

B.Sc. Semester - 1 (CBCS) Examination
Oct/Nov-2025 (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 types and significance of ionic, covalent, and hydrogen bonds in biomolecules.
 2. Discuss weak forces hydrogen bonds and Van der Waals forces and their effects on molecular structure.
- Que.1(B) Attempt any one. (Out of Two) (04)
1. Differentiate between electrophiles and nucleophiles, giving suitable examples.
 2. Mention two physical and two chemical properties of water.
- Que.1(C) Attempt any three. (Out of Five) (03)
1. The bond formed by sharing of electrons between atoms is called a _____ bond.
 2. The weak attractive force between nonpolar molecules is known as _____ forces.
 3. Hydrogen bonds are stronger than covalent bonds. (True/False)
 4. Define dipole moment.
 5. What is the role of water as a biological solvent?
- Que.2(A) Answer the following. (Any one Out of two) (07)
1. Explain the concept of free energy, standard free energy, and their role in biochemical reactions.
 2. Describe and analyze high-energy compounds and discuss their importance in energy transfer and metabolism.
- Que.2(B) Attempt any one. (Out of two) (04)
1. Differentiate between oxidation and reduction reactions in biochemical systems.
 2. State the second law of thermodynamics and its biological significance.
- Que.2(C) Attempt any three. (Out of Five) (03)
1. The first law of thermodynamics states that energy can neither be _____ nor _____, but only transformed.
 2. The molecule ATP is known as a _____ compound.
 3. Standard free energy change (ΔG°) is independent of temperature and pressure. (True/False)
 4. Define free energy in thermodynamics.
 5. What is redox potential?
- Que.3(A) Answer the following. (Any one Out of two) (07)
1. Explain the principle, types of electrodes, and working of a pH meter.
 2. Discuss buffer capacity, factors affecting it, and the importance of physiological buffers in biological systems.
- Que.3(B) Attempt any one. (Out of two) (04)
1. Differentiate between strong and weak acids with the help of titration curve shapes.
 2. Write the Henderson–Hasselbalch equation and explain its significance.

- Que.3(C) Attempt any three. (Out of Five) (03)
1. The negative logarithm of hydrogen ion concentration is called _____.
 2. A solution that resists changes in pH upon addition of acid or base is called a ____.
 3. The pH of a strong acid is always higher than that of a weak acid of the same concentration. (True/False)
 4. Define K_a and pK_a .
 5. What is the role of electrodes in a pH meter?
- Que.4(A) Answer the following. (Any one Out of two) (07)
1. Explain the principle and applications of osmosis and viscosity in life sciences.
 2. Discuss the process of adsorption, highlighting their biological importance and practical applications.
- Que.4(B) Attempt any one. (Out of two) (04)
1. State the factors affecting the rate of osmosis.
 2. Explain the biological importance of diffusion.
- Que.4(C) Attempt any three. (Out of Five) (03)
1. The movement of solvent molecules through a semipermeable membrane is called _____.
 2. The resistance offered by a fluid to flow is known as _____
 3. Diffusion occurs from a region of low concentration to high concentration. (True/False)
 4. Define adsorption.
 5. What is viscosity coefficient?
- Que.5(A) Answer the following. (Any one Out of two) (07)
1. Explain the preparation of w/v and v/v solutions with suitable examples.
 2. Discuss the concepts of density and specific gravity and their importance in biochemical calculations.
- Que.5(B) Attempt any one. (Out of two) (04)
1. Differentiate between normality and molarity.
 2. Write the formula for preparing dilute solutions from stock solutions.
- Que.5(C) Attempt any three. (Out of Five) (03)
1. The number of moles of solute dissolved in one liter of solution is called _____.
 2. The ratio of the density of a substance to the density of water is known as ____.
 3. A 1 M solution contains one mole of solute per 100 mL of solution. (True/False)
 4. Define molality.
 5. What is meant by a stock solution?
