

B.Sc. Semester - 2 (CBCS) Examination
March/April – 2026 (New Course)
BIO-CHEMISTRY (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que.1(A) Answer the following. (Any one Out of Two) (07)
1. Explain the history of cell biology, highlighting key discoveries that led to the development of the cell theory.
 2. Describe the structure and functions of microtubules, microfilaments, and intermediate filaments in the cytoskeleton.
- Que.1(B) Attempt any one. (Out of Two) (04)
1. Differentiate between plant and animal cells based on two structural features.
 2. What are viroids and prions? How do they differ from viruses?
- Que.1(C) Attempt any three. (Out of Five) (03)
1. The term "cell" was first coined by _____.
 2. The cytoskeleton in eukaryotic cells is composed of microfilaments, intermediate filaments, and _____.
 3. Prokaryotic cells have a well-defined nucleus surrounded by a nuclear membrane. (True/False)
 4. Animal cells contain chloroplasts for photosynthesis. (True/False)
 5. Name one structural difference between prokaryotic and eukaryotic cells.
- Que.2(A) Answer the following. (Any one Out of two) (07)
1. Explain the endosymbiosis hypothesis regarding the origin of mitochondria and chloroplasts.
 2. Describe the process of cell homogenization and the role of marker enzymes in identifying isolated organelles.
- Que.2(B) Attempt any one. (Out of two) (04)
1. Differentiate between glyoxysomes and peroxisomes in terms of their functions.
 2. Short note on cell wall and plasma membrane.
- Que.2(C) Attempt any three. (Out of Five) (03)
1. The plasma membrane is composed primarily of a bilayer of _____ and embedded proteins.
 2. Mitochondria are inherited maternally because sperm mitochondria are typically _____ after fertilization.
 3. The endosymbiosis hypothesis suggests that mitochondria and chloroplasts originated from free-living prokaryotic cells. (True/False)
 4. Lysosomes are involved in protein synthesis. (True/False)
 5. Name the two major types of endoplasmic reticulum.
- Que.3(A) Answer the following. (Any one Out of two) (07)
1. Describe the stages of mitotic cell division and explain its physiological importance.
 2. Explain the key events of meiosis I and meiosis II and their significance in reproduction.
- Que.3(B) Attempt any one. (Out of two) (04)
1. Why is the G1 phase important in the cell cycle?
 2. How does meiosis contribute to genetic variation?

- Que.3(C) Attempt any three. (Out of Five) (03)
1. The phase of the cell cycle where DNA replication occurs is called the _____ phase.
 2. Meiosis results in the formation of _____ haploid daughter cells from one diploid parent cell.
 3. During mitosis, homologous chromosomes pair up and exchange genetic material. (True/False)
 4. Cell differentiation allows cells to develop specialized structures and functions. (True/False)
 5. Name any two stages of the M phase (mitotic phase) in the cell cycle.
- Que.4(A) Answer the following. (Any one Out of two) (07)
1. Describe the Singer and Nicholson model of the plasma membrane.
 2. Explain the process of facilitated diffusion and active transport, highlighting their key differences.
- Que.4(B) Attempt any one. (Out of two) (04)
1. Differentiate between lateral movement and flip-flop movement of phospholipids in membranes.
 2. What is the role of FRAP in studying membrane dynamics?
- Que.4(C) Attempt any three. (Out of Five) (03)
1. The Singer and Nicholson model of the plasma membrane is also known as the _____ model.
 2. The sodium-potassium pump transports _____ ions out of the cell and _____ ions into the cell.
 3. Membrane asymmetry refers to the unequal distribution of lipids and proteins on the inner and outer layers of the membrane. (True/False)
 4. Simple diffusion requires ATP to move molecules across the membrane. (True/False)
 5. Name one function of ionophores in biological systems.
- Que.5(A) Answer the following. (Any one Out of two) (07)
1. Describe the functions of any four major plant hormones in plant growth and development.
 2. What is biological nitrogen fixation? Explain the role of nitrogenase in this process.
- Que.5(B) Attempt any one. (Out of two) (04)
1. Differentiate between C₃ and CAM plants in terms of carbon fixation and stomatal activity.
 2. What are the two main pathways of ammonia assimilation in plants?
- Que.5(C) Attempt any three. (Out of Five) (03)
1. The Hill reaction demonstrates that oxygen evolution in photosynthesis occurs in the presence of _____ as an electron acceptor.
 2. In CAM plants, carbon fixation occurs at _____ to reduce water loss.
 3. C₄ plants perform initial carbon fixation in mesophyll cells and the Calvin cycle in bundle sheath cells. (True/False)
 4. Absciscic acid (ABA) promotes seed germination and stimulates plant growth. (True/False)
 5. Which plant hormone is primarily responsible for root elongation and cell division?
