

B.Sc. Semester - 1 (CBCS) Examination
July-2025 (OLD 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 ionic and covalent bonds with examples.
 - 2) Discuss hydrogen bonds and their effects on the structure of biomolecules.
- Que-1(B) Attempt any one (Out of two) (04)**
- 1) Write the role of Van der Waals forces in biomolecules.
 - 2) Discuss importance of water for living organisms in brief.
- Que-1(C) Attempt any three (Out of five) (03)**
- 1) Fill in the blank: Water is considered a _____ solvent.
 - 2) True or False: Covalent bonds are weaker than hydrogen bonds.
 - 3) Define intramolecular hydrogen bond.
 - 4) Write one physical property of water.
 - 5) What are electrophiles?
- Que-2(A) Answer the following (Any one out of two) (07)**
- 1) Explain the first and second laws of thermodynamics with examples.
 - 2) Discuss high-energy compounds and their role in biochemical reactions.
- Que-2(B) Attempt any one (Out of two) (04)**
- 1) Describe redox potential in biological system in brief.
 - 2) Write a short note on standard free energy.
- Que-2(C) Attempt any three (Out of five) (03)**
- 1) Define free energy.
 - 2) Name one high-energy compound.
 - 3) True or False: Thermodynamics is not relevant to biology.
 - 4) Write the unit of energy used in thermodynamics.
 - 5) Fill in the blank: Oxidation involves _____ of electrons. (Loss/ Gain).
- Que-3(A) Answer the following (Any one out of two) (07)**
- 1) Derive and explain Henderson–Hasselbalch equation with an example.
 - 2) Discuss the principle and working of a pH meter.
- Que-3(B) Attempt any one (Out of two) (04)**
- 1) Describe biological importance of physiological buffers.
 - 2) Explain the properties of Acid and Base in brief.
- Que-3(C) Attempt any three (Out of five) (03)**
- 1) Define pH.
 - 2) What is the pH of a neutral solution at 25°C?
 - 3) Fill in the blank: A strong acid has a _____ pKa value.
 - 4) True or False: Strong bases have high buffer capacity.
 - 5) Name one physiological buffer.
- Que-4(A) Answer the following (Any one out of two) (07)**
- 1) Explain the concept and biological significance of osmosis
 - 2) Describe diffusion and factors affecting it in biological systems

Que-4(B) Attempt any one (Out of two) (04)

- 1) Write a short note on viscosity and its applications in biology.
- 2) Explain adsorption and its biological importance.

Que-4(C) Attempt any three (Out of five) (03)

- 1) Define viscosity.
- 2) State one factor affecting diffusion.
- 3) Fill in the blank: Osmosis involves the movement of _____.
- 4) True or False: Adsorption occurs only on liquid surfaces.
- 5) Give one example of diffusion in living organisms.

Que-5(A) Answer the following (Any one out of two) (07)

- 1) Explain molar and normal solutions with examples.
- 2) Describe the concept and significance of stock and working solutions.

Que-5(B) Attempt any one (Out of two) (04)

- 1) Write numerical problems on dilution of solutions (w/v or v/v).
- 2) Explain the difference between density and specific gravity.

Que-5(C) Attempt any three (Out of five) (03)

- 1) True or False: Specific gravity has no unit.
- 2) Name one concentration unit used in solution preparation.
- 3) Fill in the blank: Density is defined as _____ per unit volume.
- 4) Define mole concept.
- 5) How is 10% NaCl (w/v) solution prepared?
