

## Section I

Dos and Don'ts for General Science & Ability Paper  
Hi there, you've done well. Know that acquiring knowledge is one thing and reproducing it in paper according to what's asked is another. There are a few things I would like to highlight.

1. A 5 marks part requires at least 2 and at max 3 sides of a paper. Know that there can be two or three parts of a question and their marks are divided accordingly. So, address all of them in a just manner.

2. Focus on time management. You get 35 minutes to solve one question and about 8 minutes per 5 mark part. Manage your time accordingly.

3. You need to understand that your paper is supposed to look more scientific than theoretical. So, add flowcharts and diagrams where required.

4. Your handwriting and neatness can be really impactful. Avoid cutting and overwriting.

5. Focus on your spellings and your grammar. Here, in GSA there's no deduction in marks but your expression will definitely create an impact.

6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

Good luck for CSB 2025. You're gonna rock in sha Allah. :)

Q NO 2

9) What is Dengue?

Dengue is a viral infection spread by the bite of Aedes mosquitoes, especially Aedes aegypt.

This mosquito species are active during the day and typically breeds in standing water around human environments, like in buckets, plant pots, or open drains.

## Causative agents

The dengue virus is responsible for this disease. There are four types of dengue virus,

1) DENV-1

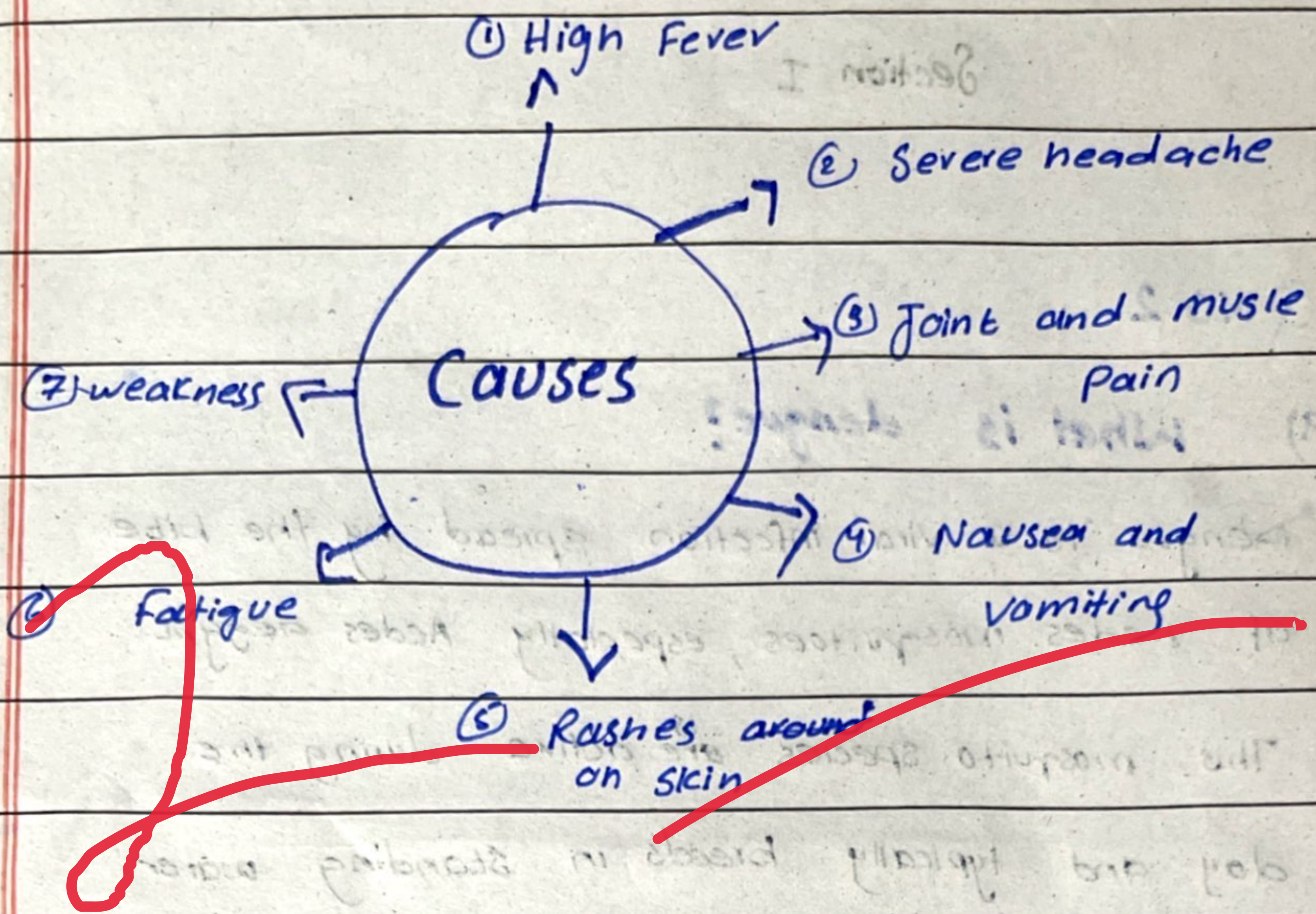
2) DENV-2

3) DENV-3

4) DENV-4

If a person is infected by with one type, they develop the immunity against the specific type but can still catch the other types.





b)

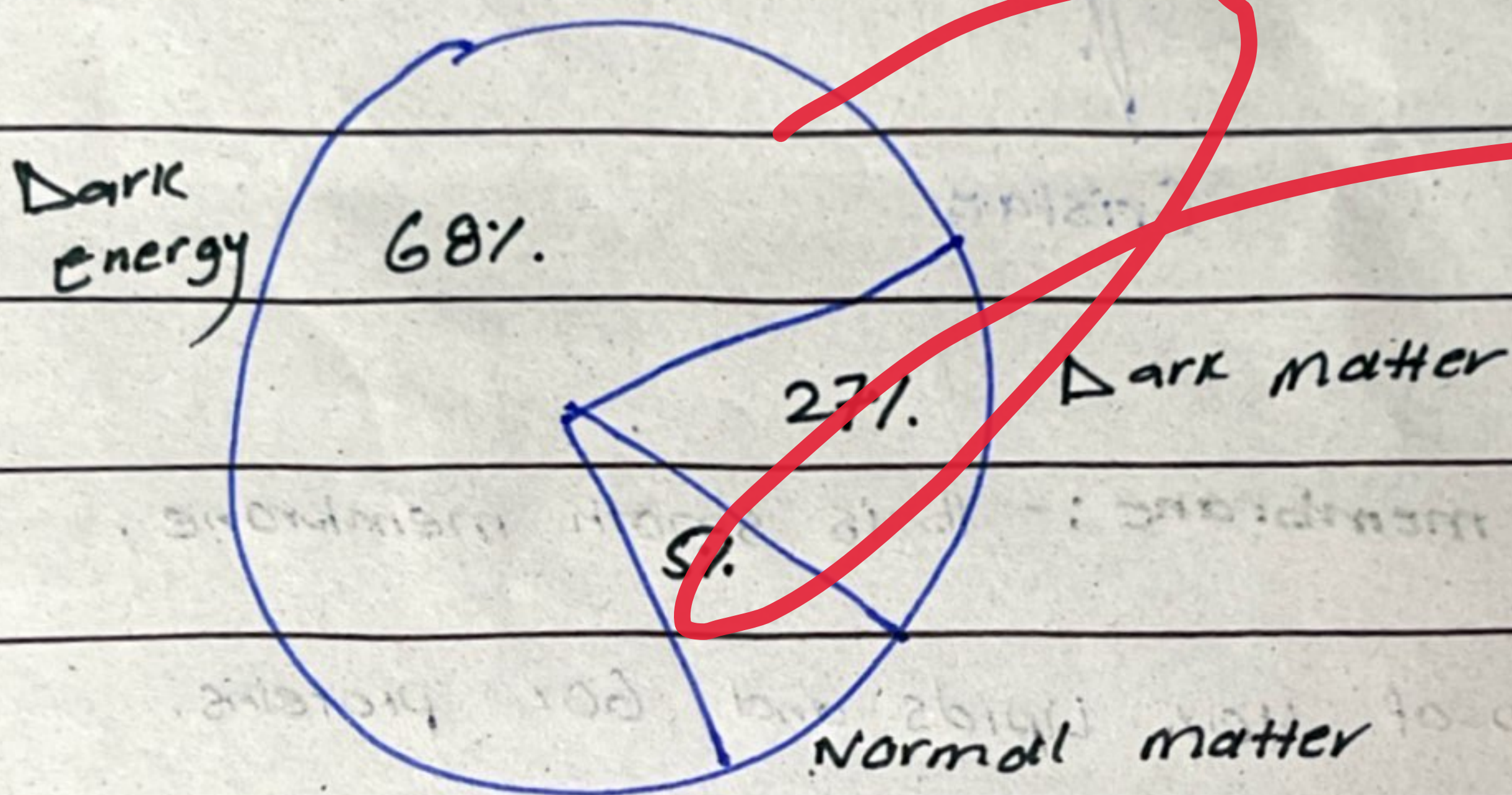
## Dark matter

Dark matter is a type of matter that doesn't emit or interact with light, which is why we can't see it directly. However, we know it exists because of its gravitational effects on galaxies and other cosmic structure. In fact, dark matter makes 17% of the universe.



## 1) Dark Energy

Dark energy on the other hand, is a mysterious force driving the accelerated expansion of the universe. Dark energy account for about 68% of the universe and has repulsive effect, pushing galaxies apart over time.



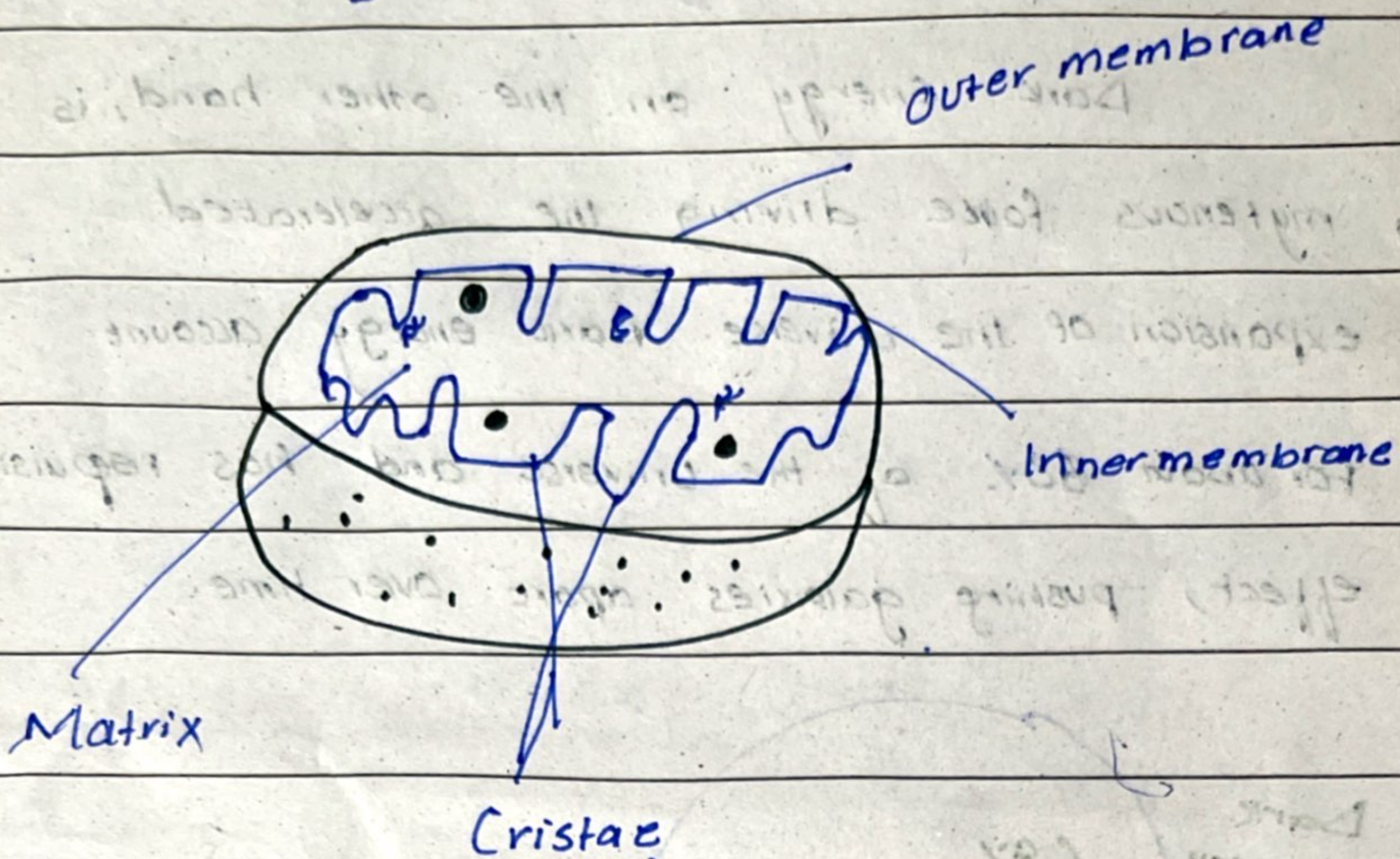
c) Discuss the structure and function of Mitochondria. How is it the powerhouse?

### Mitochondria

Mitochondria is a cell organelle which is present in plants, animals, and some microorganisms. It has filamentous and granular structure.

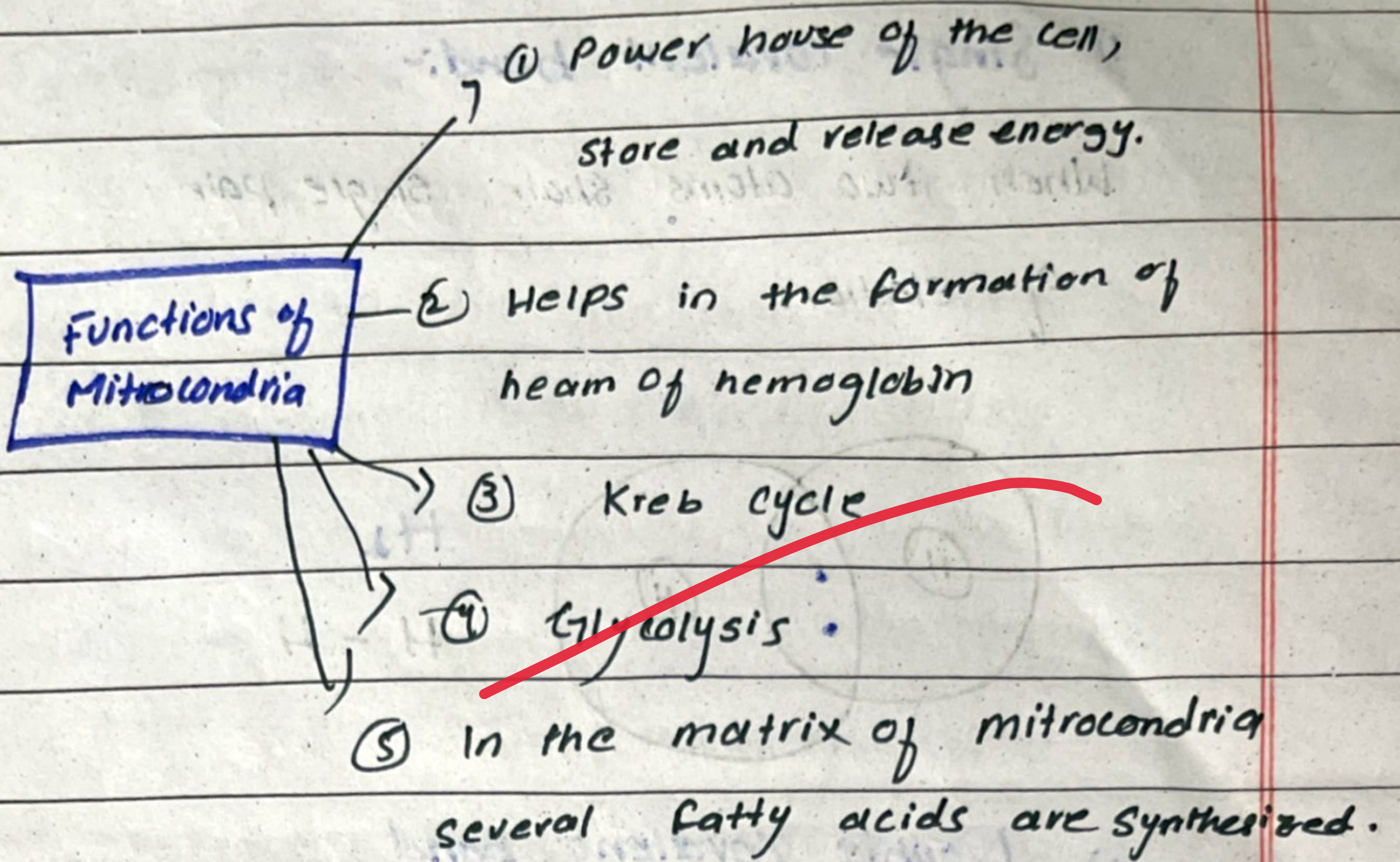


## Structure



- 1) **Outer membrane** :- It is smooth membrane, made up of 40% lipids and 60% proteins. due to presence of pores, it is permeable.
- 2) **Inner membrane** :- It is selectively permeable. made up of 20% lipids and 80% proteins.
- 3) **Cristae** :- Finger like projection.
- 3) **Intermembrane space** :- The space between outer and inner membrane.
- 4) **Matrix** :- It contains enzymes, mitochondrial DNA, and ribosomes. kreb cycle occurs here.





### Why called power house of the cell?

Mitochondria produce ATP, which cell use for energy in practically all processes. Without mitochondria, cells wouldn't be able to sustain these energy demanding activities.

### d) Covalent Bond:-

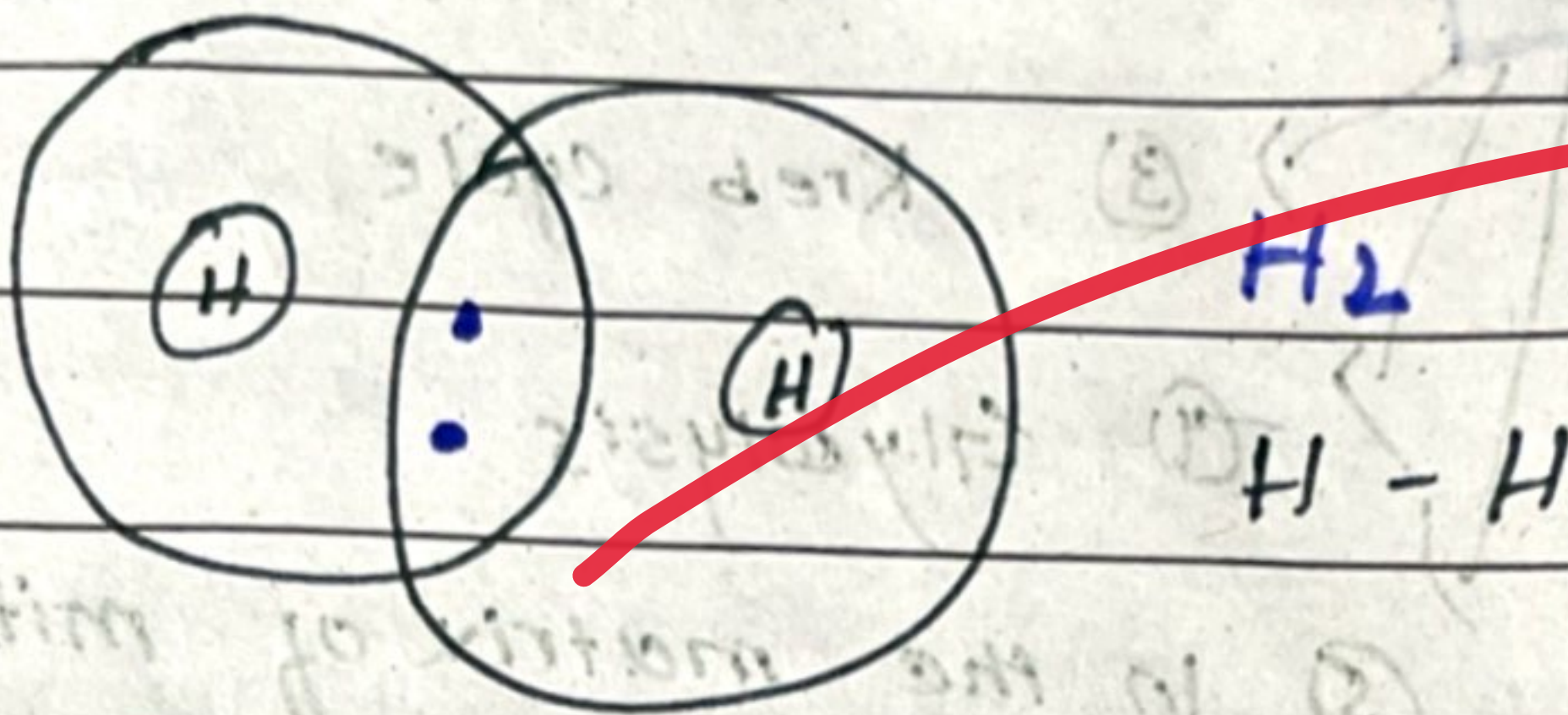
Covalent Bond is a type of bond which is formed due to mutual sharing of electrons.

- Types**
- ① Single Covalent bond
  - ② ~~Double Covalent bond~~
  - ③ Triple covalent bond



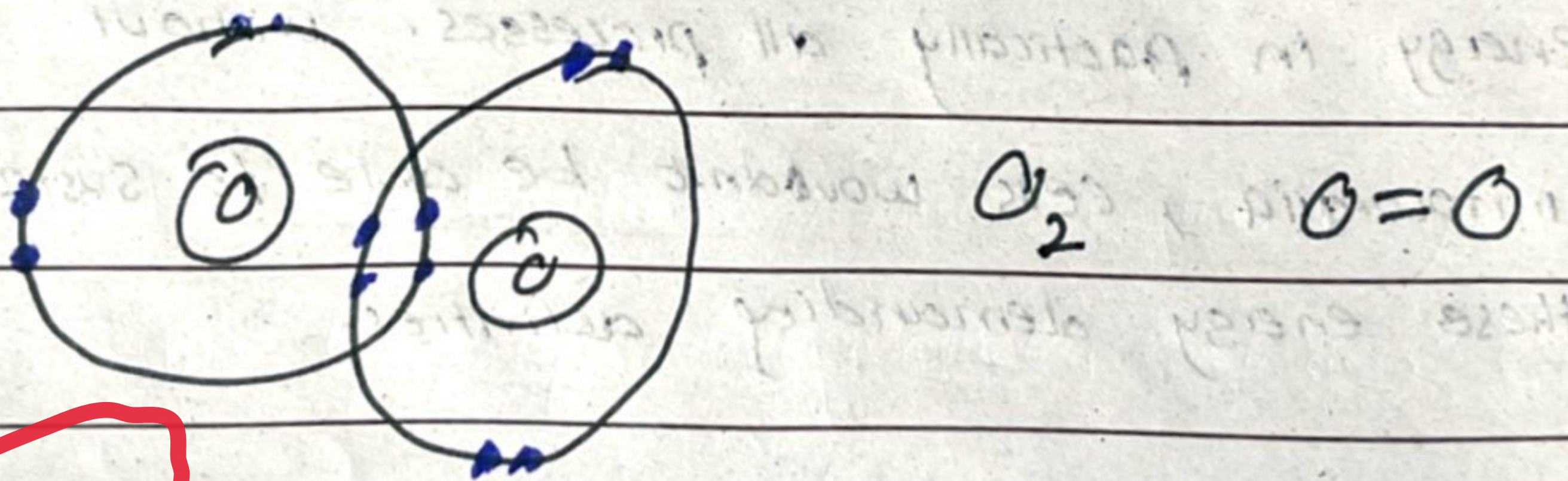
## 1) Single covalent bond:-

When two atoms share single pair of electrons.



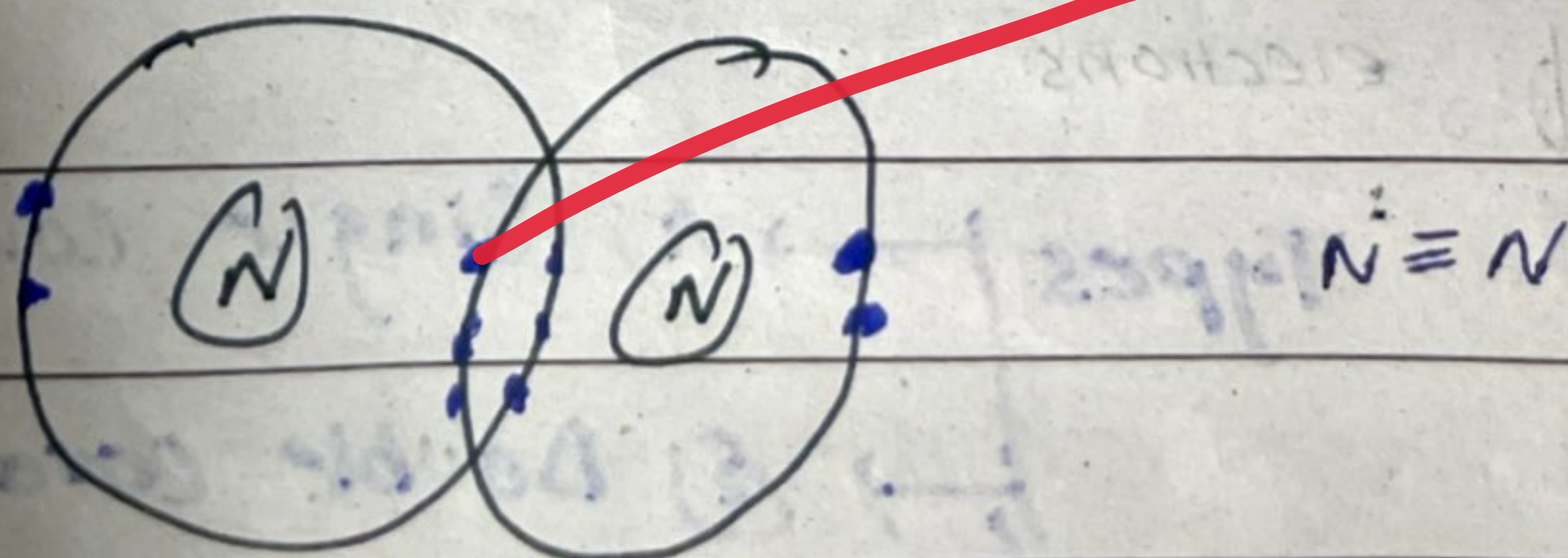
## 2) Double covalent bond

Double covalent bond is formed when two atoms share two pair of electrons.



## 3) Triple covalent bond

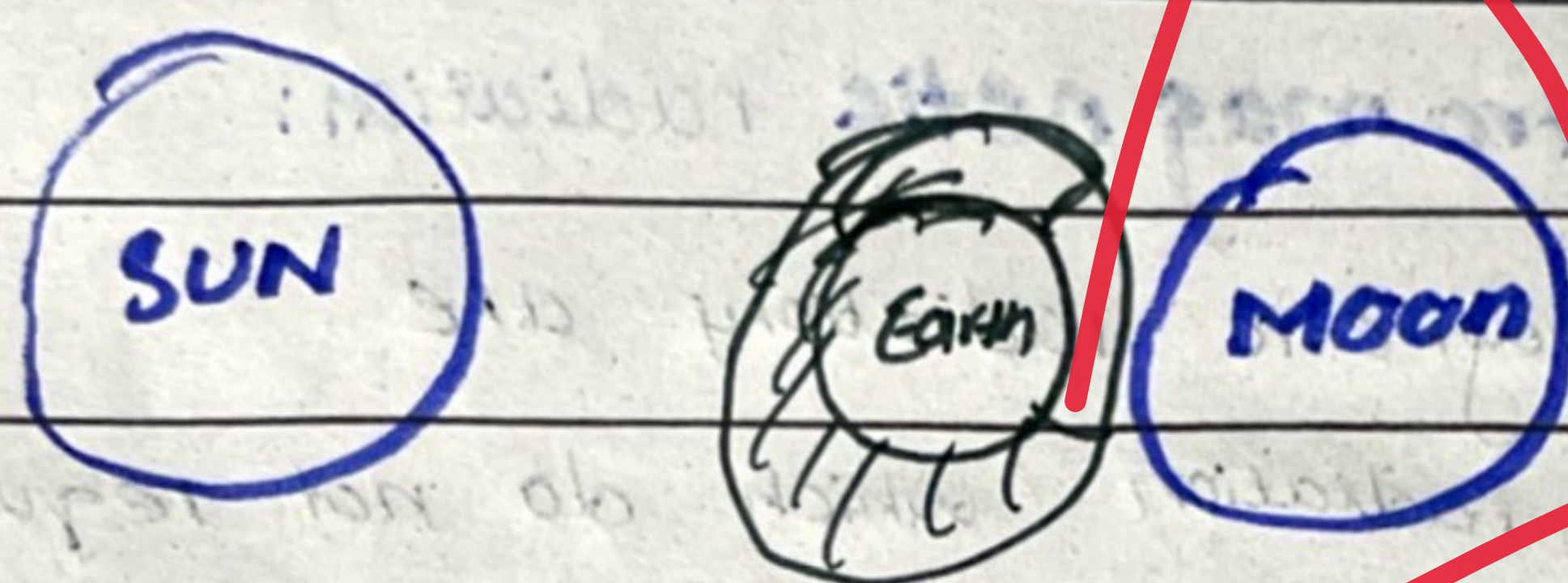
Triple covalent bond is formed when three pair of electrons are shared.





## Ques 1) What is Lunar Eclipse

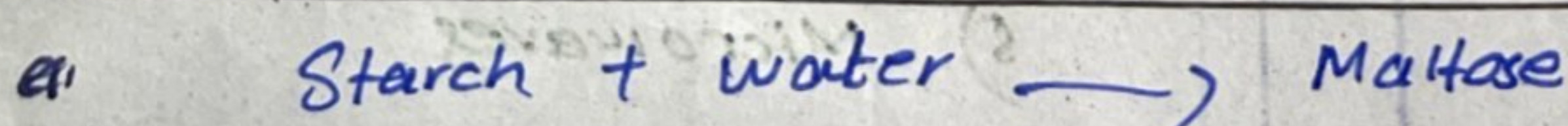
Lunar Eclipse occurs when earth moves between the sun and the moon, casting a shadow across the lunar surface.



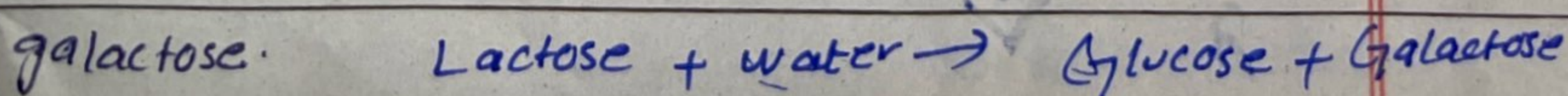
- Types
- ① Total Lunar Eclipse (Umbra)
  - ② Partial Lunar Eclipse (Penumbra)

## b) Functions of Enzymes:-

1) **Amylase** :- Found in saliva and the pancreas, amylase helps break down starch into simple sugars,

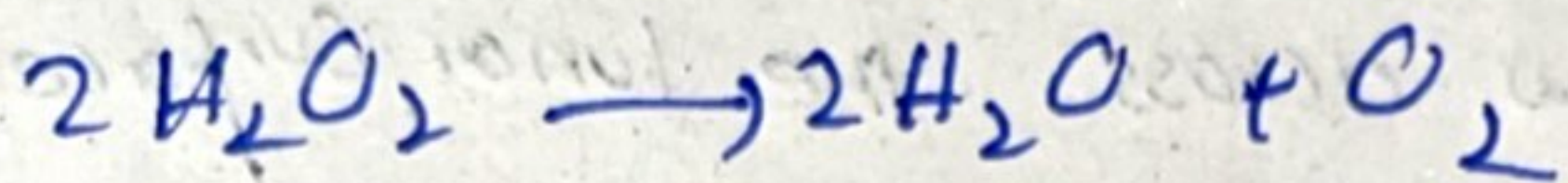


2) **Lactase** :- present in the small intestine, it break downs lactose into sugar and





3) Catalase:- It is found in nearly all living organisms exposed to oxygen. Helps in the breakdown of  $H_2O_2$

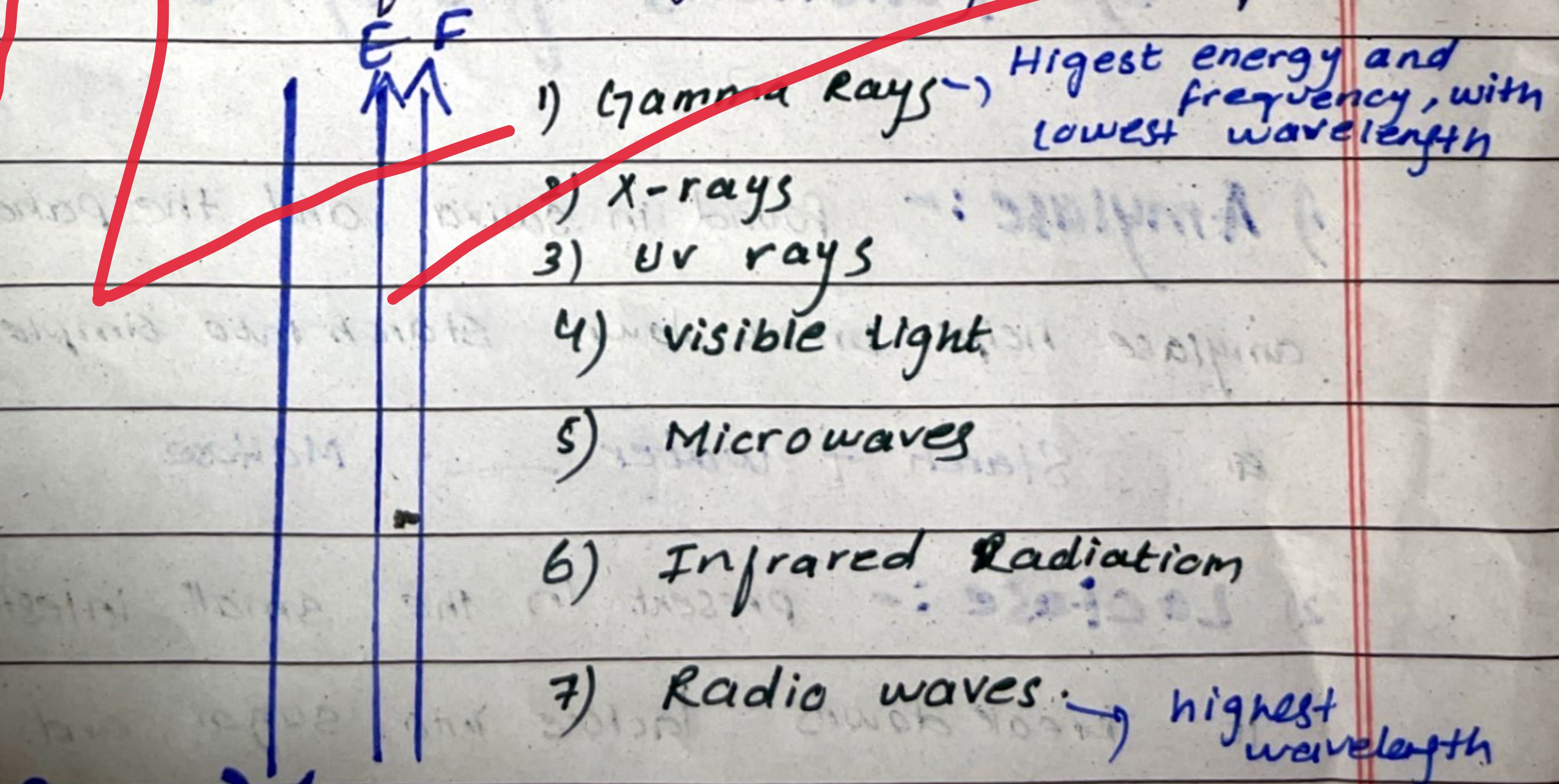


c) Electromagnetic radiation:-

Electromagnetic radiations are type of radiation which do not require medium to travel

### EMR Spectrum

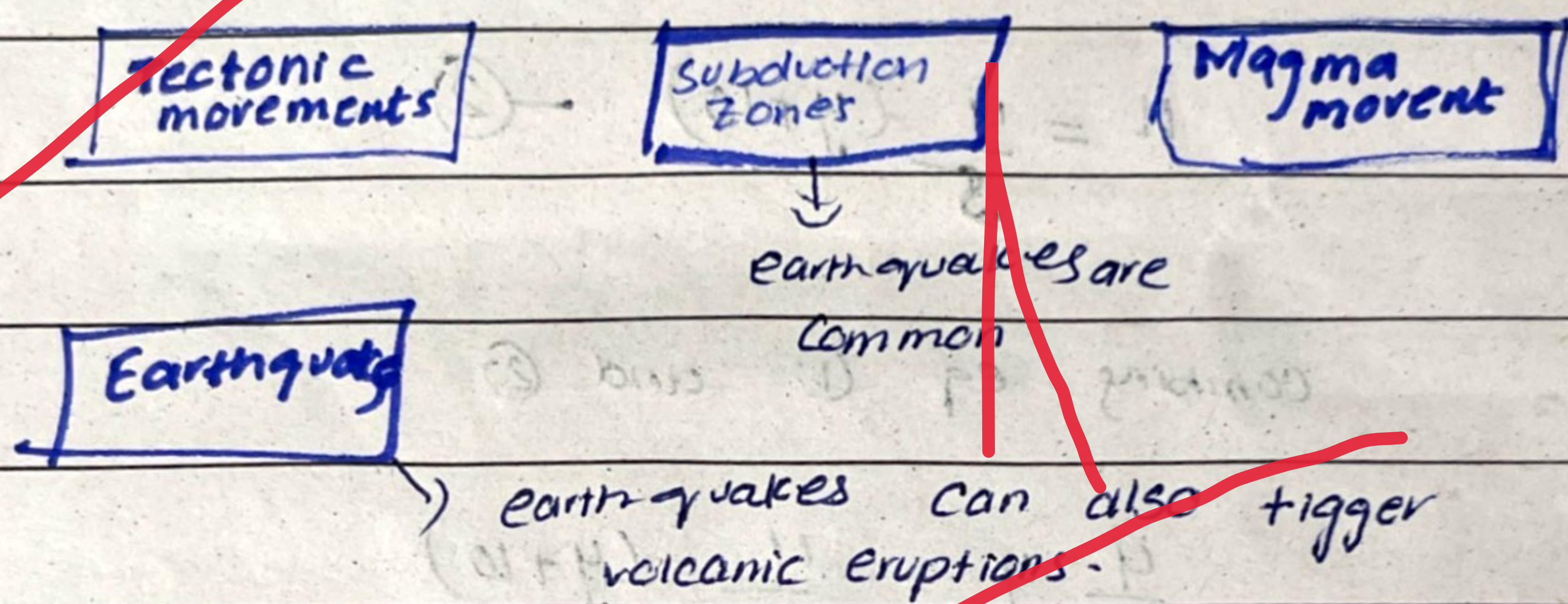
The electromagnetic spectrum is the range of all the types of electromagnetic radiations, classified on the basis of wavelength, energy and frequency.





d) Earth quakes and volcanic Eruption  
interconnected?

Yes Earth quakes and volcanic eruptions are  
closely linked through the dynamics of tectonic  
plates and magma movement within the earth crust.



## Section 2

QNO6

a) Determine the value of  $K$  if the arithmetic  
mean of 9, 8, 10,  $K$ , 12 is 15

Sol:-

$$\text{mean} = \frac{9 + 8 + 10 + K + 12}{5}$$

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

$$75 - 39$$

$$K = 36$$



b)

Sol-

The initial ratio of sugar to colored water is  $\frac{n}{y} = \frac{4}{3}$

$$n = \frac{4}{3} (y) \quad \text{--- (1)}$$

when 10 liter colored water is added

$$n = \frac{4}{3} (y+10) \quad \text{--- (2)}$$

Combining eq (1) and (2)

$$\frac{4}{3} y = \frac{4}{3} (y+10)$$

multiply both sides by 15

$$15 \times \frac{4}{3} y = 15 \times \frac{4}{3} (y+10)$$

$$20y = 20(y+10)$$

$$20y = 20y + 200$$

$$20y - 20y = 200$$

$$8y = 120$$

$$y = \frac{120}{8} = 15$$

$$y = 15 \quad \text{--- (3)}$$

Putting value of

y in eq (1)



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

$$V = 20 \text{ liters}$$

c) What will be the volume of football with radius 12 cm?

Sol:-

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

$$= \frac{4}{3} (3.14) (12)^3$$

$$= \frac{4}{3} (3.14) (1728)$$

$$= \boxed{7234.56} \text{ Ans}$$

d) Given a series of -10, -8, 6, 40, 102, ?

First the difference between consecutive terms

$$\text{From } -10 - (-8) = 2$$

$$6 - (-8) = 14$$

$$40 - 6 = 36$$

$$102 - 40 = 62$$



Find the differences of these differences

$$24 + 14 = 14 - 2 = 12$$

$$14 + 34 = 34 - 14 = 20$$

$$\text{From } 34 + 62 = 62 - 34 = 28$$

Find the difference of 2nd level differences

$$\text{From } 12 + 20 = 20 - 12 = 8$$

$$\text{From } 20 + 28 = 28 - 20 = 8$$

The 3rd level difference is common

~~Use it in 2nd level~~

The next level after 28 would be

$$28 + 8 = 36$$

The next level after 62

$$62 + 36 = 98$$

Add it in original term

$$102 + 98 = \boxed{200} \text{ Ans}$$



QNO 7

a) If 20% of  $n = y$ , what value of  $y\%$  of 20 in terms of  $n$ ?

① - to calculate value of  $y\%$  of 20

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

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

$$y = 0.2n$$

calculate  $y\%$  of 20

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

$$= \frac{0.2n}{100} \times 20$$

$$= 0.04n \text{ Ans}$$

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



Sol:-

1) The average monthly salary =  $\frac{P+Q}{2} = 5050$

$P+Q = 10100$  — (1)

2) The average monthly salary =  $\frac{Q+R}{2} = 6250$

$Q+R = 12500$  — (2)

3) The average monthly salary of  $\frac{P+R}{2} = 5200$

$P+R = 10400$  — (3)

Let's rearrange eq (3) and (1)

$Q = 10100 - P$  — (4)

$R = 10400 - P$  — (5)

Substituting  
Combining

eq 4 and 5 in (2)

$(10100 - P) + (10400 - P) = 12500$

$20500 - 2P = 12500$

$20500 - 12500 = 2P$

$P = \frac{8000}{2} = 4000$



c) Two coins are tossed 500 times,

we get:

Two heads: 105 times

One head: 275 times

No head: 120 times

Find the probability of each event to occur.

Sol:-

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Number of total outcomes}}$$

1) Two head : 150

$$\text{Probability} = \frac{150}{500} = 0.2$$

2) One head : 275

$$\text{probability} = \frac{275}{500} = 0.55$$

3) No head = 120

$$= \frac{120}{500} = 0.24$$



d) Jamie's dad is 8 times older than Jamie. In 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  $n$  represent Jamie's current age

Then Jamie's current dad's current age

can be expressed as  $4n$

as he is 4 times older than Jamie

In 14 years,

$n + 14$  — Jamie's age — (1)

$4n + 14$  — Dad's age — (2)

$$n + 14 = 4n + 14$$

14 to problem Jamie's age will

be twice as the age of Jamie

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

$$4n + 14 = 2n + 28$$

$$4n - 2n = 28 - 14$$

$$2n = 14$$

$$n = \frac{14}{2}$$

$$n = 7$$

$$n = \frac{14}{2}$$

$$n = 7$$

P.



Putting value of  $n$  in ~~eqn (1) and (2)~~

$$\text{Dad's age} = 4n$$

$$= 4 \times 7$$

$$= 28$$

$$\text{Sum of their ages} = n + \text{dad's age}$$

$$= 7 + 28$$

$$= 35$$