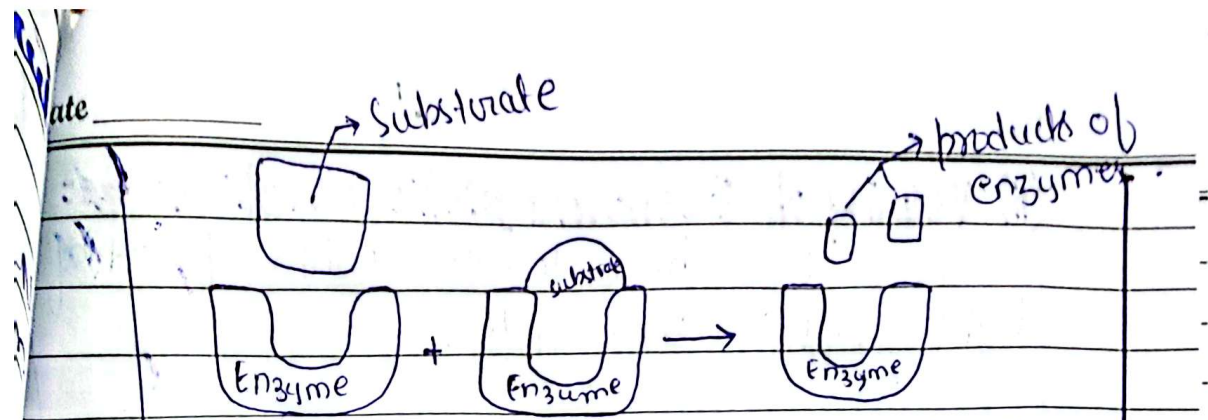
These enzymes are used in reactions involving DNA and RNA molecules i.e. in polymerase chain reactions.

For example:

Polymerase enzymes is used in PCR technologies to speed the reaction.

4) Agricultural industry:

Enzymes are used in speeding up agricultural process in agri-industry.



Structure of Enzyme showing lock and key mechanism of enzyme.

(c) ELECTROMAGNETIC RADIATIONS:

Definition:

Electromagnetic radiations are the radiations that are present everywhere in the universe and around us. These are present in the form of light rays, x -rays, gamma-rays and microwaves radiations.

Characteristics of Electromagnetic radiations:-

(i) Wavelength:

It is the measuring unit through which one estimates the distance of wave. It is measured by assessing the distance between two consecutive crests and troughs.

(ii) Velocity of Electromagnetic radiations:

These radiations travel with speed of light which is 3×10^8 m/s.

(iii) Deflection: These waves do not deflect in electric or magnetic field.

(iv) Medium: These waves do not need any medium to travel.

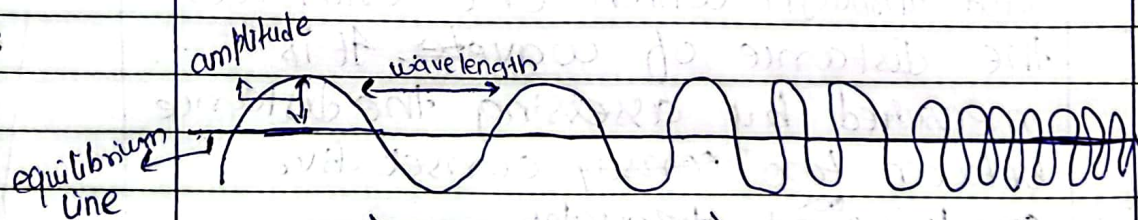
(v) Relation between frequency and wavelength:

Frequency is the number of waves emitted from the source in one second.

The relation between frequency and wavelength is that with the wavelength of electromagnetic waves decrease with and frequency of waves increases during the spectrum.

Electromagnetic Spectrum:

It is the spectrum that consists of electromagnetic waves. In this spectrum, with increase in velocity of the waves, the wavelength decreases and frequency increases.



with increasing velocity of the wave the wavelength decreases and frequency increase.

SECTION - II

Q6

(a)

$$\text{Mean} = \frac{\text{sum of value}}{\text{num of value}}$$

$$15 = \frac{9+8+10+k+12}{5}$$

find k value.

$$15 = \frac{39+k}{5}$$

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

$$75 = 39+k$$

$$75 - 39 = k$$

$$36 = k \rightarrow$$

Therefore, $k = 36$