

29 Oct - 24.

Maham

Batch no. 141 (Westridge Language Camp)

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.

SECTION II

Question: 6

a) Determine the value of k if arithmetic mean of 1, 8, 20, 12 is 15.

Solution:

Given Data:

Arithmetic Mean = 15

Number of values = 5

Formula for arithmetic mean = $\frac{\text{Sum of all values}}{\text{Number of values}}$

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 CSS 2025. You're gonna rock in sha Allah. :)

The value of k is 36.

$$\begin{aligned} 39 + k &= 15 \times 5 \\ 39 + k &= 75 \\ k &= 75 - 39 \\ k &= 36 \end{aligned}$$

b) A mixture contains sugar solution and colored water in ratio of 4:3. If 10 litres of colored 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 sugar and colored water = 4:3
Colored water added = 10 litres

Now Ratio of sugar and colored water = 4:5

let the initial quantities of sugar solution & colored water be = $4x$ and $3x$ respectively

Adding 10 liters of colored water = $4x : 3x + 10 = 4 : 5$

Calculate the value of x through equation

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

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

$$20x = 12x + 40$$

$$20x - 12x = 40$$

$$8x = 40$$

$$x = \frac{40}{8}$$

$$x = 5$$

Avoid cutting

~~Initial~~ Initial concentration of sugar solution = $4x = 20$ liters

Justification: initial concentration of sugar & colored water = 20
 $4x : 3x = \frac{20}{15} = \frac{4}{3} = 4:3$

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

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

Solution:

Given Data:- Football's radius = 12cm

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

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

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

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

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

V = 7,238 cm³

V = 7238 cm³

The volume of football is 7238 cm³

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:

20% of x = y

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

We get, $\left(\frac{20}{100}\right) x = y$ — (1)

$\left(\frac{y}{100}\right) 20 = ?$ — (2)

Put value of y from eq (1) in eq (2) we get

$\left(\frac{20x}{100}\right) \left(\frac{1}{100}\right) (20)$
 $\frac{4x}{100}$

Therefore, y% of 20 in terms of x is 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.

Solution:

Given Data.

- Avg monthly salary of:
 - P and Q = 5050
 - Q and R = 6250
 - P and R = 5200

Monthly salary of P = ?

Formula: Avg means = $\frac{\text{sum of all values}}{\text{no. of values}}$

For P & Q - $5050 = \frac{\text{values}}{2}$

$5050 \times 2 = \text{value}$

10110

For Q & R = 12500

For P & R = 10400

Add all income = $2(10400 + 12500) + 101100 = 331000$

2

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

= 16500.

P =

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

$P = (16500) - (12500)$

$P = 4000$

(5)

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 = $A = 105$ times.

One head = $B = 275$ times

No head = $C = 120$ times

Formula: Probability = $\frac{\text{occurred}}{\text{Total no.}}$, $A = \frac{105}{500} = 0.21$

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

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

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

So, the number of occurrence of each event is

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

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

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

$$4x + 14 = 2x$$

$$4x - 2x = -14$$

$$2x = 14$$

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

$$x = 7$$

Age of Jamie is 7.

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

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

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

So first condition is satisfied.

The sum of Jamie's age and his father's age now is
 $7 + 28 = 35$



SECTION - I.

Question no. 2

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

Dengue:

Dengue 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 symptoms can develop after 3 to 7 days after becoming infected by the bite of mosquito.

Causative 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 share antigens which stimulate human body to form antibodies.

Causitive Agents:

Female Mosquito - Aedes - Aegypti is the mosquito which carry the main dengue virus in it salivary glands and transmitted only through the sting of mosquito. Dengue cases are more common in subtropical 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 & microorganisms.

Pupa - growth stage between larva and adult.

Adult - Feed on human and animal blood cause 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.

Add early, recovery, and critical symptoms

b) Explain dark matter and dark energy.

Dark Matter:

Dark matter is comprised of particles that do not reflect or emit light, so they cannot be detected 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 believe 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 is it the power house?

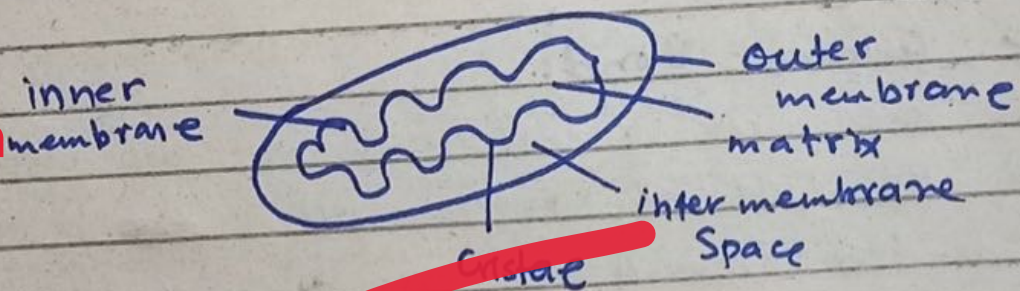
Mitochondria:

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 membrane 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**.

Explain in detail



Functions:

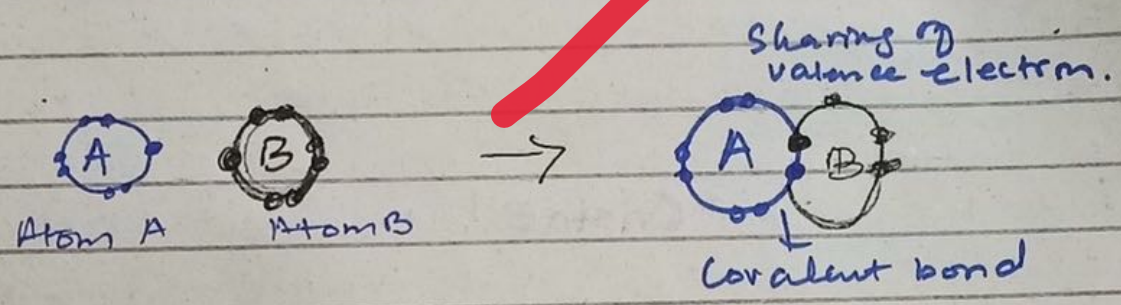
Mitochondria produces ATP (Adenosine triphosphate) through the process of cellular respiration. This is the major function of mitochondria.

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.

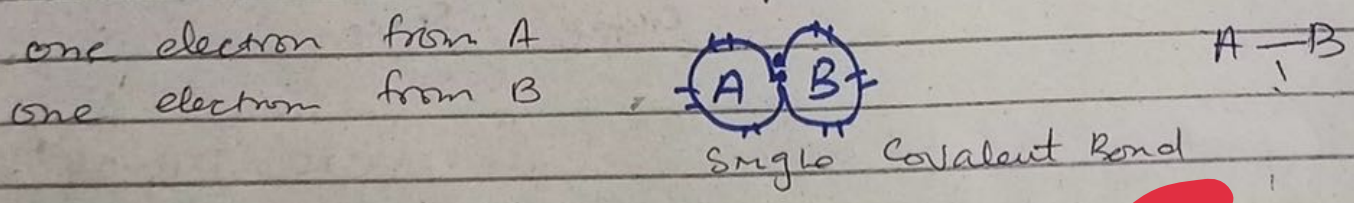


Types of Covalent Bond ::

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

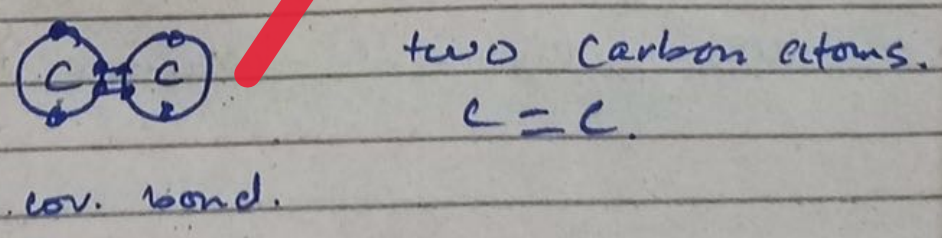
1. Single Covalent Bond ::

When one pair of electrons or two electrons are shared between the atoms. For example, ~~H₂~~, H₂, Cl₂.



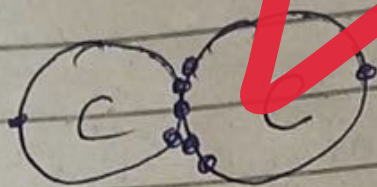
2. Double Covalent Bond

When two pair of electrons or four electrons are shared between the atoms, For example O₂, CO₂.

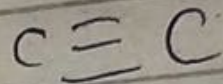


Triple Covalent Bond

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



Triple cov. Bond



Question no 3:-

What is lunar eclipse? Explain in detail with apt diagram.

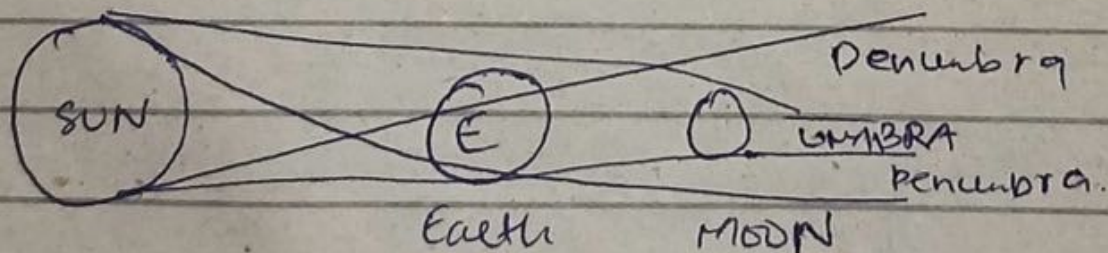
Lunar eclipse takes place when earth comes between moon and the Sun. Earth casts a shadow on the moon. At one point, it completely blocks the sunlight, it can be seen anywhere in the world where there is night. The moon can be seen as red or orange in color.

There are three types of lunar eclipses.

Partial

Total

Annular / Penumbral lunar eclipse.



Explain function of enzymes in detail with example.
Enzymes provide support for many important processes within the body.

Proper explanation is required

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

Examples lipases - help digest fats.

Amylases :: help change 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 the DNA. For example :- DNA polymerase, Helicase.

Liver enzymes :: The liver breaks down toxins in the body. Range of enzymes facilitate the process of destroying toxins. For example: Alanine transaminase.