

Part-IIQuestion: 2

(a)

Origin of the Universe

According to the **Big Bang Theory**, the universe originated from an extremely hot and dense state. All matter and energy were concentrated at one point.

Expansion of the Universe

A sudden expansion caused the universe to spread outward. As space expanded, temperature decreased and matter began to organize itself.

Formation of Matter

With cooling :

- Subatomic particles were formed.
- Atoms of hydrogen and helium came into existence. These atoms

served as the basic building blocks of the universe.

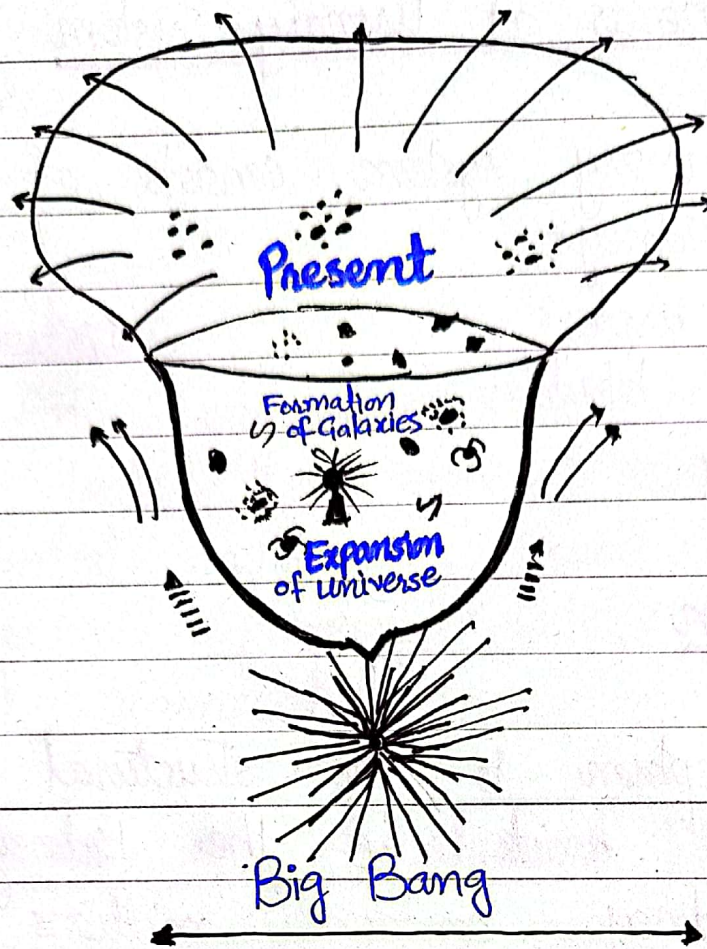
Development of Cosmic Structures

Under gravitational force :

- Atoms formed stars .
- Stars grouped into galaxies .
- Galaxies arranged into clusters and superclusters .

Present Structure of the Universe

Today, the universe is characterized by vast empty spaces with galaxies distributed unevenly across it. These galaxies are observed to be moving away from one another, indicating continuous expansion. This large-scale arrangement reflects a dynamic and ever-expanding universe rather than a static one.



Q.2 (b)

Urinary System

The urinary system is responsible for the removal of metabolic wastes from the body and for maintaining water, salt, and pH balance.

Components of Urinary System

The urinary system consists of :

- Two kidneys
- Two ureters
- Urinary bladder
- Urethra

Nephron

A nephron is the structural and functional unit of the kidney. Each kidney contains millions of nephrons.

Working of Nephron

1.

Glomerular Filtration:

Blood is filtered in the glomerulus.

2

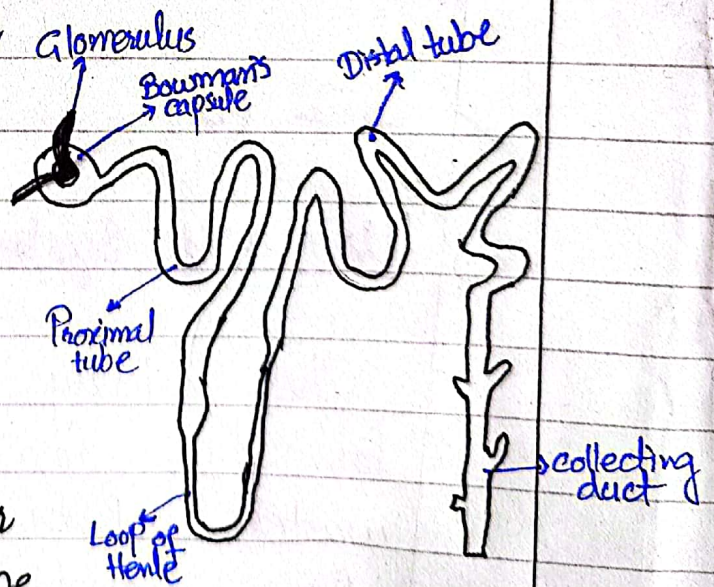
Reabsorption:

Useful substance like glucose, salts, and water are reabsorbed in the tubules.

3.

Secretion and Urine Formation

Wastes are secreted and urine is formed in the collecting duct.



Q.2

(C)

Definition

An unbalanced diet is a diet that lacks the proper proportions of essential nutrients, such as carbohydrates, protein, fats, vitamins, and minerals.

Causes of Unbalanced Diet

1. **Poor Food choices:** Excessive junk or fast food.
2. **Nutrient deficiency:** Lack of fruits, vegetables, or proteins.
3. **Overeating or under-eating:** Leads to obesity and malnutrition.
4. **Economic and social factors:** Poverty, wars, famines, and food scarcity.
5. **Negligence / Lack of awareness:** Not understanding the importance of balanced nutrition.

6. **Biological factors:** Inability to metabolize or absorb nutrients properly.

Effects on Healthy Living

1. **Weak immunity:** Increased susceptibility to infections.
2. **Malnutrition or obesity:** Improper weight and growth issues.
3. **Poor growth and development:** Especially in children.
4. **Low energy and fatigue:** Reduced productivity in daily life.
5. **Increased risk of diseases:** Such as anemia, diabetes, and heart problems.

Q.2

(d)

1.

Cell Wall

A cell wall is a rigid, outer layer found in plant cells. Its structure gives the cell strength and shape, allowing it to maintain its form even under pressure. Functionally, the cell wall protects the cell from physical damage and supports the plant in standing upright.

2.

Cell Membrane

The cell membrane is a thin and flexible layer surrounding all cells. Structurally, it forms the boundary between the cell and its environment. Its main function is to act as a selective barrier, regulating the movement of substances into and out of the cell and maintaining internal balance.

3.

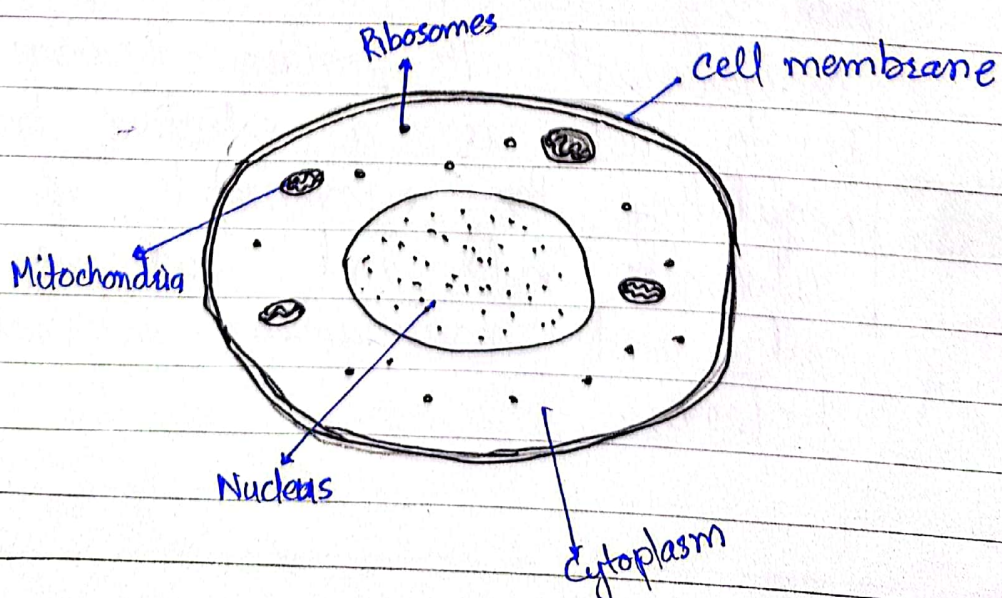
Cytoplasm

The cytoplasm is jelly-like substance that fills the interior of the cell. Structurally, it provides a medium in which organelles are suspended. Functionally, it supports organelles and serves as the site for many metabolic reactions, enabling the cell to perform its essential activities.

4.

Mitochondria

The mitochondria are oval-shaped organelles enclosed by a double membrane. They have an inner membrane folded into cristae to increase surface area. Their main function is to produce energy in the form of ATP, which powers cell's activities.



Question : 4

(a)

The Heart

The heart is a muscular organ that functions as the main pump of the circulatory system. It has four chambers: two atria and two ventricles, which ensure blood flows in one direction only. The heart pumps deoxygenated blood to the lungs for oxygenation and oxygen-rich blood to the rest of the body, maintaining a continuous circulation essential for life.

Blood Vessels

Blood vessels are the network of tubes that carry blood throughout the body. Arteries have thick walls with valves that prevent backflow and carry deoxygenated blood back to the heart.

Capillaries are extremely thin-walled vessels where exchange of oxygen, nutrients, and waste products

occurs between blood and body tissues.

Role in Circulation

Together, the heart and blood vessels maintain an unbroken flow of blood, delivering oxygen and nutrients to all cells while removing metabolic wastes. This system ensures proper functioning of organs and tissues, sustaining life and homeostasis in the body.

Question: 4

(b)

Cyclone

A cyclone is a large-scale, rotating storm system characterized by strong winds, heavy rain, and low atmospheric pressure at its center. Cyclones can cause significant damage due to wind, rainfall, and storm surges along coastal areas.

Formation of a Cyclone

Cyclones form over warm ocean waters when air rises due to low pressure. As the warm, moist air ascends, it cools and condenses, releasing latent heat, which further decreases pressure and intensifies air movement. The **Coriolis** effect causes the rising air to rotate, creating a spinning system of winds around a low pressure center. The cyclone strengthens as long as it remains over warm waters, and weakens upon reaching land or cooler waters.

Characteristics of Cyclone

- (i) Rotating wind system around a low-pressure center.
- (ii) Heavy rainfall and thunderstorms.
- (iii) It can produce storm surges and flooding along coasts.

Q.4 (C)

Carbohydrates

Carbohydrates are the primary source of energy for the body. They are broken down into glucose, which fuels cellular activities and physical work. Adequate carbohydrate intake ensures proper functioning of the brain and muscles.

Proteins

Proteins are essential for growth, repair, and maintenance of body tissues. They form enzymes, hormones, and antibodies, supporting metabolism, immunity, and overall body development.

Fats

Fats provide a concentrated source of energy and help in the absorption of fat-soluble vitamins. They also act as insulation and protection for internal organs and are important for cell membrane structure.

Calcium

Calcium is vital for strong bones and teeth. It also plays a role in muscle contraction, blood clotting, and nerve function, maintaining overall body health.

Iron

Iron is a key component of hemoglobin, which carries oxygen in the blood. Adequate iron intake prevents anemia, supports energy metabolism, and ensure efficient oxygen transport to tissues.

Q.4 (d)

Remote Sensing

Remote sensing is the process of collecting information about the Earth's surface without direct contact, typically using satellites or aircraft sensors. It captures data in the form of images, signals, or

measurements, which can be analyzed to understand environmental conditions.

Environmental Applications

Remote sensing can be employed to monitor and manage the environment in several ways:

- i. **Forest Monitoring:** Detects deforestation, forest degradation, and changes in vegetation cover.
- ii. **Water Resources:** Tracks lakes, rivers, groundwater, and drought conditions.
- iii. **Pollution Detection:** Monitors air and water pollution over large areas.
- iv. **Disaster Management:** Assists in floods, cyclone, or earthquake assessment and planning.
- v. **Land Use and Soil Monitoring:** Helps identify land degradation, urban expansion, and soil erosion.

Section : B

Q.6

(A)

Answer: The woman is Ahsan's mother.

Q.7

(A)

Let the numbers be
First number = x ,
Second number = y .

$$x:y = 5:3 \quad \text{Answer.}$$

Q.7

(B)

Let CP per ball = x
CP of 17 balls = $17x$
Loss = $5x$

Formula :

$$\text{Loss} = \text{CP} - \text{SP}$$

$$17x - 720 = 5x$$

Rs. 60 per ball.

Q.7

(c)

$$\begin{aligned}\text{let son's age} &= x \\ \text{Man's age} &= x + 24\end{aligned}$$

In 2 year :

$$x + 24 + 2 = 2(x + 2)$$

Son's age : 22 years Answer.

Q.7

(d)

Rashid :

32 pages in 6 hours

$$\text{pages per hour} = \frac{32}{2} = \frac{16}{3} \text{ pages/hr}$$

Kamran :

40 pages in 5 hours

$$\text{pages per hour} = \frac{40}{5} = 8 \text{ pages/hr}$$

combined rate :

$$\text{Total rate} = \frac{16}{3} + \frac{24}{3} = \frac{40}{3} \text{ pages/hr}$$

18 hours 15 minutes Ans.