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Q. NO-2

(a) **DENGUE:**

Dengue also known as (Break-bone fever) is a viral infection that spreads from mosquitos to people. It is common in tropical and subtropical climates.

It happens when infected female mosquito bites human body. Dengue rarely cause death. In most of the cases, the patient of dengue experience fever, headache, high fever, mausea, and rash.

## Causative Agent of Dengue:

The dengue virus is transmitted to humans through the bites of infected female mosquitoes, primarily the "Aedas aegypti" mosquito. Other species within the "Aedas genus" can also act as vectors, but their contribution is normally secondary to "Aedas aegypti".

After feeding on a infected person, the virus replicates in the mosquito midguts before disseminating.

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## Symptoms of Dengue:

- → High fever
- → Sever headache
- → Nausea and vomitting
- → Plain behind the eyes
- → Severe joint and muscle pain
- → Mild Bleeding
- → Fatigue

**Q.no: (B)**

Dark matter and dark energy are two of the most mysterious and fundamental components of the universe, making up about 95% of it. Yet, they are unlike anything we can see or directly observe.

→ **Dark Matter:** It is a form of matter that does not emit, absorb or reflect light, making it invisible and detectable only through its gravitational effects on visible matter such as; stars and galaxies.

*** Evidence of Dark Matter:**

Observations of galaxies and galaxy clusters reveal that there is not enough visible matter to account for the observed gravitational effects. For instance; stars in galaxies orbit at speeds that cannot be explained by visible matter alone — there must be additional "hidden" mass providing gravitational pull.

→ **Dark Energy:** It is an unknown energy form that makes up about 68% of the universe. It is believed to be responsible for the accelerated expansion of the universe, pushing galaxies away from each other at an increasing rate.

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## * Evidence for Dark Energy:

In the late 1990s, astronomers discovered that distant galaxies were moving away from us faster than expected, suggesting that some unknown force is causing the expansion of the universe to speed up.

**Conclusion:** Dark Matter is primarily responsible for the gravitational "glue" that helps hold galaxies and larger structures together. whereas, Dark Energy works in the opposite way, pushing everything apart and accelerating the expansion of the universe.

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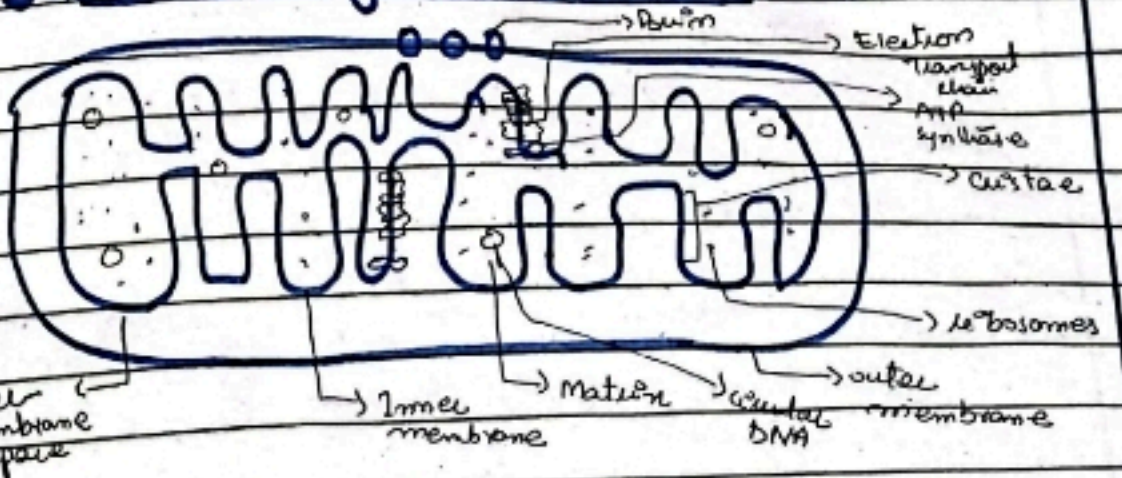
Q. NO. 2 (C)

## Structure of Mitochondria:




Mitochondria is made-up of two membranes, an inner membrane and an outer membrane. The inner membrane is folded to create cristae. The most of the organelle of mitochondria located inside the inner membrane. The inner region called as matrix (mitochondrial matrix).

## Functions of Mitochondria:

The main function of mitochondria is to produce the chemical energy that required to fuel biochemical reactions in the cell. Though a series of chemical reactions, mitochondria break down glucose into an energy molecule known as adenosine triphosphate (ATP), which is used to fuel various other cellular process

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## Mitochondria as the Powerhouse of Cell:

The proteins synthesized by the proteins in mitochondria are utilized to generate adenosine triphosphate (ATP) from the food. This ATP acts as the energy currency of the cell, because of which the whole cell and body get energy. Thus, mitochondria are called the powerhouse of the cell

---

Q.NO. 2. (D)

**Covalent Bonds:** It is a bond which is formed by the "mutual sharing" of elections between the atoms.

### Types of Covalent Bond:

There are three types of covalent bonds: Single covalent bond, Double covalent bond, Tuple covalent bond. These three are based on the number of shared electron pairs.

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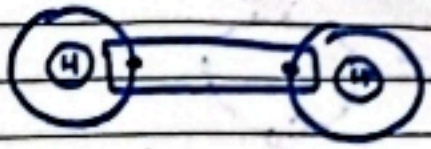
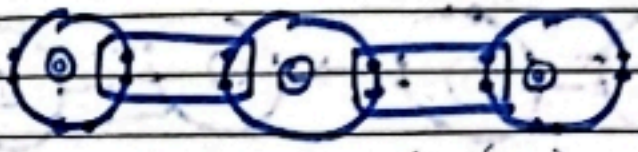
## Single Bond



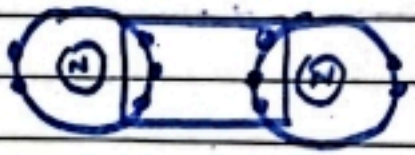
Hydrogen ($H_2$)

## Double Bond



Carbon dioxide ($CO_2$)

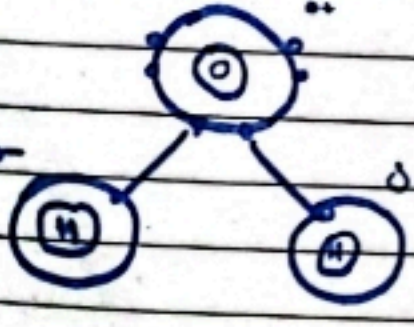
## Tuiple Bond



Nitrogen ($N_2$)

Also, there are a types of Covalent Bond based on the polarity and coordination of the atoms, that are: Polar Bond, Nonpolar Bond, Coordinate Bond

## Polar Bond



Water ($H_2O$)

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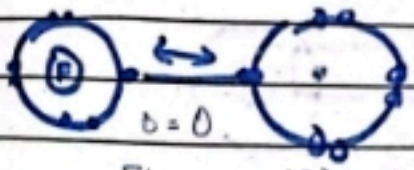
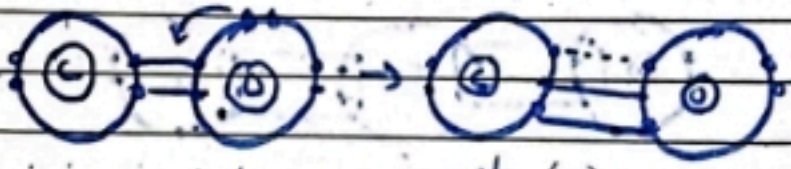
# Nonpolar Bond

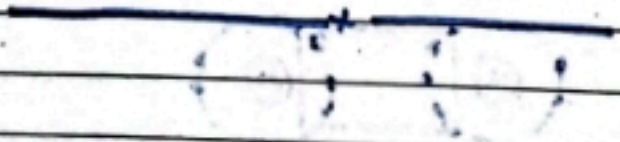



Fluorine ($F_2$)

# Coordinate Bond



Carbon monoxide (CO)



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# SECTION - II

Q.No.6

(a) Arithmetic Mean of:

9, 8, 10, K, 12 is 15.

Value of K ?

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

Arithmetic mean : $\Sigma n/m$

The value of k would be 36.

$$\frac{9+8+10+36+12}{5} \Rightarrow \frac{\cancel{75}^{15}}{\cancel{5}_{1}} = 45$$

**K=36**

---

Q.NO.6

(b)

Ratio: 4:3

Added quantity: 10 litres of coloured water

new ratio: 4:5

Initial quantity = ?

⇒ Initial ratio: 4x and 3x

Added quantity of coloured water into mixture $\frac{4x}{3x+10}$

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The final ratio is $\frac{4}{5}$

So the equation is:

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

Let's cross multiply the equation

$$5(4x) = 4(3x+10)$$

$$20x = 12x + 40$$

$$20x - 12x = 40$$

$$\Rightarrow 8x = 40$$

$$\Rightarrow x = \frac{40^{5}}{8_{1}} \quad \Rightarrow x = 5$$

Now, we can find by putting the x value in equation:

$4x \Rightarrow 4 \times 5 = 20$ Litres of s

20 Litres of sugar solution

$3x \Rightarrow 3 \times 5 = 15$

15 Litres of coloured water

$20 + 15 = 35$

The total quantity of the mixtures is 35 Litres

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Step # (5) :-

Add the difference of 98 in 102 that is 200.

So the final pattern would be

-10, -8, 6, 40, 102, 200

Ans.

---

## Q. NO. 8

(A)

Data :-

charge = $20 + 4n

windows = 7

$20 + 4n

n = number of windows

$20 + 4(7)

⇒ $20 + 28

⇒ 48

⇒ Brain would charge $48

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## Q.NO.6.(b)

Given series : $-10, -8, 6, 40, 102, ?$

Step #1

Let's find the difference :

$102 - 40 = 62$

$40 - 6 = 34$

$6 - (-8) = 14$

$-8 - (-10) = 2$

Step#2: The differences for the sequence $2, 14, 34, 62$

The difference from there

$62 - 34 = 28$

$34 - 14 = 20$

$14 - 2 = 12$

Now we have,

Step#3 $12, 20, 28$

These terms increasing by 8.

The next term in step 3 would be

$28 + 8 = 36$

Step#4 : The next difference after 62 would be : $62 + 36 = \boxed{98}$

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## Q.NO.6 (C)

Volume of a football with a radius of 12 cm

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

$\Rightarrow \frac{4}{3}\pi (12)^3$

$\Rightarrow \frac{4}{3}\pi (12 \times 12 \times 12)$

$\Rightarrow \frac{4}{3}\pi \times (1728)$

Volume = $\frac{4 \times 1728}{3}\pi$

$\Rightarrow \frac{6912}{3}\pi$

$\Rightarrow 234\pi$

$\Rightarrow \pi = 3.14159$

$\Rightarrow 234 \times 3.14159$

$\Rightarrow$ 735.31 $cm^3$ or $234\pi$ is the volume of football

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## Q.NO.8 (B)

(i) ralaïeP

Replica

(ii) tyhmïaum

Thymium or Humanity

(iii) aysehcc

Seach

(iv) monïteah

Heat monitor

(v) taeph

(vi) Haptic

## Q.NO.8 (C)

A = {10, 11, 12, 13, 15}

B = {10, 12, 14}

U = {10, 11, 12, 13, 14, 15, 16, 18}

Complent of A (A')

A' = U - A

=> {14, 16, 18}

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Complement of B (B')

$B' = U - B$

$\Rightarrow \{11, 13, 15, 16, 18\}$.

Intersection (A∪B)

$\rightarrow \{16, 18\}$

Union of A and B

$A \cup B = \{10, 11, 12, 13, 14, 15\}$

Complement of A∪B

$((A \cup B)')$

$U - A \cup B$

$\Rightarrow \{16, 18\}$

$(A \cup B)' - \{16, 18\}$

$(A' \cap B') = \{16, 18\}$

The equation $(A \cup B)' = A' \cap B'$ for the sets $A = \{10, 11, 12, 13, 15\}$, $B = \{10, 12, 14\}$, and $U = \{10, 11, 12, 13, 14, 15, 16, 18\}$ Holds true