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MBC-007

M. SC. (BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

December, 2025

MBC-007 : BIOINFORMATICS AND

BIostatISTICS

Time : 3 Hours

Maximum Marks : 100

Note : (i) Answer any *five* questions.

(ii) All questions carry equal marks.

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1. (a) Explain the importance of bioinformatics as an interdisciplinary subject and its application in modern biological research. 10
 - (b) Write about different sequence file formats used in bioinformatics with suitable examples. 10

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2. (a) What is biological database ? Explain any *two* databases with examples. 10
(b) Define the term 'sequence alignment'. Discuss the different types of BLAST sequencing methods. 10
3. (a) Compare and contrast distance-based and character-based phylogenetic analysis methods. 10
(b) Write the importance of sequence motif databases. Explain how these database contribute to the identification and analysis of protein families. 10
4. (a) Differentiate between bottom-up and top-down approaches for structure identification in systems biology. 10
(b) Describe the concepts of soft redundancy and modular design in biological systems. 10
5. (a) Define modelling and list its types. Explain Boolean network model for single gene. 10

- (b) Explain the concept of separators in bioinformatics and discuss the challenges involved in their identification. 10
6. (a) With the help of a flow chart, explain various types of data used in biostatistics. 10
- (b) Describe the concept of probability in statistics with examples. 10
7. (a) Write short notes on any *two* of the following : 2×5=10
- (i) Regression
- (ii) Skewness
- (iii) Null hypothesis
- (b) Differentiate between probabilistic and non-probabilistic sampling schemes. 10

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