

**B.Sc. Semester - 4 (CBCS) Examination****March/April-2026 [NEW COURSE]****BioChemistry-BC401(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 principle, components, and working of a double beam spectrophotometer with a neat labeled diagram.
  2. Write the advantages of double beam instruments and explain applications of UV–Visible spectroscopy in biological and chemical analysis.
- Que.1(B) Attempt any one. (Out of Two) (04)
1. State Beer–Lambert’s law and mention any one limitation.
  2. Differentiate between single beam and double beam colorimeter (any two points).
- Que.1(C) Attempt any three. (Out of Five) (03)
1. The relationship between absorbance and concentration of a solution is explained by \_\_\_\_\_ law.
  2. The constant that represents absorbance of a 1 M solution in a 1 cm path length is called \_\_\_\_\_ coefficient.
  3. In a double beam spectrophotometer, both sample and reference are measured simultaneously. (True/False)
  4. Define electromagnetic radiation.
  5. What is meant by extinction coefficient?
- Que.2(A) Answer the following. (Any one Out of two) (07)
1. Explain the concept of centrifugal force and relative centrifugal force (RCF) with suitable equations.
  2. Describe the principle and instrumentation of preparative centrifugation.
- Que.2(B) Attempt any one. (Out of two) (04)
1. State the relationship between centrifugal force and relative centrifugal force.
  2. Mention any two differences between preparative and analytical centrifugation.
- Que.2(C) Attempt any three. (Out of Five) (03)
1. The force responsible for particle separation during centrifugation is known as \_\_\_\_\_ force.
  2. Relative centrifugal force (RCF) is expressed in terms of \_\_\_\_\_ acceleration.
  3. Analytical centrifugation is mainly used for large-scale separation of biomolecules. (True/False)
  4. Define relative centrifugal force (RCF).
  5. What is sedimentation?
- Que.3(A) Answer the following. (Any one Out of two) (07)
1. Describe the types of radioisotopes used in biochemistry and explain the units of radioactivity.
  2. Explain the principle and working of gas ionization techniques for measurement of radioactivity.
- Que.3(B) Attempt any one. (Out of two) (04)
1. List any two units of radioactivity and mention what they measure.
  2. Differentiate between gas ionization and liquid scintillation counting (any two points).

- Que.3(C) Attempt any three. (Out of Five) (03)
1. \_\_\_\_\_ is the SI unit of radioactivity.
  2. \_\_\_\_\_ counting is widely used for measurement of low-energy  $\beta$ -emitters.
  3. Liquid scintillation counting is suitable for measuring alpha, beta, and gamma radiation. (True/False)
  4. What is a radioisotope?
  5. Name any one radioisotope commonly used in biochemistry.
- Que.4(A) Answer the following. (Any one Out of two) (07)
1. Explain the general principle, method, and applications of ion exchange chromatography.
  2. Write the principle, instrumentation, and applications of Gas-Liquid Chromatography.
- Que.4(B) Attempt any one. (Out of two) (04)
1. Differentiate between paper chromatography and thin-layer chromatography (any two points).
  2. Mention any two advantages of High-Performance Liquid Chromatography.
- Que.4(C) Attempt any three. (Out of Five) (03)
1. In thin-layer chromatography, \_\_\_\_\_ is commonly used as the stationary phase.
  2. The separation in ion exchange chromatography is based on \_\_\_\_\_ charges.
  3. Molecular sieve chromatography separates molecules mainly on the basis of their molecular size. (Complex / Viscous)
  4. Define  $R_f$  value.
  5. Name any one application of affinity chromatography.
- Que.5(A) Answer the following. (Any one Out of two) (07)
1. Describe the principle, materials used, and applications of Polyacrylamide Gel Electrophoresis.
  2. Describe the principle, materials used, and applications of 2-D gel electrophoresis.
- Que.5(B) Attempt any one. (Out of two) (04)
1. Mention any two factors affecting electrophoretic mobility.
  2. Differentiate between agarose gel electrophoresis and polyacrylamide gel electrophoresis (any two points).
- Que.5(C) Attempt any three. (Out of Five) (03)
1. The movement of charged particles in an electric field is known as \_\_\_\_\_.
  2. SDS is used in PAGE to impart a uniform \_\_\_\_\_ charge to proteins.
  3. What is electrophoretic mobility?
  4. Agarose gel electrophoresis is mainly used for separation of nucleic acids. (True / False)
  5. Define isoelectric point (pI).

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