Part-II
(Section-I)

Q#2:-

Q What is dengue? Give brief account of its causative agents and its symptoms?

Introduction:-

Dengue is a mosquito born viral disease that has rapidly spread in all regions in recent years - Dengue virus is trasmitted by female mosquito of vaious species. Aedes aegypti and to lesser extent Aedes. albopictus. This mosquito also transmits Chickengunya, yellow fever and Zika. Dengue is widespread through tropics and areas where rainfall occurs oftenly. It spreads through the accumulation of clean water storage areas.

Severity of Dengue & Causitive Agents:-

It vaires in severity. There are four specific stereotypes of virus that cause dengue DEN-1, DEN-2, DEN3 and DEN-4. It provides life long immunity of that specific type after the infection.

The Aedes Aegypti is a common vector of transmission of dengue. The virus is transmitted through the bites of infected female mosquito. As female mosquito needs human blood for their eggs maturation. After virus incubation time is 3 to 10 days.

After infection symptoms appear. In some cases people do not show symptoms

Infected people ~~may~~ also transmit infection to others via Aedes Aegypti after the appearance of symptoms.

Aedes mosquito bite during early morning time and at the dusk. There is no specific treatment for dengue.

Symptoms:-

Symptoms of dengue fever vary from person to person and from age to age. Symptoms include fever, flu, and the fever of 104°F a very high fever. along with severe headache and body pain. Pain behind eyes, in joints, muscle, vomiting, nausea and rash.

Symptoms last from 2 to 7 days after incubation period of 3 to 10 days.

Platelets count decreases to the dangerous level, fluid accumulated in respiratory tract - ~~The~~ If the temperature decreases to 100°C next 2 days would be more critical and better to see a doctor otherwise they may prove lethal.

Immunization and Prevention:-

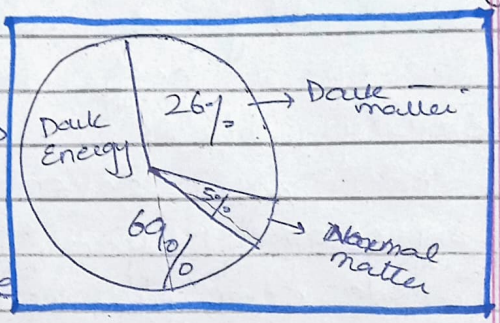
The first dengue vaccine was made in 2015 named as Dengvaxia (CYD-TDV) by Sanofi Pasteur. But at present main method is its prevention and control through the control of dengue virus by controlling its vector and spread

Conclusion:-

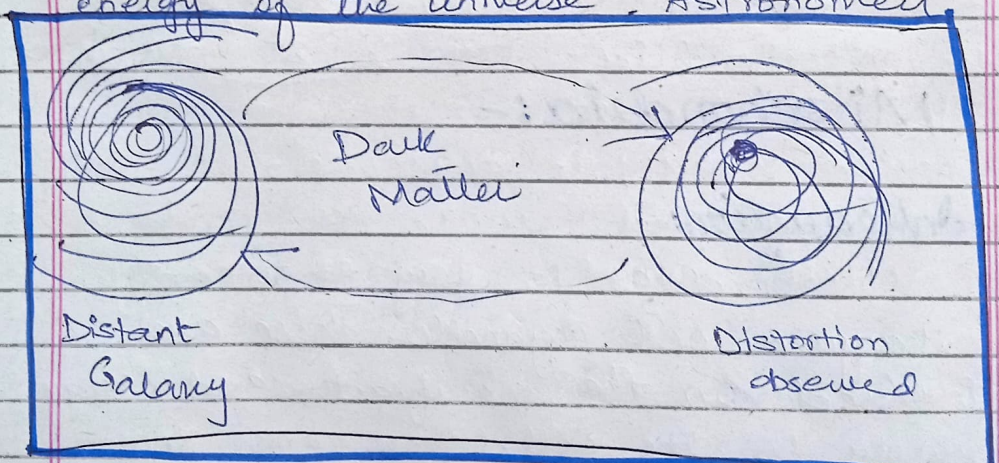
- Vector spread can be control through
- Prevent mosquito from accessing its egg laying environment e.g pots, tyres etc.
- Properly dispose off the solid wastes.
- Appling ~~fotets~~ insecticides and mosquito propellent sprays..
- Provide awareness
- Using personal protective equipments.

(b) Explain dark matter and dark energy.

Dark Matter:-



Dark matter makes up most of the mass of galaxies and galaxy clusters, and is responsible for the way galaxies are organized. Dark matter makes up 26% of all the energy of the universe. Astronomers



observed star bending and other objects bending. Initially they believe there is some kind of force but then it was discovered there is some dark matter present in it

which is dark and can not be seen directly. It do not emits light It is not an antimatter or Black Holes.

Dark Energy:-

Dark energy is basically a force and the fifth fundamental force known as gravity, electromagnetism and strong and weak nuclear forces. Scientists believe that universe is expanding constantly at different rates. Initially the first half life era begins slowly known as big bag explosion but after seven billion years ago, explosion began increasing rapidly. Dark energy is approximately 69% of the universe.

(c) Discuss the structure and function of mitochondria. How is it powerhouse.

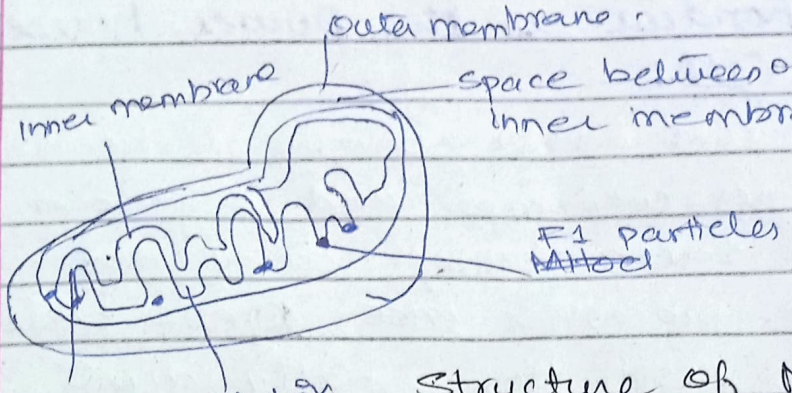
Mitochondria:-

Introduction:-

Mitochondria is very important eukaryotic cell organelle. These are involved in the manufacture and energy supply to the cell. These are known as Power House of the cell.

⇒ Under ~~electron~~ microscope, they appear to be complex morphology.

⇒ Under compound microscope they appear to be vesicles, rods or filaments.



Structure of Mitochondria.

Structure of Mitochondria:-

Their number, shape and internal structure vary widely; a mitochondrion is bound by two membranes. Outer membrane and inner membrane.

Outer membrane:- It is smooth.

Inner Membrane:- It has so many folds known as cristae.

These membranes are similar in structure as cell membranes.

DNA and Ribosomes / Distinguishing feature:-

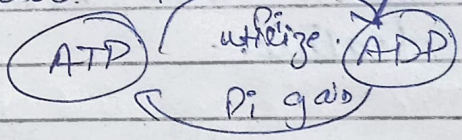
The mitochondrial membranes are similar in structure to other membrane organelles Mitochondria have their own synthetic machinary as these are known as self replicating organelles due to the presence of ribosomes and DNA which indicates that protein are synthesize in it.

F1:-

Inner surface has F1 particles. These are knob like.

Mitochondria as the power house of Cell:-

Mitochondrial matrix contains large number of enzymes, coenzymes and organic and inorganic salts which carry out metabolic processes like Kreb's cycle, aerobic respiration, fatty acid metabolism etc. As a result of these metabolic processes energy is extracted from organic food which is then transformed into energy rich compound known as ATP (Adenosine Triphosphate) and supplies to cell on demand. The spent energy will be converted into ADP and then is regenerated to ATP. That's why mitochondria is known as Power house of cell.



Conclusion:-

Mitochondria is a double membrane bound eukaryotic organelle. It is self replicating and known as power house of cell as it provides energy to the cell on Demand.

(d) What are covalent bonds? Explain types along with elaborating structures?

Covalent Bonds:-

Covalent bond is a type of bond in which two non-metal elements combine, they share one or more pair of electrons. It is a bond

that is formed by mutual sharing of an electrons.

Types of Bonds:-

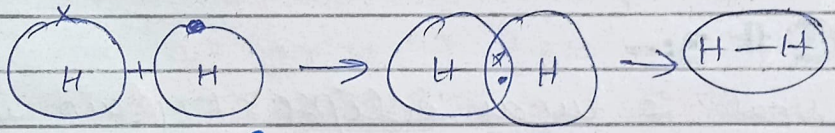
Covalent bonds is of multiple types depending on the bond pairs shared between atoms. Types are

- Single covalent bond
- Multi covalent bond.

Single Covalent bond:-

When a single pair of electron is shared between atoms. It is represented by single line.

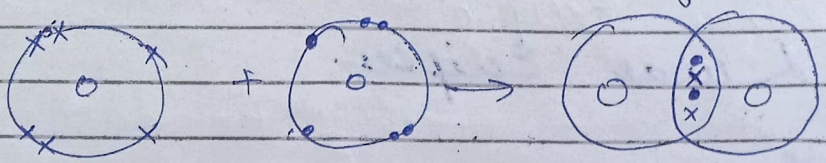
For example Hydrogen gas forms the simple covalent bond and forms diatomic gas. It attains the nearest noble gas electronic configuration



Multiple Covalent Bond:-

⇒ Double Covalent bond:- Some atoms can bond together by sharing two pairs of electrons. It is represented by drawing double line between the atoms.

For example. In case of oxygen atom . O=O. oxygen make double bond by sharing two pairs of electron.

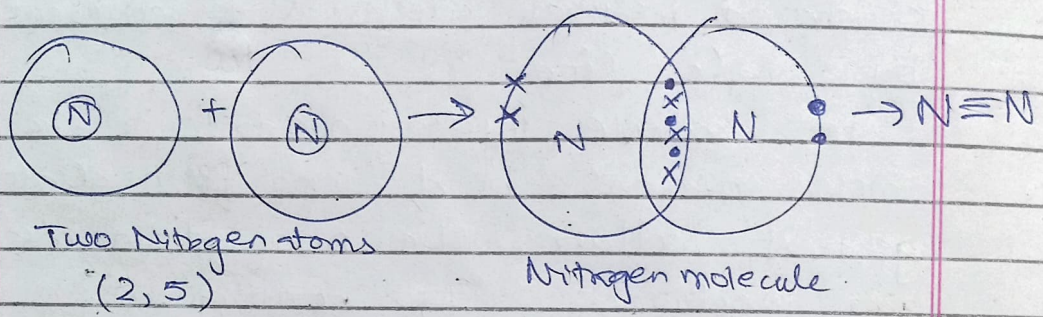


(Two oxygen atoms) (2,6)

Oxygen molecule.

⇒ Triple Covalent Bond:- Atoms can also bond together by sharing three pairs of electrons. It is represented by drawing three lines in between two atoms.

For example in case of Nitrogen molecule ~~atom~~. In order to form a nitrogen molecule, each nitrogen atom gain three electrons and triple covalent bond is formed.



Two Nitrogen atoms (2,5)

Nitrogen molecule

Q# 3:-

Q#1. What is lunar eclipse? Explain in detail with apt diagrams?

Eclipse:-

An eclipse takes place when one heavenly body such as moon or ~~sun~~ planet moves into the shadow of another heavenly body.

Types of Eclipses:-

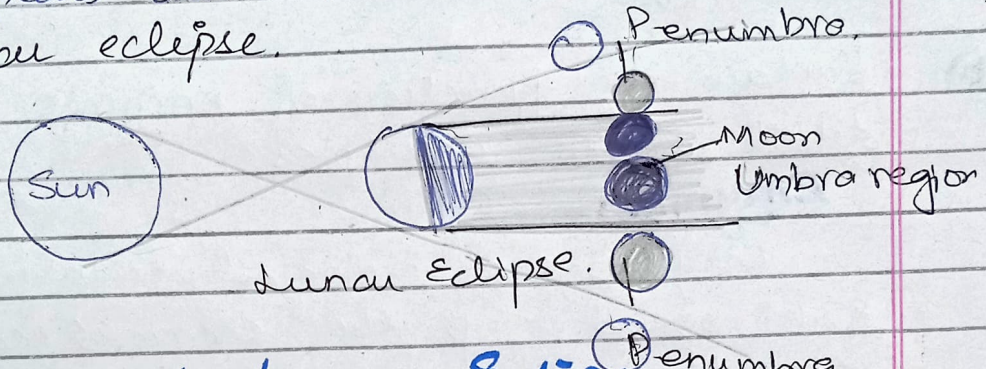
There are two types of eclipses.

- Solar ~~lunar~~ Eclipse
- Lunar Eclipse

Lunar Eclipse:-

The moon moves in an orbit around Earth and at the same time,

Earth orbits the sun. Sometimes Earth moves between the sun and moon. When this happens, Earth blocks the solar radiations that were falling on moon which causes the moon to shine. Instead of light hitting the moon's surface, Earth casts its own shadow and makes the moon appears dark. This is called lunar eclipse.



Types of Lunar Eclipses:-

Lunar eclipse is of three types depending upon the region. In one region light from the sun is totally obscured called the umbra region, is an area of partial shadow called penumbra. A lunar eclipse last for a few hours.

- Penumbral lunar eclipse
- Partial lunar eclipse
- Total lunar eclipse.

→ **Penumbral Lunar Eclipse:-**

The moon only passes through penumbra of Earth's shadow. It is barely visible from earth as there is slight change of color of moon.

→ **Partial lunar eclipse:-** When part of the moon passes through the umbra of Earth's shadow. Thus it is termed as partial lunar eclipse.

→ **Total lunar eclipse:-** When the entire moon passes through the umbral region of Earth's shadow and moon is totally obscured.

(b) Explain the function of enzymes in detail with examples?

Enzymes:-

Enzymes are biological catalysts that speed up the chemical reaction without using themselves. They are globular proteins. There are various types of enzymes and each one is responsible for particular chemical reaction only. For example, the enzyme that controls urea decomposition is called urease. Some enzymes such as trypsin and pepsin, retain the names used before this nomenclature.

Function of Enzymes:-

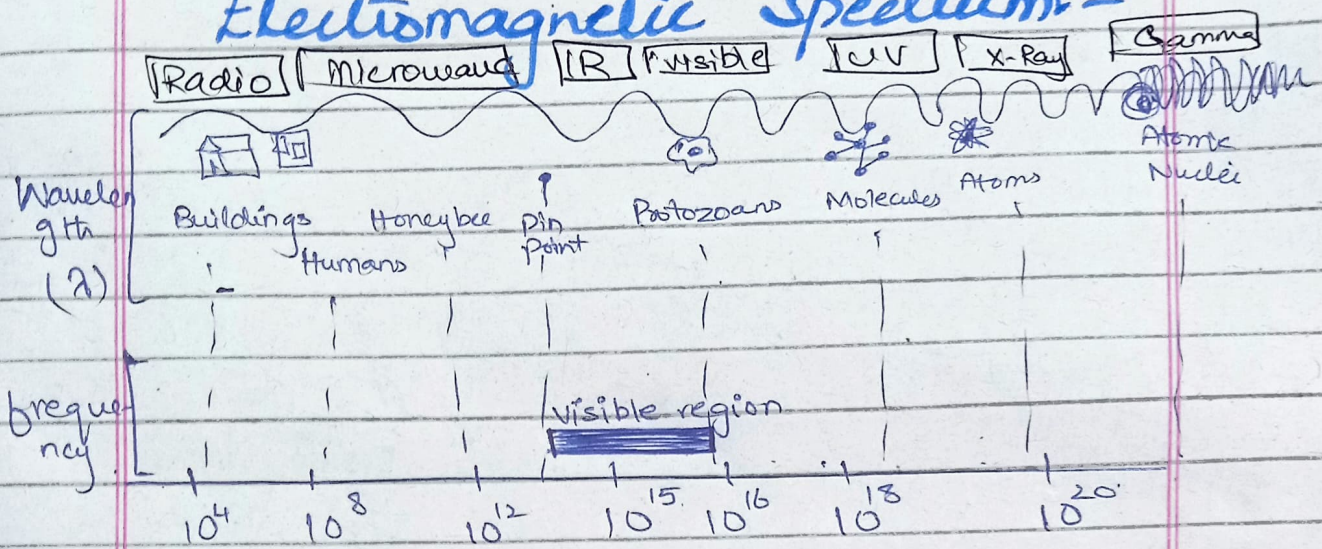
Enzymes performs a wide variety of functions in living organism. and enzymes also act as a billion dollar industry. They are also used outside the body. There are major components in signal transduction and cell regulation, kinases and phosphotases

speed of light.

→ Electromagnetic waves have momentum.

→ They exhibit diffraction and interference.

Electromagnetic Spectrum:-



MOCK- 5

GSA (GK-I)

(PART-II)

Q#6:-

(a) Determine the value of "k" if A.M of 9, 8, 10, k, 12 is 15.

Solution:-

$$A.M = \frac{\text{Sum of values}}{\text{No. of values}}$$

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

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

$$75 = 39+k$$

$$75-39 = k$$

$$36 = k$$

$$\Rightarrow \boxed{k = 36}$$

The value of k is 36.

(b) A mixture contains sugar solution and colored water in the ratio 4:3. If 10ℓ of colored water is added to the mixture, the ratio becomes 4:5. Find initial quantity of sugar solution in the given mixture.

Sugar solution : Colored water

$4x$: 3

Let the quantity of sugar soln and colored water is $4x$ and $3x$ respectively.

Then, $\frac{4x}{3x+10} = \frac{4}{5}$

$$20x = 4(3x+10)$$

$$20x = 12x+40$$

$$20x-12x = 40$$

$$8x = 40$$

$$x = \frac{40}{8} = 5 \Rightarrow x = 5$$

Quantity of sugar solution in mixture is

$4x = 4(5)$

$4x = 20$ liters.

The initial quantity of sugar solution in a mixture was 20 liters.

(c) **Volume of football = ?**

radius = 12cm

Volume of sphere $= \frac{4}{3}\pi r^3$

Volume of football $= \frac{4}{3}\pi (12\,cm)^3$

$= \frac{4}{3}\pi (144\,cm^2)(12\,cm)$

$= 16\pi (144\,cm^3)$

$= 2304 \times \frac{22}{7}\,cm^3$

$= \frac{50688}{7}\,cm^3$

Volume of football $= 7241.1\,cm^3$

The volume of football is $7241.1\,cm^3$ having the radius of 12cm.

(d) Given a series ... Find what the number would come in place of question mark?

$-10, -8, 6, 40, 102, ?$

-10 to $-8 = +2$

-8 to $6 = +14$

-6 to $40 = 34$

40 to $102 = 62$

$2, 14, 34, 62$

$\Rightarrow 14 - 2 = 12$

$\Rightarrow 34 - 14 = 20$

$\Rightarrow 62 - 34 = 28$

$x - 62 = 36$

$x = 36$

$x =$

~~Next number in~~

So add 8 in $28 = 36$

So the next addition will be

$102 + 36 = 138$

Next number in the series is 138.

Q# 7:-

(a) If 20% of $x = y$, what is the value of y% of 20 in terms of x?

$y = 20\%$ of x

$y = \frac{20}{100} \times x$

$$\boxed{y = \frac{20}{100}x} \quad \text{or} \quad \boxed{\frac{1}{5}x}$$

Value of y% of 20 in terms of x.

$y\%$ of 20

$\frac{y}{10\phi} \times 2\phi$

$\frac{2\phi \times 1}{100\ 1\phi\phi} \times 2\phi$

$= \frac{4}{100}x$

The value of y% of 20 in terms of $x = \frac{4}{100}x$.

(b) P and Q have an average monthly salary of Rs. 5050. Q and R have an average monthly income of Rs 6250, while P and R have an average monthly income of Rs 5200. Find monthly salary of P.

P and Q = Rs 5050 av. monthly.
Q and R = Rs 6250
P and R = Rs 5200
P's salary = ?

$(P+Q) = Rs(5050 \times 2)$
$= Rs\ 10,100 \longrightarrow (1)$
$(Q+R) = Rs(6250 \times 2)$
$= Rs\ 12500 \longrightarrow (2)$
$(P+R) = Rs(5200 \times 2)$
$= Rs\ 10400 \longrightarrow (3)$

Adding eq (i), (ii) and (iii) we get

$2(P+Q+R) = (P+Q) + (Q+R) + (P+Q)$
$2(P+Q+R) = 10100 + 12500 + 10400$
$2(P+Q+R) = 33000$
$P+Q+R = \frac{33000}{2}$
$P + (6250) = 16500$
$P = 16500 - 12500$
$\boxed{P = Rs\ 4000}$

The salary of P is 4000 on monthly basis.

(c) Two coins are tossed 500 times, and we get:

Two heads = 105 times

One head = 275 times

No heads = 120 times.

Find probability of each event to occur:

Probability of head to occur on 1 coin.

$P(\text{Head}) = \frac{1}{2}$

P of both Heads to occur.

$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1$

Two heads $= \frac{105}{500} = \frac{21}{100}$

One head $= \frac{275}{500} = \frac{11}{20}$

No heads $= \frac{120}{500} = \frac{6}{25}$

(d) Jamie's dad is 4 times older than Jamie. In 14 years time, Jamie's dad will be twice the age of Jamie. What is the sum of Jamie's age now and Jamie's dad's age now?

Let the age of Jamie's $= x$

According to condition.

Jamie's dad $= 4x$

$\Rightarrow x + 14 = 2(2x) + 14$

$x + 14 = 4x(2x) + 14$

$x + 14 = 8x^2 + 14$

$0 = 8x^2 - x$

$= x(8x - 1)$

$8x = 1$

$x = \frac{1}{8}$

	Age Now	Age 14 years
Jamie	x	$x + 14$
Father	$4x$	$2(x+14)$

Sum of Jamie's age and Jamie's dad age.

$x + 14 + 4x + x + 14 = m$

$6x + 28 = m$

Sum of Ages $= 6x + 28$

Their sum of ages will be six times the age of Jamie and 28 addition