

Reg No.: _____

Name: _____

0720MCA287112401
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester MCA (Two Year) Degree (R,S) Examination December 2024



Course Code: 20MCA287

Course Name: BIOINFORMATICS

Max. Marks: 60

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

1 What is the scope of bioinformatics? (3)

2 Given the DNA sequence as follows: (3)

5'-GGATTATCGACGTAA-3'

Write down its complementary strand.

3 What is the importance of biological databases in bioinformatics? (3)

4 Write a short note on SWISS-PROT database. (3)

5 Determine the score of the following aligned sequence (3)

ATGACCTGATATT

AT TTTTA

Match = +1, Mismatch = 0 and Gap penalty = -1

6 Differentiate between PAM and BLOSUM matrices. (3)

7 Write a short note on gene expression in eukaryotes. (3)

8 What are microarrays? (3)

9 Explain the significance of genetic algorithm in bioinformatics. (3)

10 Explain structure visualization in bioinformatics. (3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11 With the help of a diagram explain the concept of Central Dogma of Molecular Biology. (6)

OR

- 12 Describe the functions of mRNA, tRNA and rRNA. (6)

Module II

- 13 Explain different types of primary sequence biological databases. (6)

OR

- 14 Describe structure classification databases in bioinformatics. (6)

Module III

- 15 Using Needleman and Wunsch dynamic programming method, construct the partial alignment score and trace back matrix for the sequences ATGCT and AGCT with match: +1, mismatch: -1, gap penalty: -2. Also write down the optimal global alignment between these sequences along with optimal score. (6)

OR

- 16 Using Smith Waterman method, Find the best local alignment between AGCGA and ACGAA with match: +1, mismatch: -1, gap penalty: -2. (6)

Module IV

- 17 Explain the gene structure of prokaryotic genome. (6)

OR

- 18 Describe the GC content of the eukaryotic genome. (6)

Module V

- 19 Explain how Neural Networks is used in bioinformatics to analyze the biological data. (6)

OR

- 20 Describe the pattern recognition and discovery process in bioinformatics. (6)
