

Q2

(i) Dengue

Dengue is a viral disease that spread from people to people through mosquitos. This disease is common in tropical and subtropical climates.

Symptoms.

Most affectees of dengue feel no or mild symptoms and get well in 1-2 weeks. Sometimes it is severe and can be fatal. Common symptoms are: fever, severe headache, pain behind eyes, muscles and joint pain, nausea, vomiting, swollen glands and rash etc.

Causative Agents

The dengue disease is caused by the bites of infected female mosquito, *Aedes Aegypti*. It may be caused due to human-to-mosquito transmission, maternal transmission and others.

(ii) Dark Matter

It makes up around 27% of universe total mass and energy but does not emit, absorb or reflect light, which makes it invisible to tools. Its availability is predicted from the gravitational effects on visible matter. It helps in holding galaxies together.

Dark Energy

It is more mysterious and constitute almost 68% of universe total energy content. It is responsible for the accelerated expansion of universe.

(iii) Mitochondria

These are small, double-membraned organelles found in the cells of eukaryotic organisms. It plays a critical role in energy production due to which it is called power house of the cell.

Structure.

Mitochondria have a unique, highly specialized structure designed to support their function in energy production. Its structure is given below.

- It has an outer membrane which is smooth and permeable to ions and small molecules.

- There is an inter-membrane space which is involved in electron transport chain and building up a gradient of protons (H^+ ions).

The inner membrane is folded into structures called cristae.

These folds increase the surface area which gives more space for reactions required for energy production.

Functions.

The primary function of mitochondria is to produce ATP through cellular respiration.

d) Covalent Bonds.

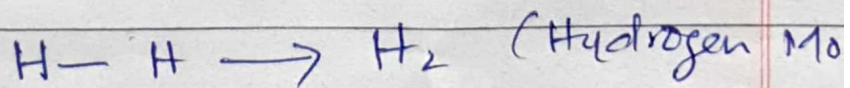
The type of bonds which are produced by the mutual share of electrons between two ^{atoms} elements. It allows each atom to achieve a full outer shell of electrons resulting in stability.

Types.

There are some types of covalent bonds which are given below.

Single Covalent Bond

When a covalent bond is formed by sharing a single pair of electrons between two atoms, then it is called single covalent bond.



Double Covalent Bond.

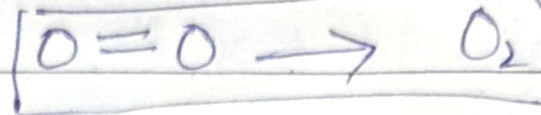
A double covalent bond is formed which atoms share two pairs of electrons in order to achieve its full

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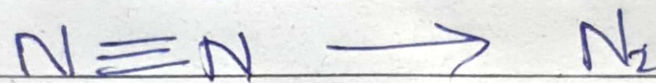
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outer state.



Triple Covalent Bond.

When a covalent bond is formed by sharing three pairs of electrons between two atoms, then it is called triple covalent bond.



Q.6 (a)

Solution

From the given data
we have to find out value
of 'k'.

Formula

$$\text{Arithmetic Mean} = \frac{\text{Sum of terms}}{\text{No of terms}} \quad \text{--- (1)}$$

Putting data in question in eq (1)

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

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

$$75 - 39 = k$$

$$\boxed{36 = k}$$

The value of k is 36.

(b) From the given data, we know:

→ Initial ration of sugar to water is 4:3

→ When 10 liters of water is added,
we get new ration: 4:5

Suppose the initial amount of
sugar be $4x$ liters.

Suppose the initial amount of
water = $3x$ liters.

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After adding 10 liters of water,
the new amount of water
 $= 3x + 10$

According to the new ratio

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

Cross-Multiplying.

$$20x = 12x + 40$$

Simplifying

$$20x - 12x = 40$$

$$8x = 40$$

$$x = 5$$

Now put the value of "x" in
initial ^{ratio} value of sugar

$$4x = 4 \times 5 = 20 \text{ liter}$$

(c) Given data

radius of football (r) = 12 cm

To Find

Volume of football, $V = ?$

Formula.

$$V = \frac{4}{3} \pi r^3 \quad \text{--- (1)}$$

Putting values in eq (1)

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

$$V = \frac{4}{3} \times 1728$$

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

$$V = 2304 \pi$$

$$V = 2304 \times 3.14$$

$$= 7238.56$$

(d) To find the number in place of question mark, we have to first find out differences between each pair.

$$\begin{array}{ccccccc} -10 & -8 & 6 & 40 & 102 & ? & \\ \hline & 2 & 14 & 34 & 62 & & \end{array}$$

Now let's find out patterns in the differences.

$$14 - 2 = 12$$

$$34 - 14 = 20$$

$$62 - 34 = 28$$

This shows a quadratic pattern where number is increased by 8 each time.

Adding "8" to the last difference in last pattern.

$$28 + 8 = 36$$

To find next difference, add this

$$-8 + x = 6$$

$$x = 6 + 8$$

$$x = 14$$

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to last difference

$$62 + 36 = 98$$

Adding this difference to the last term in series.

$$102 + 98 = 200$$