

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 mark 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. :)

Thus value of K is 39.

b. A mixture?

2. Given Data

Ratio of sugar and colored water = 4:3

No of Liters of water added = 10

Ratio after water addition = 4:5

Initial quantity of sugar = ?

Solution

Since ratio of sugar and colored water is 4:3, we can assume that initial quantity of sugar solution = $4x$ (1)

Initial quantity of colored solution

$$= 3x$$

After addition of 10 Liter of colored water, Ratio becomes

$$x = 38$$

4:5. So we can write for
disolved solution

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

Multiplying $4x$ on both sides

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

$$3x + 10 = 5x$$

Subtracting $3x$ on both sides

$$3x - 3x + 10 = 5x - 3x$$

$$10 = 2x$$

dividing by 2 on both sides

$$\frac{10}{2} = \frac{2x}{2}$$

$$5 = x$$

putting value of x in eq ①

Initial quantity of sugar water

in solution = 4×5

$$= 20 \text{ Liters}$$

Thus initial quantity of sugar solution
in mixture is 20 Liters

C. volume of football ... ?

Given Data
Radius of football $= r = 12 \text{ cm}$ — (1)

Volume of football $= V = ?$

Solution

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

Since football is sphere in shape

So its volume $= \frac{4}{3} \pi r^3$ — (2)

Putting value of r from Eq (1)

and using value of π as $\frac{22}{7}$

Eq (2) becomes

$$\text{Volume of football} = V = \frac{4}{3} \times \frac{22}{7} \times (12)^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 12 \times 12 \times 12$$

$$= \frac{50688}{7} \text{ cm}^3$$

$$\text{Volume of football } V \approx 7241.1 \text{ cm}^3$$

Thus volume of football is approximately 7241.1 cm^3

Q. Given a series - - - -

① Given Data terms of the series = -10, -8, 6, 40, 102, ?
Number that comes in place of ? = unknown

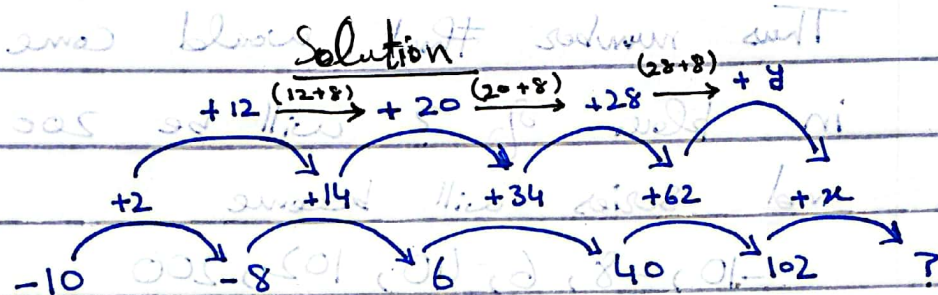


figure 6d(1)

Careful examination of series reveals that each next term of series is achieved by addition of 8 into the increment that was added into the previous term.

from the figure 6d(1), we know that

$$? = 102 + x \quad \text{--- (1)}$$

$$\text{where as } x = 62 + y \quad \text{--- (2)}$$

$$\text{where as } y = 28 + 8$$

$$y = 36$$

putting value of y in Eq (2)

$$x = 62 + 36$$

$$x = 98$$

Putting value of x in eq ①

$$9, 10, 12, \dots, ? = 102 + 98$$

$$? = 200$$

Thus number that would come in place of $?$ will be 200 and series will become

$$9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200$$

(A) is correct

Q. No. 7

a. If 20% of $x = y$

Given Data:

$$20\% \text{ of } x = y$$

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

Solution

we know that

$$20\% \text{ of } x = y \quad \text{--- ①}$$

As $\frac{1}{100} = \frac{1}{100}$ so Eq (1)

becomes y value

$250 = 51 \text{ but } 20 \times \frac{1}{100} \times x = y$

250 = 51 but

$\frac{x}{5} = y$ — (2)

Value of $y\%$ of 20 = $\frac{y}{100} \times 20$

Value of $y\%$ of 20 = $\frac{y}{5}$ — (3)

putting value of y from Eq (2) into Eq (3)

Value of $y\%$ of 20 = $\frac{x}{5} \times \frac{1}{5}$

Value of $y\%$ of 20 = $\frac{x}{25}$

Thus value of $y\%$ of 20 in terms of x is $\frac{x}{25}$

(2) — $9 + 9 = 18$

b. P and Q ?

Given Data:

Average monthly salary of P and Q = 5050 Rs — (1)

" " " " Q and R = 6250 Rs — (2)

" " " " P and R = 5200 Rs — (3)

Monthly salary of P = ?

Solution:

We know that

$$\text{② — average} = \frac{\text{Sum of terms}}{\text{No of terms}}$$

So Eq ① becomes

$$5050 = \frac{P+Q}{2}$$

Multiplying with ② on both sides

$$2 \times 5050 = \frac{P+Q}{2} \times 2$$

$$10100 = P+Q \text{ — ④}$$

Eq ② becomes

$$6250 = \frac{Q+R}{2}$$

Multiplying by 2 on both sides

$$2 \times 6250 = \frac{Q+R}{2} \times 2$$

$$12500 = Q+R \text{ — ⑤}$$

(4) Eq (3) + becomes $10000 = 9$

$$9 + \frac{P+R}{2} = 5200 \quad (4)$$

Multiplying with 2 on both sides

$$2 \times \frac{P+R}{2} = 9 + 5200 \times 2 = 9 + 10400$$

$$P+R = 10409 \quad (5)$$

Subtracting R on both sides

$$P+R-R = 10409-R$$

$$P = 10409-R \quad (6)$$

Subtracting Q on both sides of (5)

$$12500-Q = Q+R-Q$$

$$12500-Q = R \quad (7)$$

Putting value of R in Eq (6)

$$P = 10409 + 12500 - Q \quad (8)$$

Subtracting P on both sides of (4)

$$10000 - P = P+Q-P$$

$$10000 - P = Q \quad (9)$$

Putting value of Q in Eq (8)

of these two eqs if multiplied

$$10000 - P = Q$$

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

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

adding P on both sides

$$P + P = 8000 - P + P$$

$$2P = 8000$$

dividing by 2 on both sides

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

$$P = 4000 \text{ Rs}$$

This monthly salary of P is Rs 4000.

C. Two coins are tossed 500 times

Given Data :

Total number of times two coins are tossed = 200

Number of times 2 heads come = 105

" " 1 head comes = 275

" " no head comes = 120

probability of each event to occur = ?

Solution

$$\text{Probability of an event} = \frac{\text{total outcomes}}{\text{No of times that event occurs}} \quad \text{--- (1)}$$

So from given data putting values in Eq (1)

$$\text{Probability of two heads} = \frac{500}{105}$$

$$\text{Probability of an event} = \frac{\text{No of times that event occurs}}{\text{total outcomes}} \quad \text{--- (1)}$$

For two heads, putting values from given data in Eq (1)

$$\text{Probability of two heads} = \frac{\text{No of times 2 heads come}}{\text{total times coin is tossed}}$$

$$= \frac{105}{500}$$

$$\text{Probability of two heads} = \frac{21}{100}$$

For one head, Eq (1) becomes

$$\text{Probability of one head} = \frac{\text{No of times 1 head comes}}{\text{total coin tosses}}$$

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

$$\text{Probability of one head} = \frac{55}{100} = \frac{11}{20}$$

For no head Eq ① becomes

① - Probability of no head = $\frac{\text{No. of times no head comes}}{\text{Total coin tosses}}$

$$\frac{120}{500} = \frac{6}{25}$$

probability of no head = $\frac{6}{25}$

d. Jamie's dad - - - - -

Given Data

Let Jamie's age = J

Jamie's dad age = D

Jamie's Dad is four times older

than Jamie, it means we can

write $D = 4 \times J$ — ①

After 14 years, Jamie's dad will

be twice of age than Jamie,

So we can write

$$D + 14 = 2 \times (J + 14) \text{ — ②}$$

Sum of Jamie's age and his

dad's age now = ?

11 = $\frac{22}{2}$

$$\text{James age now} = J + 14 = 1$$

$$\text{James dad age now} = D + 14$$

$$\text{Sum of their ages} = (J+14) + (D+14)$$
$$J + D + 28 = \text{---} \textcircled{3}$$

In order to find J and D's values, we will use eq ① and ② from given conditions.

$$\text{eq ①} \Rightarrow D = 4J$$

$$\text{eq ②} \Rightarrow D + 14 = 2 \times (J + 14)$$

$$D + 14 = 2J + 28$$

subtracting 14 on both sides

$$D + 14 - 14 = 2J + 28 - 14$$

$$D = 2J + 14 \text{ --- } \textcircled{4}$$

putting value of D from eq ①

$$4J = 2J + 14$$

subtracting 2J on both sides

$$4J - 2J = 2J - 2J + 14$$

$$2J = 14$$

dividing by two 2 on both sides

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

$$\boxed{J = 7}$$

putting value of J in eq ④

$$D = 1(2 \times 7) + 14$$

$$= 14 + 14$$

$$\boxed{D = 28}$$

③ → putting values of T and D in eq (3)

Sum of Janie and his dad's ages now = $7 + 28 + 28$

$$= \boxed{63}$$

Thus Sum of Janie and his dad's current age now is 63.

④ → $P_1 + T = D$

⑤ put value of T in eq ④

$$P_1 + 28 = 28$$

value of P_1 is 0

$$P_1 + 28 - 28 = 28 - 28$$

value of P_1 is 0

$$P_1 = 0$$

value of T is 7

$$T = 7$$

Q. No. 2

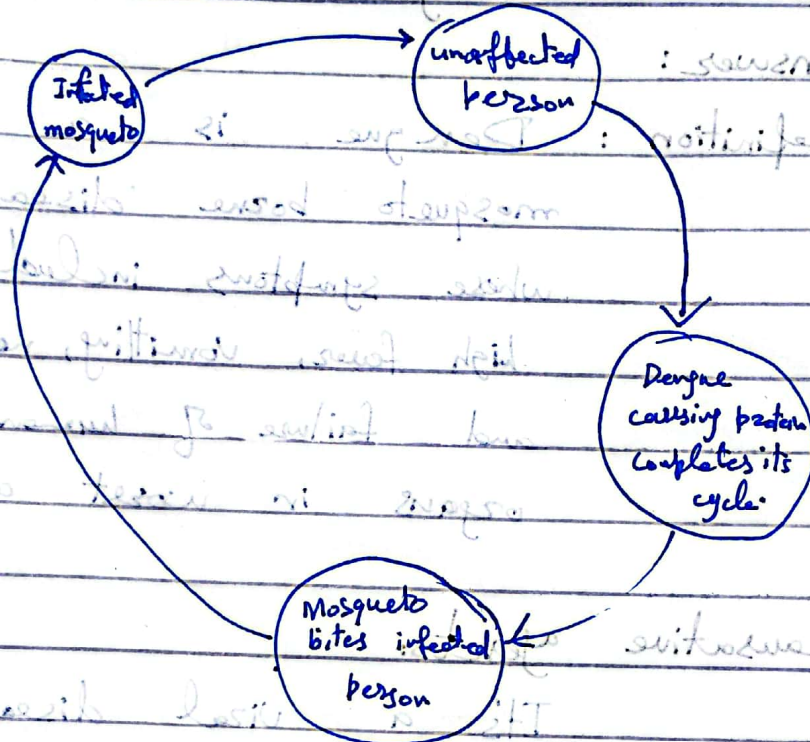
a. what is dengue ? - - -

Answer:

Definition : Dengue is a mosquito borne disease whose symptoms include high fever, vomiting, nausea and failure of human organs in worst cases.

Causative agents:

It's a viral disease. It is spread by mosquitoes of special kind known as Aedes Aegypti. Infected mosquito transmit the protein into people it bites. The protein completes its cycle inside body of the host and causing him dengue in this process. When mosquito bites the infected person it transmits the disease from his blood to next person it bites.



Dengue Cycle

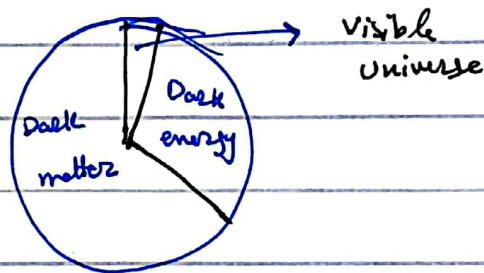
Symptoms

- 1- high fever
- 2- head ache
- 3- Vomiting
- 4- Nausea
- 5- Multiple organ failure

Early, critical and recovery symptoms

b- Dark Matter and Dark Energy

Dark matter and dark energy collectively make around 97% of our universe. They are called dark, as they do not reflect light and hence cannot be seen.

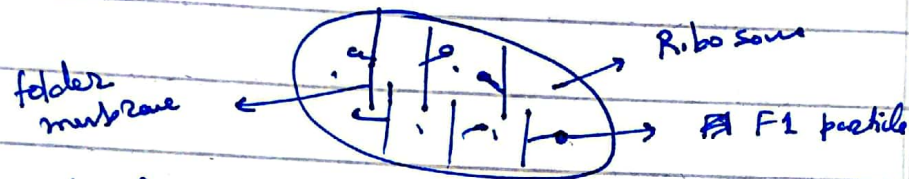


How Dark matter and Energy are Detected?

~~They are detected due to their high magnetic field and mass bending the light and time space around them.~~

C. Mitochondria

Structure



Mitochondria is a membrane bound organelle that is found within cytoplasm of the cell. It has folded membrane, with F1 particles sticking out of it and fewer ribosomes, used for protein synthesis.

Function

- 1- It provide energy to the cell to conduct its functions
- 2- Helps in cell respiration
- 3- Facilitates Krebs cycle.
- 4- Provides assistance in metabolic processes.

Why is it power house of cell?

Since it facilitates

processes that are involved in releasing energy i.e. respiration, metabolic, Krebs cycle, it provides energy to the cell in form of ATP. which upon usage at appropriate time get converted into ADP. Mitochondria again converts it to ATP and act as source of power to cells. That is why it is called power house of cell.

d- Covalent Bond

Bonds between atoms that are formed due to sharing of electron pairs.

Reason of covalent Bond formation

Atoms share bond to attain electronic configuration of nearest noble gas and attain stability

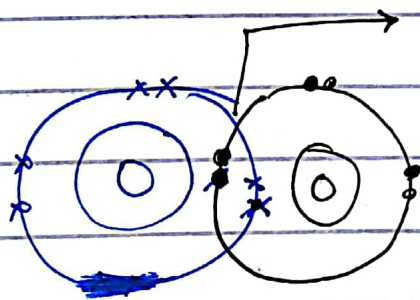
by doing so.

What kind of atoms form covalent Bond.

non metallic atoms form bond by sharing electron pairs. Metallic and form electron

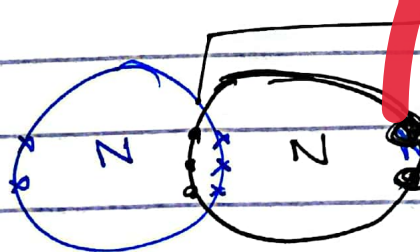
Structures after Covalent Bond.

Oxygen gas



O_2 forms double covalent bond by sharing electrons

Nitrogen gas

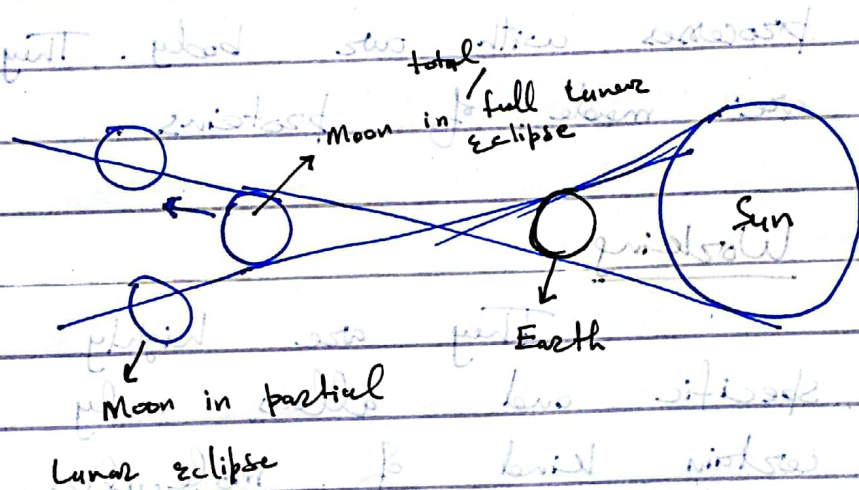


N_2 forms triple covalent bond by sharing 3 electron pairs.

Q. No. 3

a. Lunar Eclipse

When Earth comes between Sun and Moon, it casts its shadow upon the moon. This phenomenon is called Lunar Eclipse.



Total: Lunar Eclipse

When the Earth's shadow completely blocks the moon, it is said to be in total lunar eclipse.

Partial Lunar Eclipse

When earth's shadow

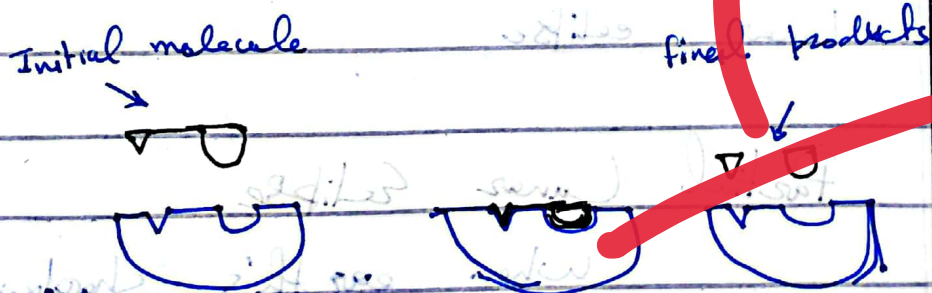
only partially covers the moon,
it's called partial lunar eclipse.

b- Enzymes

Enzymes are catalysts that increase the rate of various chemical processes with our body. They are made of proteins.

Working

They are highly specific and allow only certain kind of molecules to be processed. Molecule attaches itself to specific site on enzyme and enzyme converts it into smaller products by breaking it down.



examples

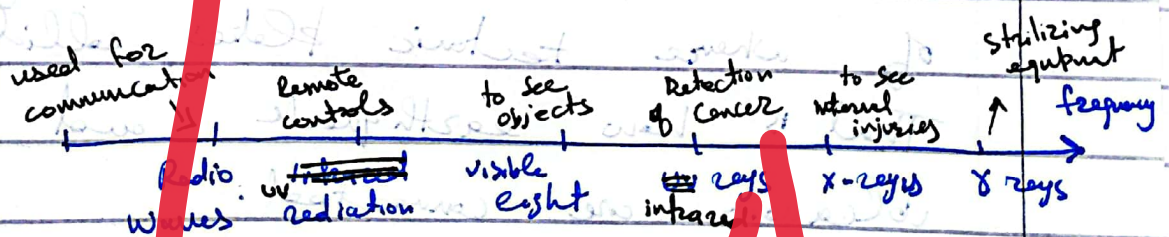
Trypsin $\rightarrow$ converts proteins into amino acids in digestive system

Amylase $\rightarrow$ Converts Lipids into fatty acids

C- Electromagnetic Radiation

Electromagnetic radiations are waves that transfer energy due to changing electric and magnetic field. They vary in type based upon their wavelength.

EMR Spectrum

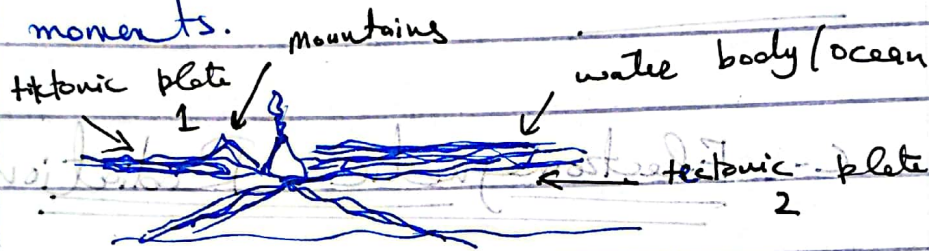


Based upon the frequency / wavelength Electromagnetic Radiations form a spectrum shown above, known as EMR spectrum

d.

Interconnection of Earthquakes and volcanic eruption.

They both are connected to tectonic plate movements.



When tectonic plate under ocean comes in contact with terrestrial tectonic plate, their friction causes earthquake, while ocean water gets through cracks and lowers boiling point of mantle, which comes out as lava from volcanic pipes on the boundary of where tectonic plates collide. That is how earthquake and volcanoes are connected.