

CUET 2025 Biology Question Paper With Solutions

Time Allowed :1 Hour	Maximum Marks :250	Total Questions :50
-----------------------------	---------------------------	----------------------------

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 1 hour duration.
2. The question paper consists of 50 questions. The maximum marks are 250.
3. 5 marks are awarded for every correct answer, and 1 mark is deducted for every wrong answer.

1. Which of the following organelles is involved in the synthesis of proteins?

- (1) Ribosome
- (2) Lysosome
- (3) Golgi apparatus
- (4) Peroxisome

Correct Answer: (1) Ribosome

Solution: Ribosomes are the primary organelles responsible for protein synthesis in all cells. They act as molecular machines that decode the genetic information stored in mRNA and use it to assemble proteins. The process begins with the transcription of DNA into messenger RNA (mRNA), which leaves the nucleus and travels to the ribosomes.

Once the mRNA reaches the ribosome, it binds to the ribosomal subunits, and the ribosome starts translating the sequence of codons on the mRNA into a sequence of amino acids. This process is called translation. The ribosome moves along the mRNA, and as it reads the codons, tRNA molecules bring the corresponding amino acids, which are linked together to form a polypeptide chain.

The newly formed polypeptide chain will later fold into a functional protein that performs various essential tasks in the cell, such as catalyzing reactions (enzymes), providing structural support (cytoskeletal proteins), or acting in signaling (hormones).

Quick Tip

Ribosomes are the "protein factories" of the cell, responsible for building proteins based on the genetic blueprint provided by mRNA. Remember: without ribosomes, cells can't produce the proteins they need to function!

2. If a heterozygous tall plant (Tt) is crossed with a dwarf plant (tt), what will be the phenotypic ratio of the offspring?

- (1) 1 Tall : 3 Dwarf
- (2) 1 Tall : 1 Dwarf
- (3) All Tall
- (4) All Dwarf

Correct Answer: (2) 1 Tall : 1 Dwarf

Solution: In this genetic cross, we are dealing with a heterozygous tall plant (Tt) crossed with a dwarf plant (tt). The trait for tallness (T) is dominant over the dwarf trait (t), which is recessive.

The first step is to set up the Punnett square to determine the possible offspring genotypes. Let's analyze the parental genotypes: - The first parent is heterozygous tall, Tt. - The second parent is homozygous dwarf, tt. We will now cross these genotypes:

$$Tt \times tt$$

	<i>T</i>	<i>t</i>
<i>t</i>	Tt	tt
<i>t</i>	Tt	tt

Now, let's interpret the results: - Half of the offspring will inherit the T allele (tall) from the Tt parent and the t allele (dwarf) from the tt parent, resulting in a Tt genotype (which

expresses the tall phenotype because T is dominant). - The other half will inherit the t allele from both parents, resulting in a tt genotype (which expresses the dwarf phenotype because both alleles must be recessive to show this trait).

Thus, the genotypic ratio is 1 Tt : 1 tt, and the phenotypic ratio is 1 Tall : 1 Dwarf.

This means there will be an equal number of tall and dwarf plants among the offspring.

In summary: - Tt (tall) will be dominant and appear as tall plants. - tt (dwarf) will be recessive and appear as dwarf plants.

Quick Tip

A Punnett square is a powerful tool to visualize genetic crosses and determine the probability of offspring genotypes and phenotypes. In cases where you have dominant and recessive traits, always check the genotype of the parents before drawing the Punnett square!

3. Which of the following elements is essential for the synthesis of chlorophyll?

- (1) Calcium
- (2) Magnesium
- (3) Sodium
- (4) Potassium

Correct Answer: (2) Magnesium

Solution: Magnesium is the central atom in the chlorophyll molecule. Chlorophyll is a pigment that absorbs light energy, primarily in the blue and red wavelengths, to drive the process of photosynthesis. The presence of magnesium in the chlorophyll molecule allows it to absorb light efficiently and capture the energy needed for converting carbon dioxide and water into glucose and oxygen. Without magnesium, plants cannot produce chlorophyll, and thus cannot carry out photosynthesis, which is essential for their survival.

Quick Tip

Magnesium is at the heart of chlorophyll. Without it, photosynthesis wouldn't happen efficiently!

4. Which part of the nephron is primarily responsible for filtration of blood?

- (1) Loop of Henle
- (2) Proximal convoluted tubule
- (3) Bowman's capsule
- (4) Collecting duct

Correct Answer: (3) Bowman's capsule

Solution: The Bowman's capsule is a cup-shaped structure that surrounds a network of capillaries called the glomerulus. Filtration begins when blood enters the glomerulus under high pressure. This high pressure forces water, small solutes (like salts, glucose, urea, etc.), and other substances through the walls of the capillaries into the Bowman's capsule. This process forms the initial filtrate, which is then processed further as it travels through the renal tubules of the nephron. Larger molecules such as proteins and blood cells are too large to pass through the filtration membrane and remain in the bloodstream.

Quick Tip

Bowman's capsule = Blood filtration. It is the first step in urine formation!

5. Which of the following is a pioneer species in primary succession on rocks?

- (1) Ferns
- (2) Lichens
- (3) Mosses
- (4) Algae

Correct Answer: (2) Lichens

Solution: Lichens are often the first organisms to colonize bare rock surfaces during primary succession. They are a symbiotic relationship between fungi and algae or cyanobacteria. Lichens are able to survive in harsh conditions with little or no soil. They secrete acids that break down the surface of the rock, slowly weathering it and forming a thin layer of soil. Over time, this process creates a more hospitable environment for other plants to grow. Lichens play a crucial role in ecosystem development by initiating soil formation.

Quick Tip

Lichens are rock pioneers! They break down rocks to create soil for future plants.

6. Which type of bond is found between amino acids in a protein chain?

- (1) Hydrogen bond
- (2) Peptide bond
- (3) Ionic bond
- (4) Glycosidic bond

Correct Answer: (2) Peptide bond

Solution: Peptide bonds are covalent bonds that link amino acids together in a protein chain. A peptide bond is formed during a dehydration synthesis reaction where the carboxyl group (-COOH) of one amino acid reacts with the amino group (-NH₂) of another amino acid. This results in the release of a water molecule and the formation of the bond between the two amino acids. Peptide bonds are the fundamental link that holds together the primary structure of proteins. As the chain of amino acids grows, it folds into complex shapes, determining the protein's final structure and function.

Quick Tip

Amino acids are linked by peptide bonds. Without peptide bonds, proteins wouldn't exist!

7. Which enzyme is responsible for the unwinding of DNA during replication?

- (1) DNA polymerase
- (2) DNA ligase
- (3) DNA helicase
- (4) RNA primase

Correct Answer: (3) DNA helicase

Solution: DNA helicase is the enzyme responsible for unwinding the DNA double helix during replication. It works by breaking the hydrogen bonds between the complementary base pairs (A-T and C-G), separating the two strands of the double helix. This unwinding creates two single-stranded DNA templates that can be used for the synthesis of new DNA strands. The enzyme works in the 5' to 3' direction, and this unwinding is essential for the subsequent action of other enzymes such as DNA polymerase, which synthesizes the new DNA strand by adding nucleotides complementary to the template strand.

Quick Tip

Helicase unwinds the helix, creating templates for new DNA strands to be synthesized during replication!

8.

Double fertilization is a characteristic feature of which group of plants?

- (1) Bryophytes
- (2) Gymnosperms
- (3) Pteridophytes
- (4) Angiosperms

Correct Answer: (4) Angiosperms

Solution: Double fertilization is a hallmark of angiosperms (flowering plants). This process involves two sperm cells from the pollen grain. One sperm fuses with the egg cell to form the diploid zygote, which will develop into the embryo. The second sperm combines with the two polar nuclei in the central cell of the ovule, resulting in the formation of the triploid

endosperm. The endosperm will later nourish the developing embryo. This unique process helps ensure efficient utilization of resources for the growing seed, which is why it is considered a key adaptation for angiosperms.

The other plant groups mentioned—Bryophytes, Gymnosperms, and Pteridophytes—do not exhibit double fertilization. In these plants, fertilization typically involves the union of one sperm and the egg cell to form the zygote without the formation of endosperm.

Quick Tip

***Key concept:** Double fertilization occurs in angiosperms and is essential for seed development. One sperm forms the zygote, and the other forms the endosperm. ***Remember:** It's only in angiosperms, not in other plant groups like Bryophytes or Gymnosperms.

9.

The part of the brain responsible for maintaining posture and balance is the:

- (1) Cerebrum
- (2) Medulla oblongata
- (3) Cerebellum
- (4) Hypothalamus

Correct Answer: (3) Cerebellum

Solution: The cerebellum, located at the back of the brain below the cerebrum, is primarily responsible for coordinating voluntary movements, maintaining posture, and ensuring balance. It receives information from the sensory systems of the body and the spinal cord to fine-tune motor activity and adjust movement, ensuring that movements are smooth and coordinated.

It helps in motor learning, including complex tasks like walking, riding a bike, or playing a musical instrument. Damage to the cerebellum can result in loss of coordination, balance issues, and difficulty in performing coordinated actions.

While the other brain regions listed are also important for other functions, they do not have a

major role in motor coordination and balance: - The cerebrum is involved in higher functions such as reasoning, perception, and voluntary movement. - The medulla oblongata regulates basic life functions like breathing and heart rate. - The hypothalamus controls homeostasis, including temperature regulation, hunger, and thirst.

Quick Tip

Remember: "Cerebellum = Coordination and Balance." Think of it as the brain's "fine-tuner" for movements.

10.

The gradual and predictable change in species composition in an area is known as:

- (1) Succession
- (2) Evolution
- (3) Mutation
- (4) Speciation

Correct Answer: (1) Succession

Solution: Ecological succession is a natural process by which the species composition of an ecosystem changes over time. It typically progresses through a series of stages, from a pioneer community to a more stable, climax community. Succession occurs in two main forms: primary and secondary.

Primary succession occurs in an area where no soil exists (e.g., after a volcanic eruption or glacier retreat). The first organisms to colonize the area are typically simple plants or microbes. **Secondary succession** occurs in areas where an ecosystem has been disturbed but soil remains (e.g., after a forest fire or agricultural abandonment). It progresses faster than primary succession since the soil already contains nutrients and some species.

The process is predictable in the sense that certain species tend to replace others as conditions change, moving the community towards a climax state that is in equilibrium with the environment.

Evolution, on the other hand, refers to the process by which species change over generations

through natural selection and genetic variation, while mutation and speciation refer to changes at the genetic level.

Quick Tip

***Key takeaway:** Succession = gradual change in species composition over time. Primary succession starts from bare rock, while secondary succession occurs in areas with existing soil.

11.

During which phase of mitosis do the centromeres split and chromatids move to opposite poles?

- (1) Prophase
- (2) Metaphase
- (3) Anaphase
- (4) Telophase

Correct Answer: (3) Anaphase

Solution: Anaphase is the stage of mitosis where the centromeres, which hold the sister chromatids together, split. As a result, the sister chromatids are pulled apart by the spindle fibers toward opposite poles of the cell. This ensures that each daughter cell will receive an identical set of chromosomes.

To better understand mitosis:

Prophase: Chromosomes condense and become visible. The nuclear envelope breaks down, and spindle fibers form.

Metaphase: Chromosomes align at the metaphase plate (the center of the cell).

Anaphase: Centromeres split, and chromatids are pulled toward opposite poles.

Telophase: The chromatids arrive at the poles, the nuclear membrane reforms, and the cell begins to divide.

Anaphase is crucial because it ensures that genetic information is evenly distributed to the two daughter cells.

Quick Tip

Remember: "Anaphase = Apart." It's when the chromatids move apart to opposite poles.

12.

Which of the following organisms is correctly matched with its kingdom?

- (1) Amoeba – Plantae
- (2) Euglena - Fungi
- (3) Paramecium - Protista
- (4) Nostoc - Animalia

Correct Answer: (3) Paramecium - Protista

Solution: Paramecium is a member of the kingdom Protista , which includes unicellular eukaryotic organisms that do not fit into the plant, animal, or fungi kingdoms. Paramecia are single-celled organisms that move using cilia and are commonly found in aquatic environments.

Here's a breakdown of the other options:

Amoeba belongs to Protista, not Plantae. Amoebas are also single-celled organisms, but they move and feed using pseudopodia.

Euglena is a protist as well, not a fungus. It has features of both plants and animals, but it is classified as a protist.

Nostoc is a type of cyanobacterium (also called blue-green algae), which belongs to the kingdom Bacteria , not Animalia.

Quick Tip

Key concept: Organisms in Protista are often unicellular and do not fit neatly into other kingdoms.

13.

Which of the following is not a part of the human digestive system?

- (1) Stomach
- (2) Pancreas
- (3) Liver
- (4) Lungs

Correct Answer: (4) Lungs

Solution: The human digestive system is made up of organs that are involved in the process of breaking down food, absorbing nutrients, and eliminating waste. The main organs involved in digestion include:

Stomach: It secretes digestive enzymes and acids to break down food.

Pancreas: It produces digestive enzymes and bicarbonate to help neutralize stomach acid.

Liver: It produces bile, which helps in the digestion of fats.

However, the lungs are not part of the digestive system; they are involved in the respiratory system, responsible for gas exchange (oxygen and carbon dioxide) during breathing.

Quick Tip

Remember: The digestive system includes organs that help process food, while the lungs are part of the respiratory system.

14.

Which of the following is responsible for the transport of water in plants?

- (1) Xylem
- (2) Phloem
- (3) Epidermis
- (4) Stomata

Correct Answer: (1) Xylem

Solution: The transport of water in plants is carried out by the xylem, a type of vascular tissue. The xylem transports water and dissolved minerals from the roots to the leaves and

other parts of the plant. This process is crucial for maintaining the plant's hydration and for photosynthesis, which requires water.

The phloem, in contrast, transports food (mainly sugars) produced during photosynthesis from the leaves to other parts of the plant. The epidermis is the outer layer of cells that protects the plant, and stomata are small pores on the leaf surface that allow gas exchange (such as carbon dioxide and oxygen) but do not play a direct role in water transport.

Quick Tip

Key concept: "Xylem = Water transport." Think of it as the plant's plumbing system that carries water from the roots to the leaves.

15.

Which gas is primarily responsible for the greenhouse effect?

- (1) Oxygen
- (2) Nitrogen
- (3) Carbon dioxide
- (4) Hydrogen

Correct Answer: (3) Carbon dioxide

Solution: Carbon dioxide (CO₂) is the primary gas responsible for the greenhouse effect. It traps heat in the Earth's atmosphere by absorbing infrared radiation from the Earth's surface and re-radiating it back towards the surface. This process leads to an increase in the planet's average temperature, contributing to global warming.

While other gases, such as methane (CH₄) and water vapor (H₂O), also play a role in the greenhouse effect, carbon dioxide is the most significant due to its higher concentration in the atmosphere and its long-term persistence.

Oxygen (O₂) and nitrogen (N₂), although abundant in the atmosphere, do not contribute to the greenhouse effect because they do not absorb infrared radiation.

Quick Tip

Remember: "Carbon dioxide = Greenhouse effect." It's the gas that most contributes to trapping heat in the atmosphere.

16.

Which of the following is an example of a physical change?

- (1) Burning of wood
- (2) Melting of ice
- (3) Rusting of iron
- (4) Digestion of food

Correct Answer: (2) Melting of ice

Solution: A physical change is a change in the state or appearance of a substance, but it does not involve a change in its chemical composition. The melting of ice is an example of a physical change because the ice simply changes from a solid state to a liquid state, but its chemical structure (H_2O) remains the same.

The other processes listed are examples of chemical changes, where the substance undergoes a transformation into a new substance with different properties:

Burning of wood results in the formation of new substances like carbon dioxide and water.

Rusting of iron forms iron oxide, a new compound.

Digestion of food involves breaking down food into smaller molecules that are chemically different from the original food.

Quick Tip

Remember: Physical changes are reversible and do not change the chemical composition of the substance (e.g., melting, freezing).

17.

Which of the following types of bonds is formed by the sharing of electrons between

atoms?

- (1) Ionic bond
- (2) Covalent bond
- (3) Metallic bond
- (4) Hydrogen bond

Correct Answer: (2) Covalent bond

Solution: A covalent bond is formed when two atoms share electrons in order to achieve a full outer electron shell, typically following the octet rule (for most elements). This type of bond is common between nonmetal atoms, such as in the formation of water (H_2O), where oxygen shares electrons with hydrogen atoms.

Ionic bonds occur when one atom transfers electrons to another, leading to the formation of oppositely charged ions that attract each other (e.g., sodium chloride, NaCl).

Metallic bonds involve the sharing of electrons in a "sea" of delocalized electrons between metal atoms, giving metals their characteristic properties, such as electrical conductivity.

Hydrogen bonds are weak attractions between a hydrogen atom and an electronegative atom (like oxygen or nitrogen), often seen in water and biological molecules.

Quick Tip

Key concept: "Covalent bond = Electron sharing." In covalent bonding, atoms share electrons to form a stable connection.