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## Section I

### Q.No 2

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

### Answer

#### Dengue

Dengue is a mosquito born disease, that is found across the world. It has become a life threatening illness.

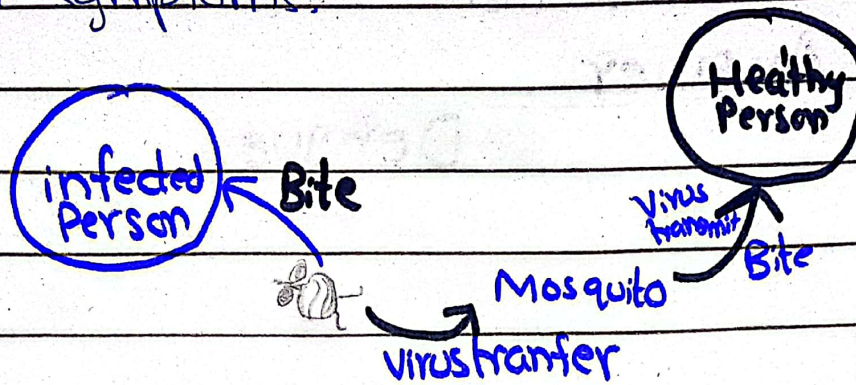
#### Causative Agent

Dengue fever is caused by the bite of mosquito belonging to Aedes species. Usually, its causative agent is known as Aedes Egypti.

#### Process

The mosquito gets the dengue virus from the infected person. When it bites infected person, virus transfer into the gut of mosquito, where it replicates and become part of its saliva. So, when mosquito bites a healthy person,

it transfers the dengue virus in the blood of healthy person After the incubation period of 7 to 14 days, persons show the symptoms.

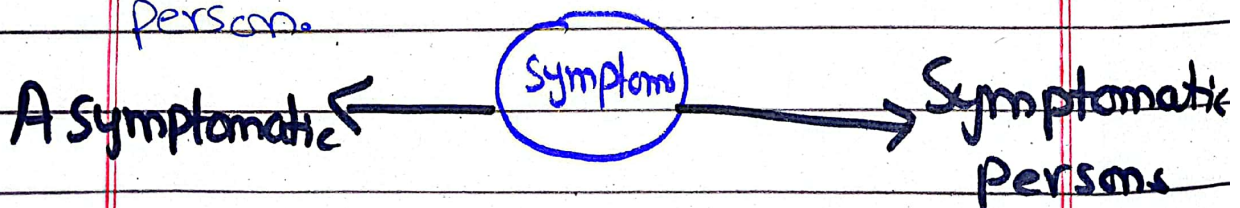


## Ministry of Health

According to Ministry of Health, approximately 36000 of dengue fever were reported from all across the Pakistan, till 30 April, 2024.

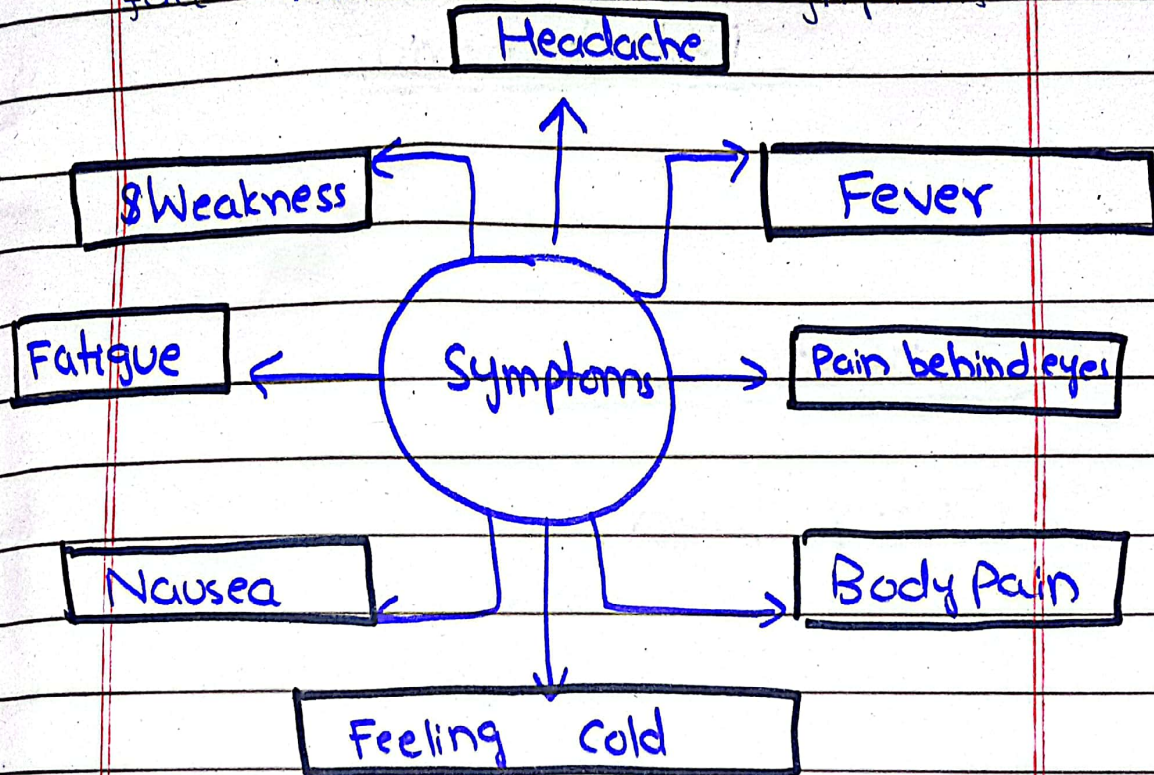
## Symptoms

The symptoms of dengue fever varies from person to person.



Asymptomatic persons do not show any symptoms of dengue and recover automatically.

While, symptomatic persons face mild to severe symptoms



## Conclusion

Dengue is a viral disease caused by mosquito bite. Its symptoms are variable in nature. World Health Organisation is striving to combat the dengue disease.

c) Discuss structure and function of Mitochondria. How is it powerhouse?

Answer

## Mitochondria

Mitochondria is an important organelle of the human body. It is found in human cells.

## Structure

### Outer layer

Mitochondria is surrounded by a outer layer that protects it from damage and invasion of foreign particles.

### Inner Layer

The inner layer of mitochondria forms many in-foldings called cristea. It is irregular in shape.

### Cytoplasmic fluid

A thick and denser fluid is present between

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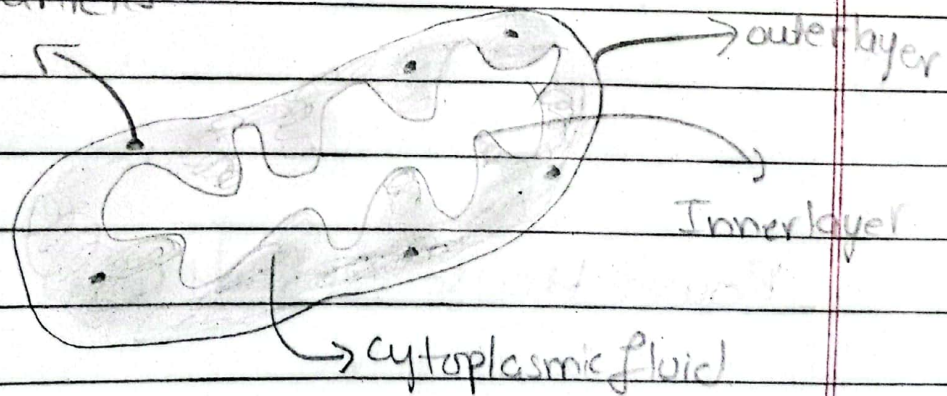
Inner and outer layers of mitochondria known as cytoplasmic fluid. It contains nutrients, vitamins, salts, ions, electrolytes etc.

### F<sub>1</sub> Particles

In mitochondria, some granular particles are found, which are known as F<sub>1</sub> particles. They are suspended in mitochondria.

### Diagram

F<sub>1</sub> particles



### Functions

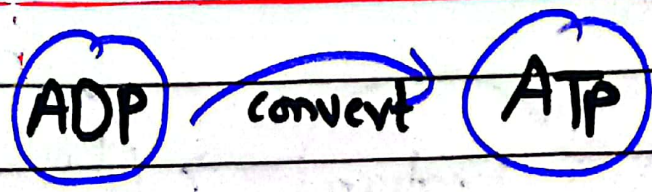
- 1) One of the most important functions of mitochondria is the production of energy for the body in the form

## of ATP.

- 2) Mitochondria serves as storage house of energy and provides energy to body, when it is needed.
- 3) It also plays vital role in the adequate process of Kerbs cycle.
- 4) Mitochondria has a significant role in glycolysis that involve, breakdown of glucose molecules and release of energy.
- 5) It is also a store house of ions, electrolytes, nutrients etc.

## Power House of Body

Mitochondria is known as power house of human body. It is involved in the production, storage and release of energy for the body. Mitochondria stores ADP, when body needs energy it converts Adenosine di-phosphate into Adenosine tri-phosphate.



When ATP is formed, mitochondria release it in body to provide a source of energy.

Conclusion

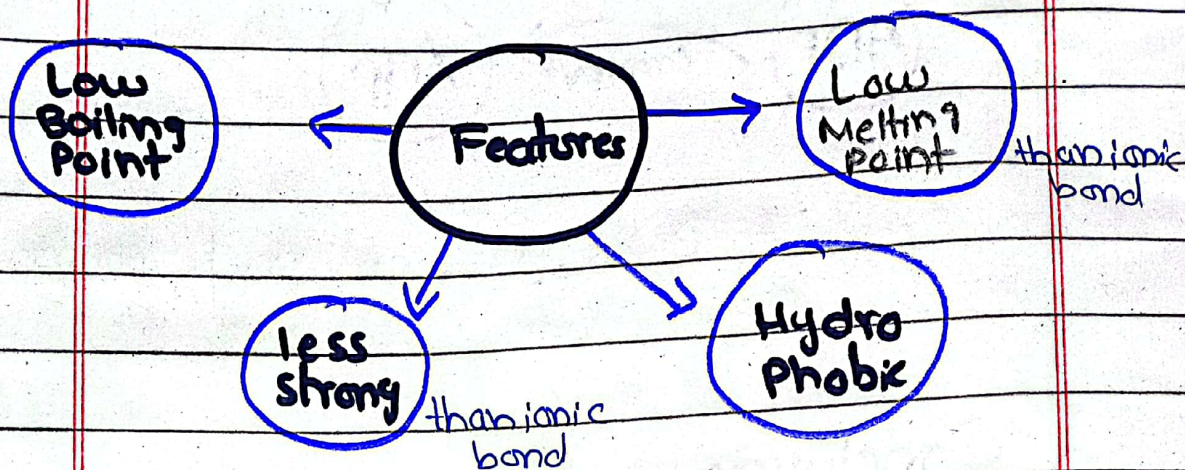
Mitochondria is a vital organelle in human body and renowned as its power house.

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

Answer

Covalent Bonds

Covalent bond is a form of chemical bonding that involves mutual sharing of electron pair between the atoms. Two atoms or molecules that form covalent bond, <sup>both of them</sup> share electrons or electron pair.

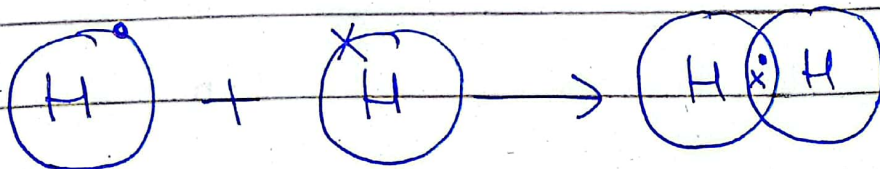


## Types

### 1) Single Covalent Bond

If a single electron pair is shared between atoms then single covalent bond is formed.

Example Hydrogen gas



Hydrogen atom has one electron in its valence shell. So when two hydrogen atoms share

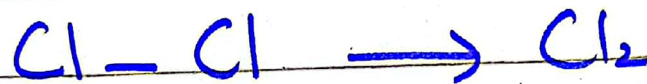
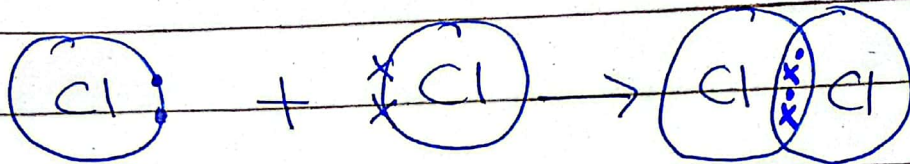


their valence electrons, single covalent bond is formed between them.

## Double Covalent Bond

Double covalent bond involves sharing of two pairs of electrons between atoms.

**Example Chlorine  $\text{Cl}_2$**

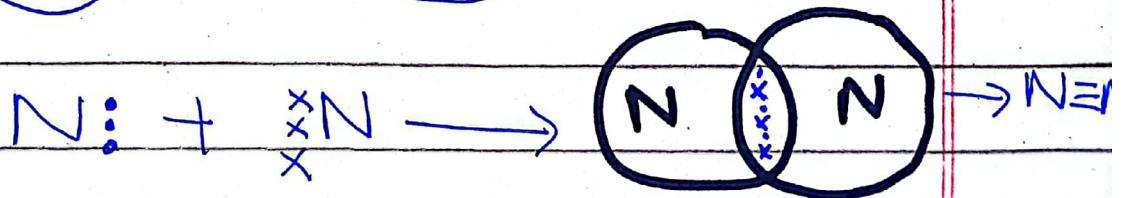
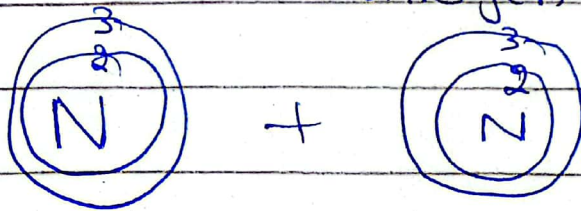


## Poly covalent bond

If more than two pairs of electrons are shared between the atoms, the resultant bond is known as poly-covalent bond.

**Example**

Nitrogen molecule



## Conclusion

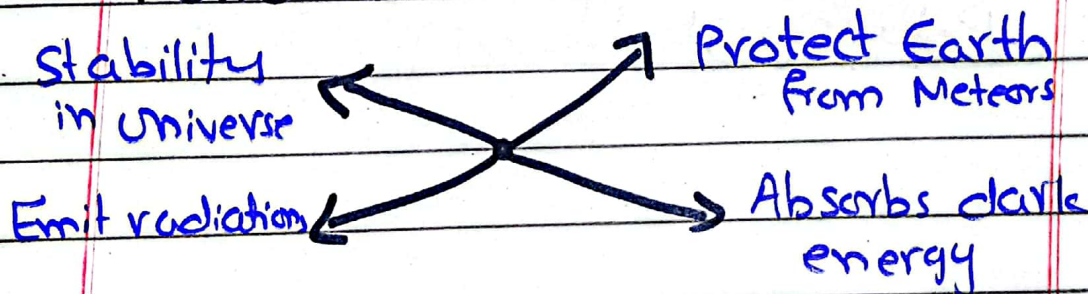
Covalent bond is a form of chemical bonding. It is of three types with different structures.

a)

## Dark Matter

Dark matter is an important component of universe. Its appearance is blackish in colour so it is termed as dark matter.

## Functions



## Dark Energy

Dark energy is the form of radiations emitted by star bodies in universe.

Q No. 3

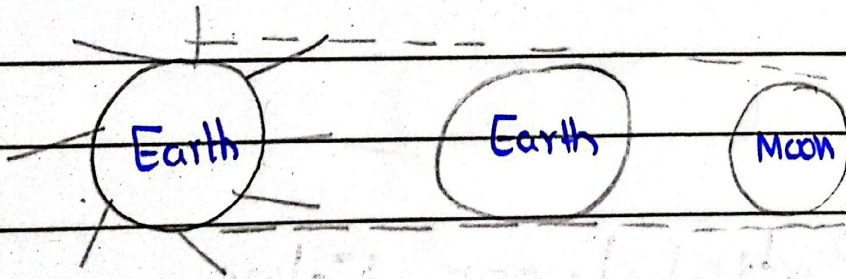
a) What is lunar eclipse? Explain in detail?

Answer

Lunar Eclipse

The phenomenon in which the earth comes between the sun and the moon, that stops the sun light or radiations to reach the moon and casts shadow on moon is called as lunar eclipse.

Diagram



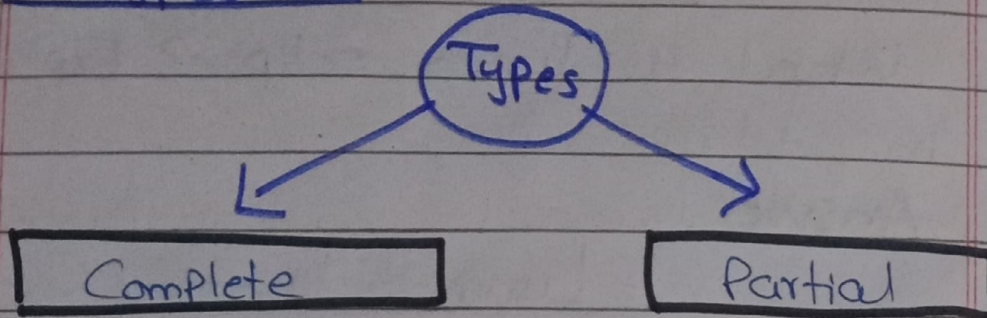
Duration

Lunar eclipse lasts usually half an hour but can extend to more than one hour.

Occurrence

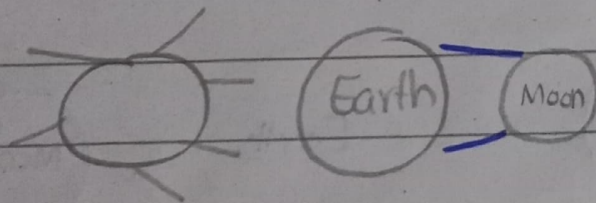
Lunar eclipse occurs usually twice a year.

## Types



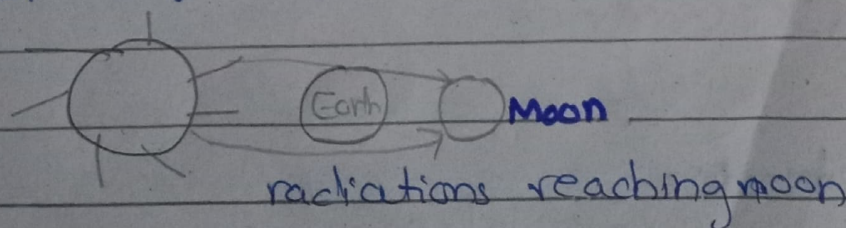
### Complete Lunar Eclipse

When Earth completely covers the sun's surface, then complete lunar eclipse occurs. Earth casts complete black shadow on moon.



### Partial Lunar Eclipse

It occurs when Earth partially covers the sun light <sup>rays</sup> to reach the moon. It is common type of lunar eclipse.



## Time of Occurrence

Lunar eclipse occurs at the time of ~~New~~ moon.

## Side effects

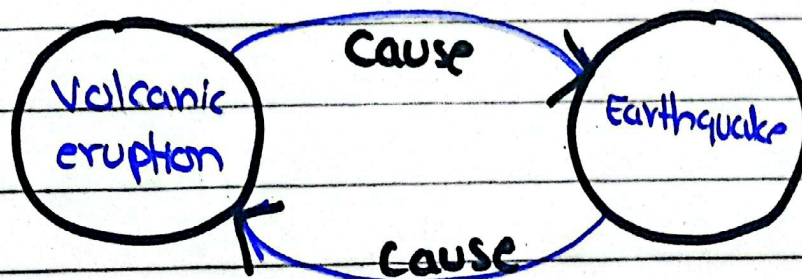
It has no severe side effects like of solar eclipse. It can be seen by naked eye. It does not cause damage to eyes.

It causes boom in tidal waves

d) Are earthquakes and volcanic eruptions interconnected. If yes, then how?

A- Yes, earthquakes and volcanic eruptions are inter-connected.

Earthquakes are the source of volcanic eruptions while volcanic eruptions also trigger earthquakes. Both are the causative agents of each other.



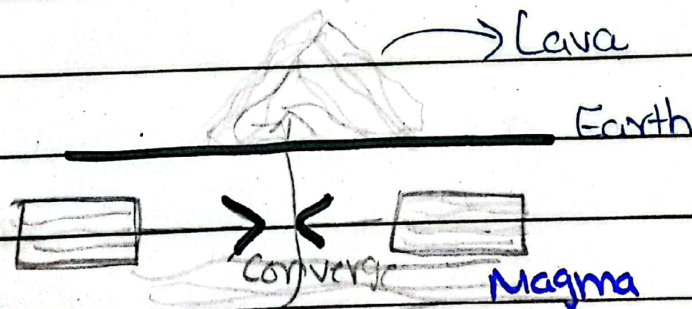
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## Earthquakes as Source of Volcanic eruption

In the areas where magma is found, if under ground tectonic plates diverge or converge, they release energy and trigger magma activity.

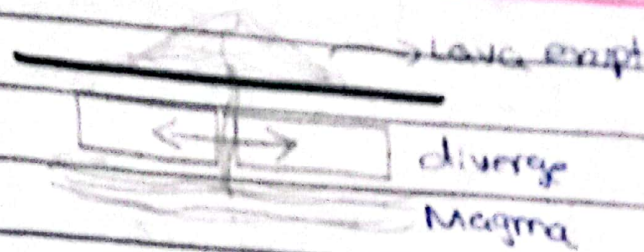
### Converging boundaries

When underground tectonic plates converge towards one another, friction will be produced. This friction release energy and causes magma to erupt on the earth as lava.



### Diverging Boundaries

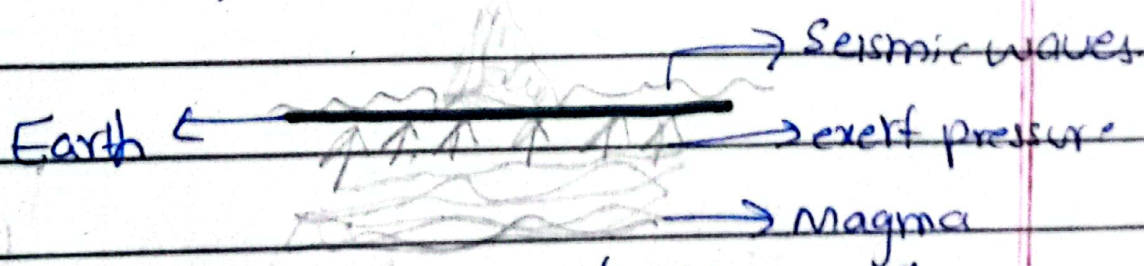
In this case, tectonic plates move apart from one another and release energy that cause volcanic eruption.



In this way, earthquakes becomes the source of volcanic activity.

## Volcanic Eruption Causes Earthquake

In this process, underground magma release intense heat, pressure on Earth surface, in order to rupture it and erupt out. During this process, this intense pressure creates movement in tectonic plates or directly exert pressure on earth surface. Resultantly, seismic waves are produced and earthquake takes place.



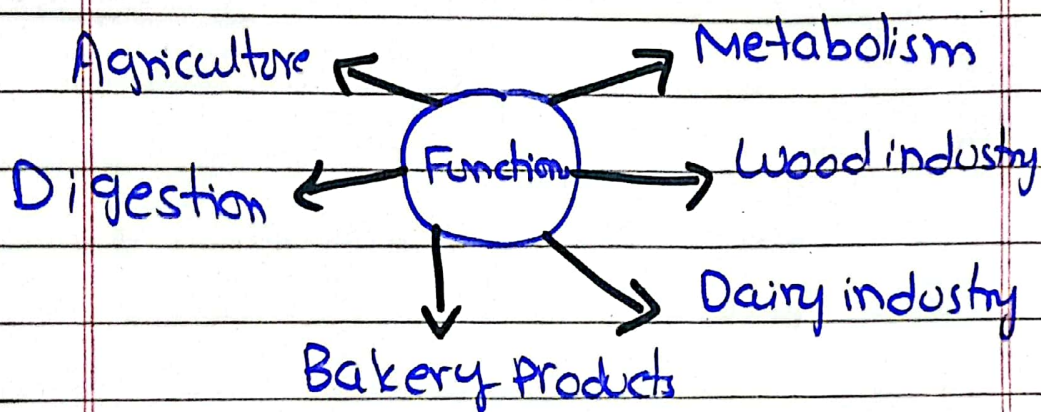
In this way, both earthquake and volcanic activity are interrelated.

b) Give a brief account of functions of enzymes ....?

Answer

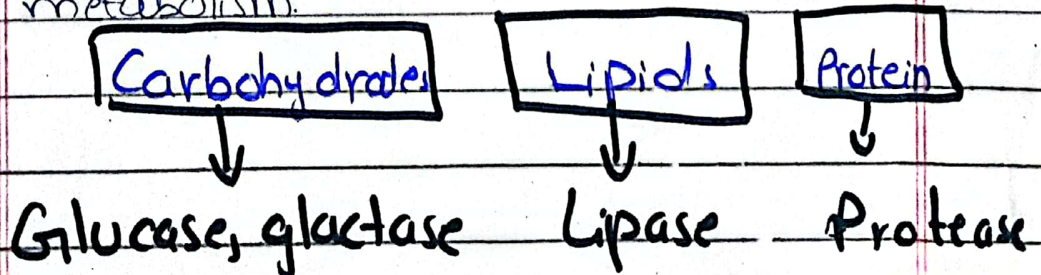
### Enzymes

The biochemical substances that catalyse the chemical reactions or metabolism are termed as enzymes.



### Metabolism

Enzymes play a vital role in metabolism of carbohydrates, lipids, proteins, fibers etc. They break down these substances into smaller particles for easy metabolism.





## Wood Industry

Moreover, enzymes are used in wood industry. They are used to remove the water and moisture from wood, making it usable.

## Bakery Products

Enzymes are used in bakery items manufacturing. **Sucrase** breakdown sucrose and maltase breaks down maltose sugar which is used to sweeten bakery products.

## Digestion

Enzymes are the catalysts of digestion process. They speed up digestion of food items by breaking them into simpler substance that can be easily absorbed by body.

## Agriculture

In the field of agriculture, enzymes are used in manufacturing of fertilizers and release of fertilizer nutrients into soil.

**Nitrase** release nitrogen, **Potaseas** release phosphorus into soil and

increase its fertility.

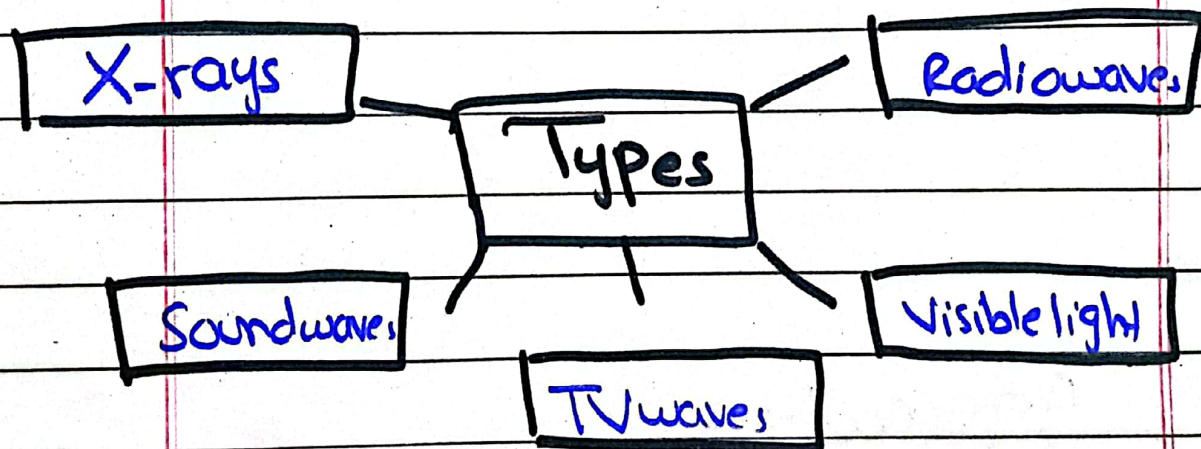
c) Give a brief account of electromagnetic radiations.....?

Answer

### Electromagnetic Radiation.

Electromagnetic radiations are the rays or radiations used to transfer information, energy, signals from one place to another.

There are various types of electromagnetic radiation.



### X-rays

X-rays have high wavelength. They possess high energy. They are used for different purposes.

# Uses

**Health sector** : X-rays are used to get picture of body parts. It helps to find out fractures in bones.

## **Cancer treatment**

Moreover, X-rays are used in cancer treatment. They kill cancer cells and hinder their spread.

## Sound Waves

These electromagnetic radiations are responsible for transferring sound wave from one place to another place.

### Uses

## **Telecommunication**

Sound waves are the lifeline of telecommunication. They are used to transmit sound waves from phones to phones etc.

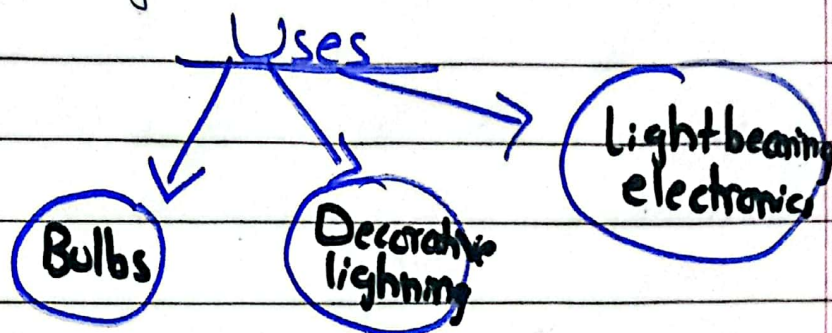
## **Re-capturing old voices**

Scientists are thriving to re-capture old voices with the

help of sound waves.

## Visible Light

Visible light is the form of electromagnetic radiation, visible to naked eye. Their wavelength varies with distance.



## Radiowaves

Radiowaves have shorter wavelength, so they are transferred over wide range of area.

### Uses

- 1) They are used to transmit radio signals and run radio programme.
- 2) Radiowaves are also used in military devices for military purpose.

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## Television waves

It is widely used across the world. Its most significant use is to transmit television signals to television devices. It provides entertainment to people.

TV signals  $\rightarrow$  TV devices

## Conclusion

Electromagnetic radiations vary in wavelength and are useful for different purposes.

## Part 2

Q. No 6

a) Given series

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

$-10, -8, 6, 40, 102, 250$

b) Given data

Mixture contains in ratio

sugar solution & colored water = 4:3

10 litre water added

Ratio = 4:5

initial quantity of sugar solut = ?

Share =  $\frac{\text{Given ratio}}{\text{Total parts}}$

sugar solution =  $\frac{4}{7}$

colored water =  $\frac{3}{7}$  = or 42...

10 litre water added  $\frac{3}{7} + 10 = 10\frac{4}{7}$

Sugar solution =  $\frac{4}{9}$

a) Arithmetic mean

$$9, 8, 10, k, 12 = 15$$

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

$$\text{sum} = \text{Mean} \times \text{Total Number of values}$$

$$\text{sum} = 15 \times 5$$

$$\boxed{\text{sum} = 75}$$

$$k = \frac{75}{5}$$

$$4 \sqrt{\frac{1}{45}}$$

Given

c) volume of football = ?

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

Formula

$$V = \frac{1}{2} (\pi r^2)$$

$$V = \frac{1}{2} \left(\frac{22}{7}\right) (12)^2$$

$$V = \frac{1}{2} \left(\frac{22}{7}\right) (144)$$

$$\boxed{V = 226.2 \text{ cm}^3}$$

7

c) Given data

Two coins tossed = 500 times

Two heads = 105 times

One head = 275 times

No head = 120 times

Probability of each event to occur = ?

Formula

Probability =  $\frac{\text{Chances of each event to occur}}{\text{Total number of events}}$

Probability of two heads

$$P = \frac{105}{500}$$

$$\text{Probability of two heads} = 0.21$$

$$\text{Probability of one head} = \frac{275}{500}$$

$$= 0.55$$

$$\text{Probability of no head} = \frac{120}{500}$$

$$= 0.24$$



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d) **Data**

Jamie's dad is 4 times older than Jamie

After 14 years

Jamie's dad will be twice the age of Jamie

Sum of their ages now = ?

**Solution**

Let Jamie's age =  $x$

Jamie's dad age =  $4x$

After 14 years

Jamie's age =  $x + 14$

Jamie's dad age =  $2(4x + 14)$

$$= 8x + 28$$

$$x + 14 = 8x + 28$$

$$8x - x = -28 + 14$$

$$7x = -14$$

(Age cannot be negative)

$$\boxed{x = 2}$$

Today's Jamie's age = 2 years

Father's age = 8 years

Sum of their ages = 10 years

In future

Jamie's age = 16

Father's age = 44

Given

$$20\% \text{ of } x = y$$

$$\frac{20}{100} (x) = y$$

$y\%$  of 20 in terms of  $x = ?$

$$\frac{y}{100} (20)$$

$$\frac{1}{5}(x) = y \rightarrow \textcircled{1}$$

$$= \frac{1}{5}(y) \rightarrow \textcircled{2}$$

Rearrang equation

$$x = y \times 5$$

$$x = \left(\frac{1}{5}\right)y \times 5$$

$$\boxed{x = y}$$