

SECTION "B"

Q2: Part A: Structure of Universe
according to Big bang theory:

According to the big bang theory, the universe began about 13.8 billion years ago from an extremely hot and dense point called a singularity. This point suddenly expanded in a massive explosion known as the big bang. According to NASA, the universe formed in six stages, that are mentioned below:

1. Big bang (Singularity stage)

The universe began from an extremely hot and dense point and suddenly expanded.

2. Formation of Subatomic Particles

Energy converted into matter, forming particles like proton, neutrons, and electrons.

3. Formation of Atoms.

These subatomic particles

combined to form simple atoms, mainly hydrogen and Helium.

4. Formation of stars

clouds of hydrogen and helium condensed under gravity to form stars.

5. Formation of galaxies.

Billions of stars grouped together to form galaxies

6. Formation of clusters & superclusters.

Galaxies grouped into clusters and superclusters, shaping the large scale structure of the universe

Part B. Urinary system and working of nephron.

Definition of Urinary System:

The urinary system is a group of organs that remove waste materials and excess water from the blood and excrete them in the form of urine.

Parts of Urinary System:

1. kidneys
2. Ureters
3. Urinary bladder
4. Urethra

Working of Nephron:

A Nephron is structural and functional unit of the kidney.

Steps of Urine formation.

1. Filtration.

Blood enters the glomerulus.

where waste materials, water, and salts are filtered into Bowman's capsule.

2. Reabsorption

Useful substances like glucose, amino acids, and required water are reabsorbed into the blood from the renal tubule.

3. Secretion

Extra wastes and toxic substances are secreted into the tubule. Finally, urine passes to the collecting duct and then to the urinary bladder.

Part C.

Unbalanced Diet and Its Effects on Healthy living.

Definition of unbalanced Diet.

An unbalanced diet is a type of diet in which the body does not receive nutrients in the correct amount and proportion. It may lack essential nutrients ~~to excess~~ such as carbohydrates, proteins, fats, vitamins, minerals, and water, or may contain some nutrients in excess. Such diet fails to meet the nutritional requirements of the body necessary for proper growth, repair, and energy.

Effects of Unbalanced diet on Healthy living

1. Weakness and Fatigue

Lack of carbohydrates and proteins reduces energy production, making a person feel tired and weak.

2. Deficiency Disease

Absence of vitamins and minerals causes diseases such as anemia (iron deficiency), rickets, and scurvy.

3. Weak Immune System.

Poor nutrition lowers the body's resistance to infections, making a person more prone to illness.

4. Obesity & malnutrition

Excess intake of fats and sugars leads to obesity, while insufficient food intake causes malnutrition, especially in children.

5. Poor growth & mental Development

In children and teenagers, an unbalanced diet affects physical growth, brain-development, concentration, and learning ability.

Part D: structure and functions of cell components.

1. Cell wall:

Cell wall is a rigid outer layer present only in plant cells. It is made of cellulose.

Functions of cell wall.

- 1- Provide shape to cell and also support.
- 2- Cell wall protect the cell
- 3- It prevent cell from bursting.

2. Cell membrane.

Cell membrane is a thin, flexible, semi-permeable membrane surrounding the cell.

Functions of cell membrane.

1. It controls movement of substances in and out
2. It provide protection to the cell.
3. It maintain internal balance.

3. Cytoplasm

It is a jelly-like substance present between the nucleus and cell membrane.

Functions:

1. It holds cell organelles.
2. Site of chemical reactions.
3. It helps in transport of materials.

4. Mitochondria

It is bean-shaped organelle with double membrane; inner membrane folded into cristae.

Functions of mitochondria.

1. It produces energy (ATP)
2. Mitochondria is known as the powerhouse of the cell.
3. It carries out cellular respiration.

Q.4

Part A:

The role of Heart and blood vessels in circulation.

Role of Heart in Circulation

The heart is a muscular organ that works as a pump for the circulatory system. Its main role is to keep blood moving continuously throughout the body. The heart pumps oxygenated blood to all body parts so that cells receive oxygen and nutrients needed for energy and growth. At the same time, it receives deoxygenated blood from the body & send it to the lungs for purification. By contracting and relaxing regularly, the heart maintains proper blood pressure and ensures smooth circulation.

Role of blood vessels in Circulation.

Blood vessels are tube-like structures that carry blood to and from the heart. They form a vast network throughout the body and help in transporting

blood efficiently

1. Arteries.

They carry oxygen-rich blood from the heart to different organs.

2. Veins.

Veins bring oxygen-poor blood back to the heart.

3. Capillaries.

They are very thin vessels where exchange of oxygen, nutrients, and waste materials takes place between blood and body cells.

Part B. cyclone and its formation

A cyclone is a violent storm with strong rotating winds that develops over warm ocean water. It is usually accompanied by heavy rainfall, thunderstorms, and strong winds.

Formation of cyclone.

- Cyclones form over warm seas where the temperature is above 26°C .
 - Warm, moist air rises from the ocean surface, creating a low-pressure area.
 - Cooler air moves towards this low pressure region and also rises.
 - As air rises, it begins to rotate due to the Earth's rotation.
 - The storm grows stronger as more warm air rises, eventually forming a fully developed cyclone with a calm center called the eye.
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Part C. Functions of Nutrients.

1. Carbohydrates

- Main source of energy for the body.
- Help in daily activities and body functions.

2. Proteins

- Help in growth and repair of body

tissues
- important for muscles, enzymes, & hormones

3. Fats,

- Provide stored energy
- Help maintain body temperature
- Protect internal organs.

4. Calcium

- Essential for strong bones & teeth.
- helps in muscle contraction & blood clotting.

5. Iron.

- Required for formation of hemoglobin.
- Helps in oxygen transport in blood.
- Prevents anemia.

Part D. Role of Remote sensing for environmental purposes.

Remote sensing is the technique of collecting information about the earth's surface without direct contact using satellites & sensors.

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It is used for environmental purposes in the following way.

1. monitoring climate change & global warming.
2. Detecting deforestation and forest fires.
3. Studying air and water pollution.
4. Predicting natural disasters like floods and cyclones.
5. observing changes in land use and wildlife habitats.

Abilities Portion

Q6: Part A: Pointing to a woman, Ahsan said:
"Her granddaughter is the only daughter of my brother."

step-by-step reasoning

1. "The only daughter of my brother"

→ The girl is Ahsan's niece.

2. "Her granddaughter is the only daughter of my brother."

→ The woman's granddaughter is Ahsan's niece.

3. If the woman's granddaughter is Ahsan's niece, then:

→ The woman's child must be Ahsan's brother (father of the niece).

∴ Therefore, the woman is the mother of Ahsan's brother.

Part B.

Given:

- Ratio of length : breadth = 3 : 2
- Speed of cyclist = 12 km/hr
- Time for one round = 8 mins

$$= 12 \times \frac{12 \times 1000}{60} = 200 \text{ m/min} \quad \text{--- (1)}$$

Distance covered in 8 min = $200 \times 8 = 1600 \text{ m}$

So,

Perimeter of rectangle = 1600 m

Let:

- length = $3x$
- breadth = $2x$

Perimeter of rectangle:

$$2(L+B) = 2(3x+2x) = 10$$

$$10x = 1600 \rightarrow x = 160$$

10.

$$\text{length} = 3 \times 160 = 480 \text{ m}$$

$$\text{Breadth} = 2 \times 160 = 320 \text{ m}$$

Finding Area,

$$\text{Area} = L \times B = 480 \times 320 = 153,600 \text{ m}^2$$

Area of the park,

153,600 sq. meters.

Part D:

Given:

- L.C.M of two numbers = 48
- Ratio of number = 2:3
- Find sum of the numbers.

Let the numbers be:

$$2x \text{ and } 3x$$

Using LCM formula,

$$\text{LCM of two numbers} = \frac{\text{Product of num}}{\text{GCD of num}}$$

$$\cdot \text{P of Num} = 2x \cdot 3x = 6x^2$$

$$\cdot \text{GCD of } 2x \text{ and } 3x = x$$

$$\text{LCM} = \frac{6x^2}{x} = 6x$$

solving for x
Given LCM is 48.

So,

$$6x = 48 \rightarrow x = 8$$

• first num: $2x = 2 \cdot 8 = 16$

• second num: $3x = 3 \cdot 8 = 24$

So, sum of nums.

Ans: $\underline{16 + 24 = 40}$
