PART - II

Section - I

Q. No. 2

a.

Ans:

Dengue: Dengue is a vector-borne infection that is caused by the dengue virus. The dengue virus is spread by a special kind of mosquito breed called the Aedes Aegypti. These mosquitos are found almost everywhere in the world. Only female aedes aegypti mosquitos carry the virus.

Causative Agents: The causative agents of dengue are DENV-1, DENV-2, DENV-3, and DENV-4. These stereotypes are all found in the genus Flavivirus. Each stereotype can cause the dengue virus, however, immunity to each is different. If a person develops immunity to one stereotype it would not protect him against other stereotypes. If a human contracts dengue fever multiple time from different ~~steer~~ stereotypes he can possibly have Dengue Shock Syndrome or DSS. In this condition, the newer infection is even more severe.

Symptoms: Symptoms of dengue fever can include:

i. Rashes and blisters
ii. Fatigue
iii. Muscle aches
iv. Vomiting
v. Sudden drop in blood pressure
vi. Nose bleeding and gum bleeding
vii. High body temperature (around 104°F)
viii. Pain behind eyes (ocular pain)
ix. Weakness upto seven weeks
x. Diarrhoea
xi. Dehydration

b.

Ans: In astrophysics and cosmology, both dark matter and dark energy are mystries. Visible universe is, for most part, made up of protons, neutrons, and electrons, however, scientists infer that 25% of universe is dark matter. There is a force that repels gravity that is called dark energy.

Dark Matter: Dark matter is invisible. It does not interact with electromagnetic radiation. The most common explanation of dark matter by scientists is that it might be some yet undiscovered subatomic particle. It was discovereed in 1990's.

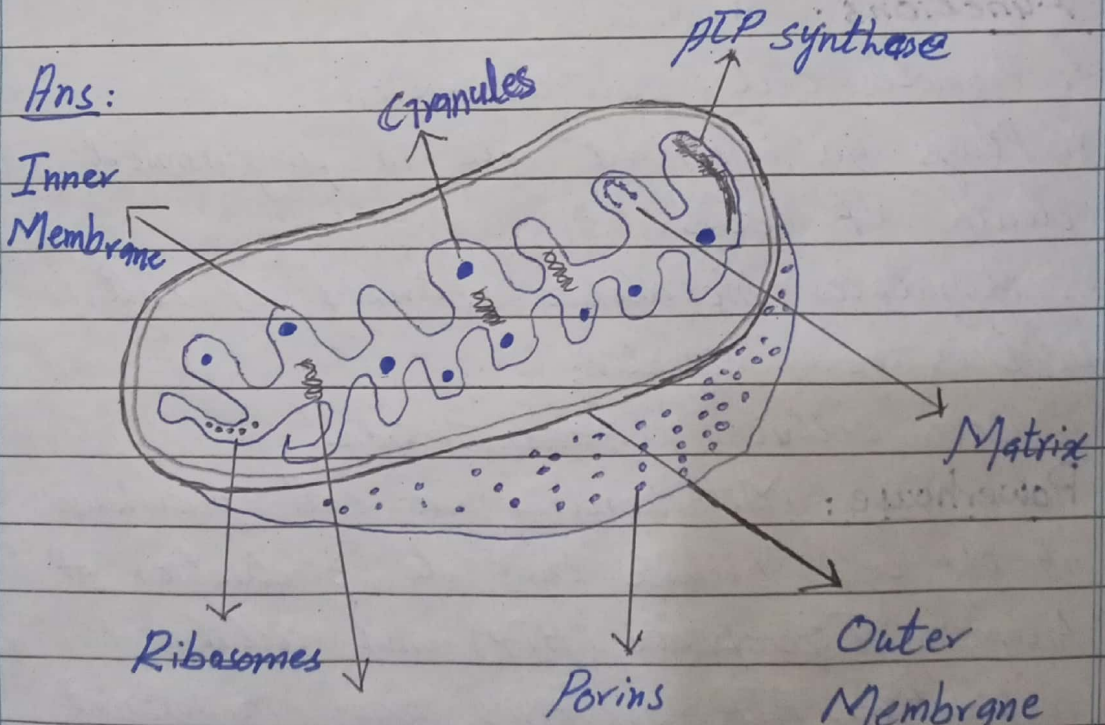
Evidence for Dark Matter: Dark matter has mass that has been observed by scientists. Observations show that stars at farther ends of galaxies rotate faster than expected. This suggests existence of dark matter.

Dark Energy: Dark energy is the theoretical form of energy that drives the accelerating expansion of universe. It is 68% of universe.

Evidence for Dark Energy: There is only indirect evidence for dark energy. First is that universe is expanding and there is some force causing it to grow.

c.

Ans:



Mitochondrial DNA

Mitochondria is the plural of mitochondrion. Mitochondria are a double membrane-bound

organelle. They play a major role in breaking down nutrients. They generate energy-rich molecules for the cells. Most of cellular respiration takes place in mitochondria.

Structure:

i. A mitochondrin is double membraned.
ii. Its size is 0.5 micrometer.
iii. The membranes are made of proteins.
iv. Membranes enclose in them a gel-like substance called matrix.
v. Proteins in outer layer are called porins.
vi. Mitochondria have ribosomes. Ribosomes are macro-molecular machines that perform protein synthesis.

Functions: A mitochondrin:

i. Promotes cell multiplication
ii. Plays an important role in programmed death of cells.
iii. Regulates metabolic activity of cell
iv. Does cell signaling
v. Does cellular differentiation.

Powerhouse: Mitochondria are call powerhouse of the cell because they do production of Adenosine Triphosphate (ATP) and cellular respiration. ATP performs many important tasks such as enabling cells to grow and move.

d.

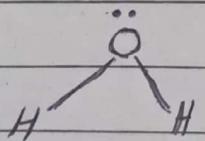
Ans:

Covalent Bonds: Covalent bonds are chemical bonds that are formed when two atoms share one or more pairs of electrons to get a stable configuration of electrons. These bonds are normally formed between non-metal atoms.

Types of Covalent Bonds: There are three types of covalent bonds, namely single, double, and triple covalent bonds.

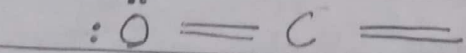
Single Covalent Bonds: In single covalent bonds one pair of electrons or two electrons are shared by two atoms. For example, Hydrogen molecule.

Structure: Structure of hydrogen molecule:



Double Covalent Bonds: A double covalent bond involves two pairs of electrons or four electrons shared between atoms. For example, Carbon Dioxide.

Structure: Structure of Carbon Dioxide:



Triple Covalent Bonds: In a triple covalent bond three pairs of electrons or six electrons are shared between atoms

Structure: Structure of Nitrogen molecule:

:N≡N:

Q.No.4

a.

Ans: Noise pollution is the pollution that occurs with excessive and harmful sounds in environment that disturb the normal acoustic balance causing negative effects on human health, wildlife, and environment.

Harmful Effects:

i. **Healt Effects:**

1. Hearing Loss
2. Anxiety
3. Stress
4. Reduced Productivity
5. Lack of proper sleep
6. Disturbance in Circadain rhythm
7. Sleep disorder or Insomnia
8. Headaches
9. Increased blood pressure

ii. **Social Impacts:**

1. People get frustrated
2. Work is not done effecently
3. Quality of life is reduced
4. Anger

Ways to Curb:

1. Legislation to enforce noise limits.
2. Introduction of zoning laws to separate residential areas from industrial area.
3. Installation of sound barriers in industrial areas.
4. Promotion of vehicle-free zones in markets.
5. Introduction and creation of pedestrian friendly zones.
6. Public awareness campaigns.

b.

Ans: Fiber: Fiber is a carbohydrate that is not digested but helps digestion. Fibres are found in whole grains, fruits, vegetables, and lean proteins such as chicken.

Importance of fiber in diet:

1. Improves digestion
2. Helps in weight management
3. Improves cardiovascular health
4. Regulates sugar level in blood.
5. Reduces risk of diabetes.

Constitution of a Platter of Food for Optimal Fiber:

1. Vegetables and fruits should be half of the platter.
2. Whole grains like brown rice, oats, and barley should be quarter of platter.

3. Lean Proteins like fish, chicken, and eggs should be quarter of the platter.
4. There should be a small portion of healthy fats such as olive oil and nuts.

c.

Ans: Quality standards for water are established to limit contaminants, pathogens, and toxic substances.

Key Parameters of Drinking Water Quality

1. Physical Parameters
a. Colour: Drinking water should be colourless.
b. Turbidity: This is measurement of cloudiness of water. Low turbidity is essential.
c. Taste: Water is tasteless.
d. Odour: Water is odourless
2. Chemical Parameters :
a. pH level: This should between 6.5 and 8.
b. Dissolved Solids: The limit for this is 500 mg/L.

d

Ans: Lithosphere: The lithosphere is the outer most layer of Earth. It consists of crust. It is rigid and consists of tectonic plates and floats upon the semi-fluid asthenosphere beneath.

Rocks: Rocks are naturally occuring solid aggregates of mineraloids. There are three types of rocks: (i) Igneous (ii) Sedimentry and (iii) Metamorphic

Minerals: Minerals are naturally occuring inorganic solids. Minerals have unique properties.

Section - II

Q. No. 7

a.

Sol:

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

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

$$y = 0.2x$$

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

$$= \frac{0.2x}{100} \times 20$$

$$= \frac{4x}{100}$$

$$\boxed{= 0.04x}$$

b.

Sol:

Avg monthly salary of P and Q:

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

DATE: __/__/____ (10)

$P + Q = 10,100$ — (i)

Avg monthly salary of Q and R

$$\frac{Q+R}{2} = 6,250$$

$Q + R = 12,500$ — (ii)

Avg monthly salary of P and R

$$\frac{P+R}{2} = 5200$$

$P + R = 10,400$ — (iii)

From (i)

~~$P = 10,100 - Q$~~

$Q = 10,100 - P$

Putting value of Q in (ii)

$(10100 - P) + R = 12500$

$R = 2400 + P$

Putting value of R in (iii)

$P + (2400 + P) = 10400$

$2P = 8000$

$\boxed{P = 4,000}$ → Answer

d.

Sol:

Let,

Jamie's age be J

Dad's age be D

Then,

$D = J + 4J$

$= 5J$

In 14 years,

$D + 14 = 2(J + 14)$

$5J + 14 = 2J + 28$

$5J - 2J = 28 - 14$

$3J = 14$

$J = \frac{14}{3}$

J = 4 years 6 months

$D = 5J$

$= 5 \times$ 4 years 6 months

$=$ 22 years 6 months

Sum of their ages,

= 22 yrs 6 mnths + 4 yrs 6 mnths

= 27 years → Answers