

B.Sc. Semester - 6 (CBCS) Examination**March/April-2024 (NEW COURSE)****Analytical Techniques and Bioinformatics (Core (New))****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) Give specific answers. (04)
1. What is the principle behind colorimetry?
 2. Write one application of NMR spectroscopy.
 3. What is the principle behind flame photometry?
 4. Which analytical technique is commonly used for quantitative analysis of metal ions in solution?
- Que.1(B) Answer in Brief. (Any one out of two) (03)
1. Explain the working principle of mass spectroscopy.
 2. Describe the applications of IR spectroscopy in biosciences.
- Que.1(C) Write a Note on. (Any one out of two) (07)
1. Explain the importance of radioisotopes in biosciences and their applications.
 2. Discuss the introduction, working principle, and applications of colorimetry and spectrophotometry in biosciences.
- Que.2(A) Give specific answers. (04)
1. Define HPLC.
 2. What does GC-MS stand for?
 3. What is the primary principle behind chromatography?
 4. Name one type of chromatography used for separating analytes based on their interactions with charged functional groups.
- Que.2(B) Answer in Brief. (Any one out of two) (03)
1. Explain the principle of thin layer chromatography.
 2. Describe the working principle of HPLC chromatography.
- Que.2(C) Write a Note on. (Any one out of two) (07)
1. Discuss the applications of GC-MS in environmental analysis.
 2. Compare and contrast the principles of partition chromatography and size exclusion chromatography.
- Que.3(A) Give specific answers. (04)
1. What does SDS-PAGE stand for?
 2. What is the primary principle behind electrophoresis?
 3. Which type of electrophoresis technique is commonly used for separating proteins based on their molecular weight?
 4. Which technique is used to separate DNA fragments based on their size using an electrical field?
- Que.3(B) Answer in Brief. (Any one out of two) (03)
1. Write the overview of biosensor technology.
 2. Explain the basic principle of flow cytometry.
- Que.3(C) Write a Note on. (Any one out of two) (07)
1. Write detailed note on Agarose gel electrophoresis.
 2. Discuss the 2D-PAGE working principle and applications in molecular biology research.

- Que.4(A) Give specific answers. (04)
1. What does PCR stand for?
 2. What is the principle underlying DNA sequencing?
 3. What is the primary method used in next-generation sequencing?
 4. Which technique is used for detecting specific DNA sequences in a complex mixture using labeled probes?
- Que.4(B) Answer in Brief. (Any one out of two) (03)
1. Describe the principle of RFLP analysis.
 2. Explain the concept of primer design for PCR.
- Que.4(C) Write a Note on. (Any one out of two) (07)
1. Discuss the principles and applications of FISH in molecular biology.
 2. Explain the chemical synthesis of DNA and its significance in molecular biology research.
- Que.5(A) Give specific answers. (04)
1. What does ENTREZ provide access to?
 2. Name one primary biological database.
 3. What is the primary objective of bioinformatics?
 4. Define DBMS and its relevance in bioinformatics.
- Que.5(B) Answer in Brief. (Any one out of two) (03)
1. Describe the FASTA file format and its usage in bioinformatics.
 2. Explain the significance of structure databases in bioinformatics.
- Que.5(C) Write a Note on. (Any one out of two) (07)
1. Explain the process of sequence alignment and phylogenetic analysis using Clustal W.
 2. Discuss the importance of sequence alignment in bioinformatics and explain the principles behind BLAST.
