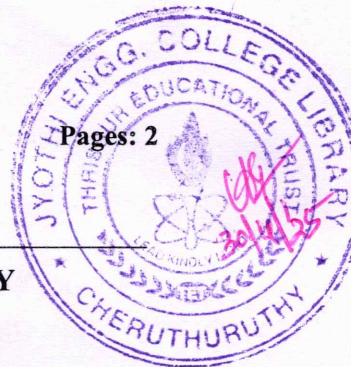


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)

**Course Code: CST468****Course Name: BIOINFORMATICS****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

- |    |  |     |
|----|--|-----|
| 1  | What are the differences between DNA and RNA?  | (3) |
| 2  | Write down the sequence of complementary strand of following DNA strand.<br>5'-TAGCATGCATGCATGCATGCATGC-3' | (3) |
| 3  | List any three major DNA nucleotide sequence databases.  | (3) |
| 4  | Write FASTA file format of a sequence.   | (3) |
| 5  | Explain the sequence alignment tool Clustal.   | (3) |
| 6  | Compare pairwise alignment and multiple sequence alignment.  | (3) |
| 7  | Define beta pleated sheet.   | (3) |
| 8  | Write short notes on STRING database   | (3) |
| 9  | What are the importances of modularity in system biology?  | (3) |
| 10 | Identify three criteria for process classifications for modelling.   | (3) |

**PART B***Answer any one full question from each module, each carries 14 marks.***Module I**

- |    |  |     |
|----|--|-----|
| 11 | a) Explain in detail about the need of bioinformatics technologies. Also write various applications. | (7) |
|    | b) Explain the structural features of Watson and Crick model of DNA.                                 | (7) |

**OR**

- |    |   |     |
|----|---|-----|
| 12 | a) Explain the process of DNA replication.  | (5) |
|    | b) What are the different steps of central dogma molecular biology? with the help of a neat diagram explain it. | (9) |

**Module II**

- |    |  |     |
|----|--|-----|
| 13 | a) What is Primary Database sequence? Explain any three primary databases. | (9) |
|    | b) Compare PAM and BLOSUM scoring matrices.                                | (5) |



OR

- 14 a) What are the purposes of BLASTX, BLASTP and BLASTN? (9)  
 b) How the dot-plots are used for similarity analysis in bioinformatics. (5)

**Module III**

- 15 a) Explain Multiple Sequence Alignment with example. (4)  
 b) Explain the different steps of Smith-Waterman Algorithm and perform the local alignment on the sequences given below using Smith-Waterman algorithm. (Gap penalty -2, match score 1, Mismatch score -1) (10)  
 S1- ATGCT  
 S2- AGCT

OR

- 16 a) List out any four differences between prokaryotic and eukaryote gene. (4)  
 b) Explain the different steps of Needleman-Wunsch algorithm and perform the global alignment on the sequences given below using Needleman-Wunsch algorithm. (Gap penalty -2, match score 1, Mismatch score -1) (10)  
 S1- TATGA  
 S2- TACGA

**Module IV**

- 17 a) Explain any two methods for determining protein three-dimensional structure. (7)  
 b) Explain the process of predicting interactions among proteins. (7)

OR

- 18 a) Explain the hierarchies of protein structure. (7)  
 b) What do you understand by Ramachandran plot? Give its applications? (7)

**Module V**

- 19 a) Explain on Variables, Parameters, and Constants in modelling biological systems. (6)  
 b) Describe the importance of model development in System Biology. (8)

OR

- 20 a) Explain why data integration is an important part of systems biology. (6)  
 b) Explain the advantages of computational modelling. (8)

\*\*\*\*