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Part - II

SECTION - I

Question

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

Answer:-

- Dengue is a viral infection transmitted by mosquitoes, primarily Aedes aegypti.
- **Causative agent:-** The causative agent of dengue virus is the dengue virus, which is a single-stranded RNA. There are four types of dengue viruses (DENV 1- DENV 4).
- **Symptoms:-** Symptoms of dengue include high fever, severe headache, pain behind the eyes, joints and muscles pain, rash and bleeding tendencies in severe case.

b. Explain dark matter and dark energy.

Answer:-

Dark matter and dark energy are the components of the universe. Together they compose 95% of the cosmos. Neither emits not absorbs light, making them difficult to observe directly.

- **Dark Matter:-**

Explain properly

Dark matter makes up about 27% of the universe and exerts gravitational force. It helps to ~~keep~~ hold galaxies together despite their high speed.

- **Dark Energy :-**

Dark energy makes about 68% of the universe. It is believed to cause the accelerated expansion of the universe.

C. Define structure and function of mitochondria. How is it the powerhouse?

Answer :-

- **Structure and functions of Mitochondria :-**

Mitochondria is a double membrane organelle with an outer membrane and a̶n̶ folded inner membrane, which forms "cristae." These increase the surface area for energy production processes. The matrix contains enzymes, mitochondrial DNA, and ribosomes.

- **Powerhouse of the cell :-**

Mitochondria produces ATP (adenosine triphosphate) through cellular respiration. Also known as energy currency of the cell. This energy production earns it the name of "powerhouse" of the house.
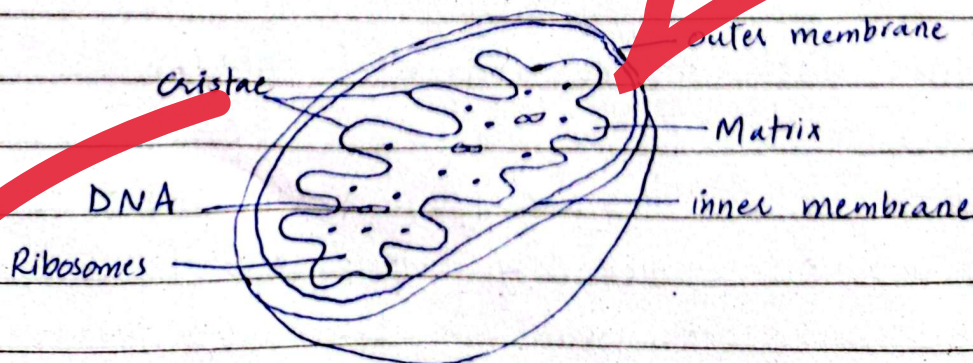
Cristae

outer membrane

Matrix

DNA
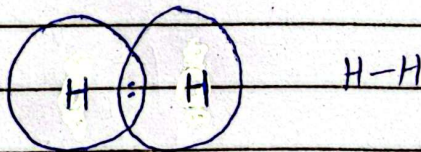
inner membrane

Ribosomes

Diagram of mitochondria

d. What are covalent bonds? Explain types with elaborating structures.
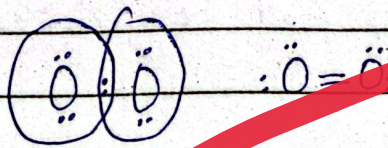
Answer:-

- Covalent bonds form when atoms share electrons to pairs to achieve stability. Following are the types of covalent bonds:-

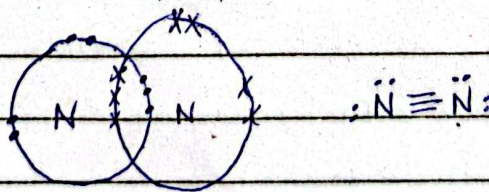i. Single Covalent bond :- One pair of electron is shared between two atoms.

For Example Single covalent bond in H_2

$$H-H$$

ii. Double Covalent bond :- Two pairs of electrons are shared. For instance, double covalent bond in O_2.

$$:\ddot{O}=\ddot{O}:$$

iii. Triple Covalent bond :- Three pairs of electrons are shared. For instance, triple covalent bond in N_2.

$$:N\equiv\ddot{N}:$$

Question. 4

a. What is noise pollution? Give its harmful effects and ways to curb.

Answer:-

- **Noise Pollution :-**

It is the presence of excessive or harmful sounds in the environment that disrupt normal activities and adversely affects the health.

- **Harmful effects :-**

Its harmful effects include hearing loss, increased stress, sleep disturbance, cardiovascular issues and reduced concentration.

- **Ways to curb noise pollution :-**

To curb noise pollusion we can implement sound proofing in buildings, ensure and enforce regulations on noise polutions, promote use of quieterg machine, and plant more trees as sound barriers.

b. **What is the importance of fibers in diet? How would a platter of food be considered balanced?**

Answer :-

- **Importance of Fibers :-**

Dietary fibers are found in plant based foods, is essential for digestive health. It helps regulate bowel movement, lowers cholectrol, controls £ blood sugar, and supports weight mangement.

- **A balanced Platter :-**

For a bt. balanced diet, our platter must include variety of nutrients: carbohydrates, g protein, healthy fats, fibers, vitamins and minerals to ensure body recieves all necessary nutrients-

Add percentage proportion

Explain properly

c- **Elaborate on drinking water quality and standard.**

The quality of drinking water can be checked by physical, chemical and biological parameters. Organizations like WHO have set standards by specifying the limit of bacteria and chemicals in water to make it safe for consumption. High quality water should be free ~~from~~ from toxins, pathogens etc., must have a balanced pH, and essential minerals in it.

d. **Explain lithosphere. What are rocks and minerals?**

Answer:-

• **Lithosphere:-**
It is the earth's rigid outer layer, comprising of crust and upper mantle. It is divided into tectonic plates that float in the semi-fluid beneath it.

• **Rocks:-**
Rocks are naturally occuring solids of minerals. They are ~~so~~ characterized by the minerals included, their chemical composition and the way in which they are formed. The three types of rocks include: igneous, sedimentary and metamorphic.

• **Minerals:-**
Minerals are naturally occuring inorganic substances with a defined chemical composition and crystalline structure. They are the building blocks of rocks.

lithosphere

Mantle
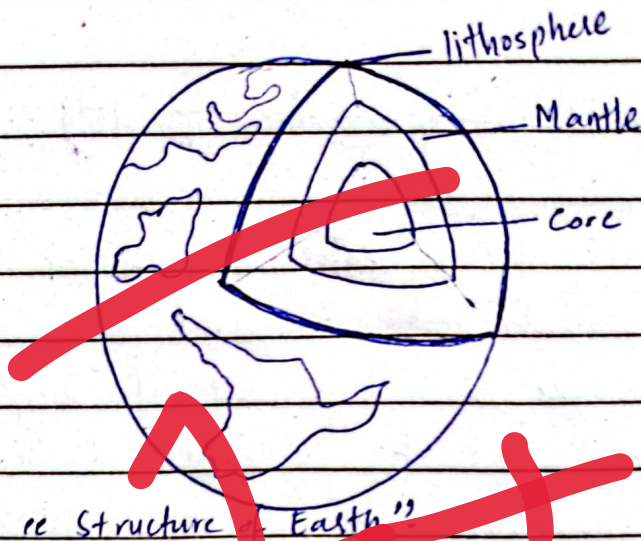
Core

"Structure of Earth"

SECTION - II

Question :- 6

Part a. Determine the "k" value if the arithematic mean of 9, 8, 10, k, 12 is 15.

Solution:-

Arithematic mean = $\dfrac{\text{sum of values}}{\text{total number of values}}$

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

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

$$15 \times 5 = 39 + k$$

$$75 = 39 + k$$

$$75 - 39 = k$$

$$36 = k \quad \text{or} \quad k = 36.$$

Rough

$\begin{array}{r} 2 \\ 2 \\ 8 \\ + 9 \\ \hline 39 \end{array}$

$\begin{array}{r} 15 \\ 5 \\ \hline 75 \end{array}$

$\begin{array}{r} 75 \\ - 39 \\ \hline 36 \end{array}$

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

Solution :-

let sugar solution be 'x' and colored water by 'y'.

Than,

$$4x : 3y+10 :: 4x + 5y.$$

product of extreme = product of mean.

$$4x × 5y = 3y+10 × 4x.$$

let the initial quantities of sugar solution and colored solution be $4x : 3x$. After adding 10 liters of colored solution the quantity of colored water becomes $3x+10$.

So,

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

product of extreme = product of mean.

$$4x(5) = 3x+10(4)$$
$$20x = 12x+40$$
$$20x-12x = 40$$
$$8x = 40$$
$$x = 40/8$$
$$x = 5$$

The initial quantity of sugar solution is $4x$

So, $4(5) = 20$ liters.

Part c. What will be the volume of football with radius of 12 cm?

Solution:-

radius $= r = 12\,cm$.

Volume $\bullet$ $= ?$

Formula of volume of sphere $= V = \dfrac{4}{3}\pi r^3$.

$$V = \dfrac{4}{3} \times \dfrac{22}{7} \times (12)^3$$

$$V = \dfrac{4}{\cancel{3}} \times 3.14 \times \overset{576}{\cancel{1728}}.$$

$$V = 4 \times 3.14 \times 576$$

$$V = 7234.56\,cm^3.$$

So, volume of football is $7234.56\,cm^3$.

Part d. Given a series $-10, -8, 6, 40, 102, ?$ Find the number that would come in place of question mark.

Solution:-

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

Difference between $2, 14, 34, 62$ is $\rightarrow$ $12, 20, 28$

Now, $12, 20, 28$. the answer is 8.

Adding 8 in 28 we '36'. And $36 + 62 = 98-$

Hence, $98 + 102 = 200$

According to this sequence the number next to 102 is 200.

Question : 7

__Part a.__ If 20% of $x = y$; what is the value of $\frac{y\% \text{ of}}{\uparrow 20}$ in terms of x.

Solution :-

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

$$\frac{20}{5 \, 100} \cdot x = y.$$

$$\frac{x}{5} = y.$$

Now finding 20 y% of 20 in terms of x

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

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

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

Adding value of y i.e $y = x/5$

$$y = \frac{x/5}{5} = \frac{x}{5 \times 5} = \frac{x}{25}$$

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

DATE __/__/____

Part c. Two coins are tossed 500 time, we get

Two heads : 105 times.

One head : 275 time.

No head 120 times.

Find the probability of each to occur.

Solution:-

Probability = $\frac{no. of\ outcomes}{Total\ outcomes.}$

=> Probability for two heads;

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

Probability = 0.21

=> Probability for one head = $\frac{275}{500}$

Probability = 0.55

=> Probability for no heads = $\frac{120}{500}$

Probability = 0.24

Part d. Jamie's dad is four times older than Jamie. In for 14 years jamies 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:-

let Jamie's age be 'x' and his dad's age be '4x'.

In 14 years,

Jamie's age = $x + 14$

and his dad's age = $4x + 14$. $\div \xi 2(x+14)$

Solving the equation to find Jamie's current age.

$4x + 14 = 2x + 28$

$4x - 2x = 28 - 14$

$2x = 14$

$x = 7$

Jamie's dad's current age = $4(x)$

$= 4 \times 7 = 28$.

Sum of their current ages = $28 + 7 = 35$ years.