Maham
Batch no. 141 (Westridge Campus Rwp).

## SECTION - II

### Question : 6 :-

a) Determine the 'k' value if arithematic mean of 9, 8, 10, K, 12 is 15.

Solution :-

Given Data:-

Arithematic Mean = 15.

Number of values = 5.

Formula for arithemitic mean = $\dfrac{(\text{Sum of all values})}{(\text{No. of values})}$    R. W

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

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

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

$$K = 75 - 39$$

$$\boxed{K = 36}$$

The value of K is 36.

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

Solution:-

Given Data:-

Ratio of initial quantities of sugars and colored water = 4:3

colored water added = 10 liters

Now Ratio of sugar sol & colored water = 4:5

Let the initial quantities of sugar solution & colored water be.
4x and 3x resp

Adding 10 liters of colored water = $4x : 3x + 10 = 4 : 5$.
Calculate the value of x through equation

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

$$5(4x) = 4(3x+10)$$
$$20x = 12x + 40$$
$$20x - 12x = 40$$
$$8x = 40$$
$$x = \frac{40}{8}$$

$$x = 5.$$

**Justification:** Initial concentration of sugar solution: $4x = 20$ liters

initial concentrations of sugar sol & colored water

$$4x : 3x = \frac{20}{15} = \boxed{\frac{4}{3}} \quad (4:3)$$

after adding 10 water in $= 4x : 3x + 10 = \frac{20}{25} \cdot \frac{4}{5} \quad \boxed{4:5}$

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

**Solution:**

Given Data: Football's radius = 12 cm

Formula for volume of a sphere is: $V = \frac{4}{3}\pi r^3$

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

$$V = \frac{4}{3}\pi \, 1728$$

$$V = \frac{4 \times 1728 \, \pi}{3} \qquad \left[\pi : \frac{22}{7}\right.$$

$$V = \frac{4 \times 1728 \times 22}{3 \times 7}$$

$$V = 7,238 \text{ cm}^3$$

$$\boxed{V = 7238 \text{ cm}^3}$$

The volume of football is $7238 \text{ cm}^3$.

d)

**Question no. 7:-**

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

**Solution:-**

Given Data:O    $y$    $y\% = ?$    $y \times 20$

20% of $x = y \cdot 20$    $\dfrac{}{100}$

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

we get:
$$\dfrac{20}{100} x = y \quad \rightarrow \text{①}$$

$$\dfrac{100}{1}\left(\dfrac{yx}{100y}\right) 20 = ? \quad \text{②}$$

$$\left(\dfrac{\frac{y}{20}x}{100}\right) \times 1 \quad \times 20$$

Put value of $y$ from eq ① in eq ② we get

$$\left(\dfrac{\frac{y}{20}x}{100}\right)\left(\dfrac{1}{100}\right)(20)$$

$$(y\% \text{ of } x)$$

$$\dfrac{4x}{100}$$

Therefore, $y\%$ of 20 in terms of $x$ is $\boxed{4\%}$

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

<u>Solution:</u>

Given Data.

Avg monthly salary of:-

$\quad$ P and Q = 5050.

$\quad$ Q and R = 6250

$\quad$ P and R = 5200.

Monthly salary of P = ?

formula: Avg means = $\dfrac{\text{sum of all values}}{\text{no. of values}}$

For P & Q = $5050 = \dfrac{Values}{2}$

$\qquad 5050 \times 2 = value$

$\qquad 10,100$

For Q & R = 12,500

For P & R = 10,400.

Add all income = $\dfrac{2(10,400 + 12500 + 10,100)}{2} = \dfrac{33,000}{2}$

$\qquad = 16500.$

$P = \cancel{(P+Q+R) + Q}$

$P =$

$P = (P+Q+R) - (Q+R)$

$P = (16,500) - (12500).$

$\boxed{P = 4000}$

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.

**Solution:**

Given Data,

Two heads = A1 = 105 times.
One head = B = 275 times
No head = C = 120 times

formula:- Probability = $\frac{occured}{Total\ no.}$, $A = \frac{105}{500} = 0.21$

$$B = \frac{275}{500} = 0.55$$

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

$P = A + B + C = 0.21 + 0.55 + 0.24 = 1.$

So. the number of occurence of each event is

| | | |
|---|---|---|
| Two heads = | A = | 0.21 |
| One head = | B = | 0.55 |
| No head | C = | 0.24 |

(d) Jamie 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

**Solution:** Given Data:

Let Jamie age be = $x$.
Jamie's dad age = $4x$.
In 14 years = Jamie's age = $x + 14$
Jamie's dad age = $4x + 14 = 2(x)$.

Sum of Jamie's age and his dad's age = ?

$$4x + 14 = 2x$$
$$4x - 2x = -14.$$
$$2x = 14.$$
$$x = \frac{14}{2}$$
$$\boxed{x = 7}$$

Age of Jamie is 7.

His father is 4 times older $= 4x = 4(7) = 28$.

In 14 year $= 28 + 14 = 42$.

Jamie in 14 year $= 7 + 14 = 21$.

So first condition is satisfied.

The sum of Jamie's age and his dad's age now is.

$$7 + 28 = 35$$

$\longleftrightarrow$

## SECTION - I.

### Question no. 2

What is dengue? Give brief account of its causative agent and its smpystoms?.

### Dengue:

Dongue is a mosquito-borne viral disease caused by the Dengue virus. It is transmitted by the female mosquito **Aedes aegypti**. They are found to be at the peak of their activeness at dawn and dusk. The fever is caused by it and symtoms can develop after 3 to 7 days after becoming infected by the bite of mosquito.

## Causing Dengue Virus :-

Dengue is transmitted by mosquito which carry the 'Dengue Virus>'. The virus has four varied serotypes to infect human being - They are closely related and have antigens which stimulate human body to form antibodies.

## Causitive Agents :-

Female Mosquito - Aedes-Agypti is the mosquito which carry the main dengue virus in it salvary glands. and transmitted only through the sting of mosquito. Dengue cases are more common in sub tropical and tropical regions -

The Mosquito has four stage of their life cycle :-

**Egg** - Female mosquito lay hundreds of eggs - Water loving.

**Larva** - Eggs hatch into larva, feed on water & microorganism

**Pupa** - growth stage between larva and adult.

**Adult** - Feed on human and animal blood causes diseases and carry viral diseases like dengue, malaria.

## Symptoms :-

Loss of appetite

Fever

Diarrhea, nausea & vomiting.

Joint and muscle pain.

Fatigue.

Headache.

Sometime rashes can also found on skin due to mosquito bites

Weakness.

b) Explain dark matter and dark energy.

## Dark Matter:

Dark matter is comprised of particles that donot reflect or emitt light, so they cannot be deflected by electro-magnetic radiations. It is mysterious and invisible substance that cannot be seen directly. The force of dark matter has attractive forces. It attracts all particles even though the light cannot move out of them. Astronomers and Scientists believes that the dark matter exists because visible matter does not have enough gravity to hold the galaxies together.

Composition: Dark matter is composed of super dense astronomical bodies called massive astrophysical compact halo objects (MACHOs) and weakly interacting massive particles (WIMPs)

For example:- Neutron stars and Black holes.

## Dark Energy:-

Dark energy is the energy that helps in the expansion of the universe. Scientist researched that the universe began to expand after the big bang while studying distant super nova. That is the indication that some unknown force is pulling against the gravitational pull causing galaxies to speed apart from each other. Dark energy is a repulsive force. It is opposite of dark matter. Dark energy repels the objects, due to which things move far away from each other.

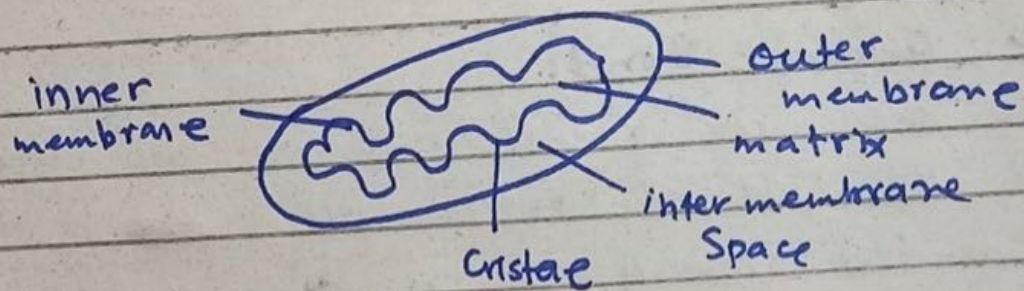For example: Phantom dark energy, The Big RIP.

c) Discuss structure and function of mitochondria. How it is the power house?

## Mitochondria:-

Mitochondria are organelles found in all eukaryotic cell They are major producers of ATP, which is the energy currency of the cell.

## Structure of Mitochondria:-

Mitochondria have two membranes, inner and outer membrane They are made of phospholipids layer. The outer layer membrane covers the surface of mitochondrion, while inner membrane has many fold known as 'Cristae'. The folds increase the surface area of membrane, and the inner membranes holds the proteins involved in the electron transport chain. The space between the outer and inner membrane is called the inter membrane space, and the space inside it is called matrix.



inner membrane

outer membrane

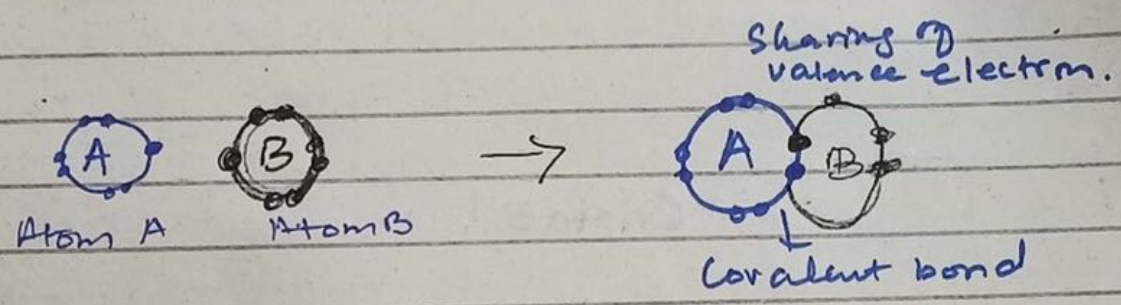matrix

inter membrane Space

Cristae

## Functions:-

Mitochondria produces ATP ( Adenosine triphosphaste) through the process of cellular respiration. This is the major function of mitochondria.

ATP is the energy currency of cell and on breakdown It release alot of energy used for cellular respiration the mitochondria is that is why called the 'power house of the cell' because it produce energy.

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

## Covalent bonds :-

Covalent bonds are type of bonds which are chemical and that involves the sharing of electron pair between atoms. Atoms share electrons so that they can obtain a stable electronic configuration following the octet rule.
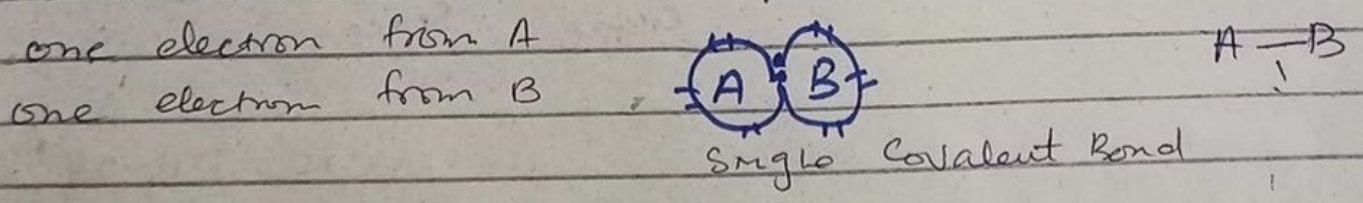


Sharing of valence electron.

Atom A    Atom B    →    Covalent bond

## Types of Covalent Bond :-

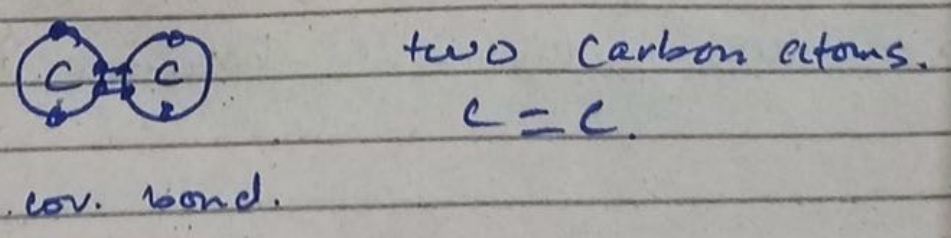A covalent bond can be classified by number of shared electrons, the polarity of bonds and the coordination of atoms.

1. ## Single Covalent Bond :-

When one pair of electrons or two electrons are shared between the atoms. For example, $H_2$, $Cl_2$.

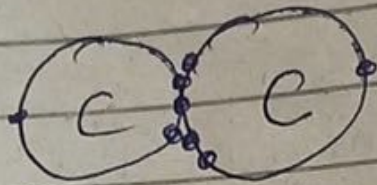one electron from A
one electron from B



Single Covalent Bond

$A - B$

2. ## Double Covalent Bond

When two pair of electrons or four electrons are shared between the atoms, For example $O_2$, $CO_2$.



two carbon atoms.
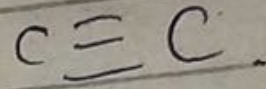$C = C$.

Double cov. bond.

## Triple Covalent Bond

When three pair of electron or six electrons are shared between the atoms. For example, $C_2H_2$

$$C \equiv C.$$



Triple cov. Bond

←————————————→

## Question no 3 :-

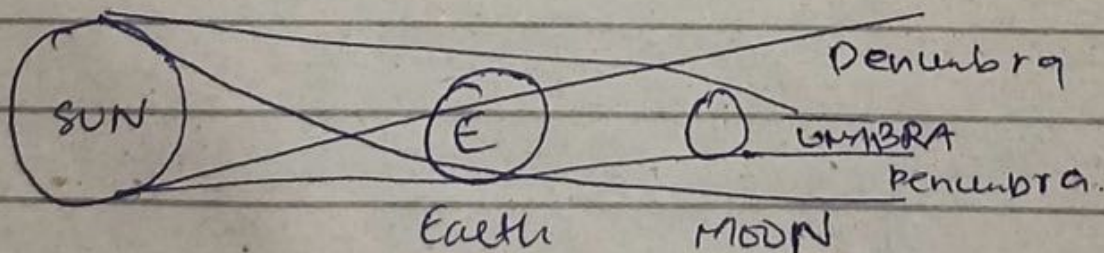What is lunar eclipse? Explain in detail with apt diagram.
Lunar eclipse takes place when earth comes between moon and the Sun. Earth casts a shadow on the moon. At one point, it completely blocks the sunlight, it can be seen anywhere in the world where there is night. The moon can be seen as red or orange in color.
There are three types of lunar eclipses.
Partial
Total
Annual ./ Penumbral lunar eclipse.



SUN

E

Penumbra

UMBRA

Penumbra.

Earth        MOON

Explain function of enzymes in detail with example.

Enzymes provide support for many important processes within the body.

The digestive system :- Enzymes help the body break down larger complex molecules into smaller molecules

Example s   Lipases :- help digest fats.
            Amylases :- helpe cheng starch into sugar
            Trypsin :- breaks protein into amino acids.
            Lactase :- breaks lactose, sugar in milk.

DNA replication :- Each cell in the body contains DNA, every time the cell divides the cell needs to copy it. Enzymes help in the process of unwinding th DNA. Fore xample :- DNA polynerase., Helicase.

Liver enzymes :- The liver breaks down toxins in the body - Rang of enzymes facilitate the process of destroying toxins. For example: Alanin tromsaminase.