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377

General Science

And Ability

(Mock)

PART-II

SECTION-I

Q. NO. 2

(a)

Dengue:

→ Dengue is a viral infection spread primarily through a female mosquito *Aedes aegypti* and *Aedes albopictus*.

It is mostly common in tropical and sub-tropical climates.

Causative Agent:

→ The disease is caused by the dengue virus (DENV), which has four different

Day: _____

Date: _____

serotypes (DENV-1, DENV-2, DENV-3, and DENV-4), it is carried by *Aedes aegypti*. A person infected with one serotype may become immune to it, but can still be infected by other serotypes.

Symptoms:

→ Following are the symptoms of Dengue virus;

1. Fever,
2. Severe headache,
3. Pain behind the eyes,
4. Joint and muscle pain,
5. Rash, and mild bleeding, etc.

(b)

Dark Matter:

→ Dark matter is an unknown form of matter that makes up about 27% of the universe. It does not emit, absorb, or reflect light, making it invisible. Its presence is inferred

from its gravitational effects on visible matter, radiation, and the structure of the universe.

Dark Energy:

→ Dark energy is a mysterious force driving the accelerated expansion of the universe, accounting for about 68% of the cosmos. Unlike dark matter, which clusters, dark energy appears to have a uniform density, affecting space's fundamental structure.

(d)

Covalent Bonds:

→ Covalent bonds are formed when;

☞ Atoms share electron pair to achieve stability. ☞



Types:

→ Following are the three types of covalent bonds;

(1) Single Covalent Bond:

→ Single covalent bond is formed when atoms share one pair of electrons.

Example:

→ For example, hydrogen (H₂)

Structure:

H₂



(2) Double Covalent Bond:

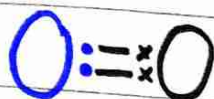
→ Double covalent bond is formed when atoms share two electron pairs.

Example:

→ For example, Oxygen (O₂)

Structure:

O₂



(3) Triple Covalent Bond:

→ Triple covalent bond is formed when atoms share three electron pairs.

Example:

→ For example, nitrogen (N_2).

Structure:

N_2



(c)

Structure of Mitochondria:

→ Mitochondria has a double membrane, the outer is smooth, while the inner membrane is folded into structures called cristae, which increases the surface area for energy production.

Figure:

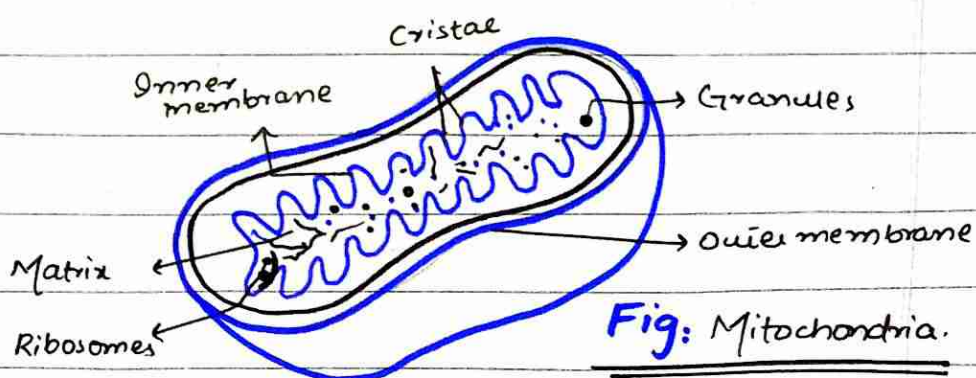


Fig: Mitochondria.

Function of Mitochondria:

→ Mitochondria are responsible for;

1. Cellular respiration,
2. Energy production,
3. Produce Adenosine Triphosphate (ATP), the cell's main energy carrier, through Oxidative phosphorylation.

Powerhouse Role:

→ They are termed as the "powerhouse of cell" because they convert glucose and oxygen into energy (ATP), essential for cellular functions.

Q.No.3

(a)

Lunar Eclipse:

→ A lunar eclipse occurs when;

“Earth comes between the sun and the moon, causing earth's shadow to fall on the moon.”

Types:

→ There are three types of lunar eclipse;

1. total,
2. partial,
3. Penumbral.

Diagram:

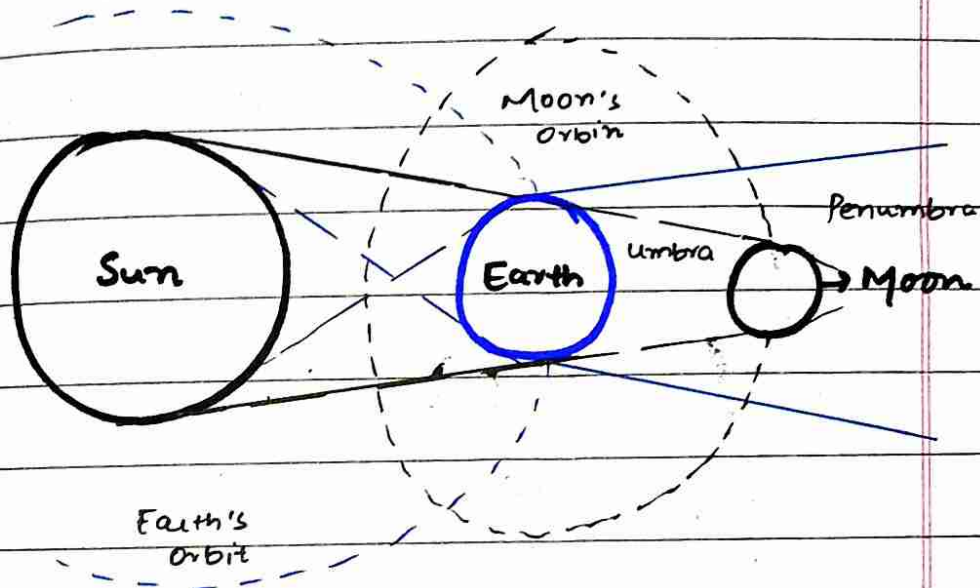


Fig: Lunar Eclipse

(b)

Enzyme:

→ Enzymes are

Biological catalysts that

speed up chemical reactions
in living organisms. →

Function:

→ Enzymes lower the activation energy required for chemical reaction.

Example:

→ Amylase breaks down starch into sugars and lipase helps digest fats.

(d)

Earthquakes and Volcanic

Eruptions are interconnected.

→ Yes, earthquakes and volcanic eruptions are interconnected as both result from tectonic plate movements. Earthquakes can occur due to volcanic eruptions, moreover, shifting plates can lead to both earthquakes and volcanic eruptions. Therefore, both are caused by heat and energy released by earth's core.

(C)

Brief account of Electromagnetic Radiations (EMR):

→ EMR consists of;

“Waves of electric and magnetic fields that travel through space.”

→ EMR is, therefore, a stream of mass-less particles, called photons, each travelling in a wave-like pattern at the speed of light.

- NASA

Figure:

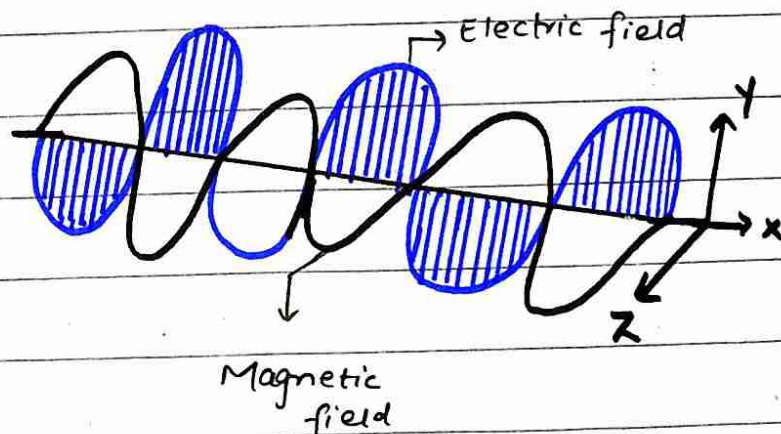


Fig: Electromagnetic Radiations
(EMR)



Day: _____

Date: _____

EMR Spectrum:

→ EMR spectrum ranges from low energy radio waves to high energy gamma rays, including microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays.

SECTION-II

Q. NO. 6

(a)

Determine the "k" value is 15.

Solution:

As,

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

Solving for "k" value;

$$39 + K = 15(5)$$

$$K = 75 - 39$$

$$K = 36$$

(b)

A mixture ----- given
mixture.

Solution:

Let, the initial quantities be;

$$\text{Sugar} = 4x$$

$$\text{Colored water} = 3x$$

After adding 10 l of colored water;

$$4x : 3x + 10 = 4 : 5$$

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

$$20x = 4(3x + 10)$$

$$20x = 12x + 40$$

$$20x - 12x = 40$$

$$8x = 40$$

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

$$x = 5$$

Putting $x = 5$, for initial quantity of sugar solution;

$$\text{Sugar} = 4(5)$$

$$\text{Sugar} = 20 \text{ l}$$

(c)What will be 12cm.Solution:

As,

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

$$\therefore r = 12 \text{ cm}$$

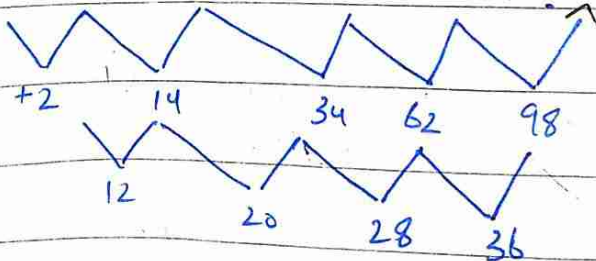
$$V = \frac{4}{3} \left(\frac{22}{7} \right) (12)^3$$

$$V = \frac{88}{21} (1728)$$

$$V = 7216.47 \text{ cm}^3$$

(d)-10, -8, -6, 40, 102, ?Find the number:Solution:

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



→ Therefore, the missing number is 200.

Q. NO. 7

(a)

If 20% ----- of x?

Solution:

Given that;

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

So,

$$\frac{20}{100} \times x = y$$

$$20x = 100y$$

$$x = \frac{100}{20} y$$

$$x = 5y$$

For y% of 20;

$$\frac{y}{100} \times 20 = \frac{y}{5}$$



Day: _____

Date: _____

Putting $x = 5y \Rightarrow y = \frac{x}{5}$

$$y\% \text{ of } 20 = \frac{y}{5} = \frac{x/5}{5}$$

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

→ Therefore, $y\%$ of 20 in terms of x is $\frac{x}{25}$.

(c)

Two coins - - - - - to occur.

Solution:

Total trials = 500 times,

Two heads:

$$P(\text{Two heads}) = \frac{105}{500}$$

$$P(\text{Two head}) = 0.21$$

One head:

$$P(\text{one head}) = \frac{275}{500}$$

$$P(\text{one head}) = 0.55$$

Day: _____

Date: _____

No head:

$$P_{(\text{no head})} = \frac{120}{500}$$

$$P_{(\text{no head})} = 0.24$$

(b)P and Q ----- of P?Solution:

Given that,

$$\frac{P+Q}{2} = 5050 = 10100 \quad \text{--- (i)}$$

$$\frac{Q+R}{2} = 6250 = 12500 \quad \text{--- (ii)}$$

$$\frac{P+R}{2} = 5200 = 10400 \quad \text{--- (iii)}$$

Adding all three equations;

$$(P+Q) + (Q+R) + (P+R) = 10100 + 12500 + 10400$$

$$2P + 2Q + 2R = 33000$$

$$2(P+Q+R) = 33000$$

Day:

Date:

$$P + Q + R = \frac{33000}{2}$$

$$P + Q + R = 16500$$

Putting $Q = 10100 - P$ and $R = 10400 - P$
from (i) and (ii);

$$P + (10100 - P) + (10400 - P) = 16500$$

$$P - 2P + 20500 = 16500$$

$$-P = 16500 - 20500$$

$$+P = +4600$$

$$P = 4600$$

(d)

Jame's dad - - - - - age now?

Solution:

Let,

Jamie's age = x

Day: _____

Date: _____

$$\text{Jamie's dad's age} = 4x$$

In 14 years;

$$\text{Jamie's age} = x + 14$$

$$\text{Dad's age} = 4x + 14$$

Given;

$$4x + 14 = 2(x + 14)$$

$$4x + 14 = 2x + 28$$

$$4x - 2x = 28 - 14$$

$$2x = 14$$

$$\boxed{x = 7}$$

→ So, Jamie's current age is 7. And his dad's age is $4 \times 7 = 28$.

→ Sum of their ages;

$$\boxed{7 + 28 = 35}$$