GUJARAT TECHNOLOGICAL UNIVERSITY

M.SC. INDUSTRIAL BIOTECHNOLOGY / POST GRADUATE DIPLOMA IN BIOINFORMATICS SEMESTER - 1 WINTER 2021 EXAMINATION

Subject Code:1310104   **Date:16 Mar 2022**

Subject Name:Bioinformatics

Time:10:30 AM TO 01:00 PM   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw neat and clean diagrams as required**

Q.1	**Write a note on following**	**(Marks-10X2=20)**

1. Bioinformatics
2. Biological Databases
3. Entrez Molecular Sequence Database System
4. Ramachandran Plot
5. Alpha (α) Helix and Beeta (β) Sheets
6. Microarray and its applications
7. PubChem & PDB
8. CATH and SCOP
9. Low Complexity Region
10. Receptor Ligand Interactions

Q.2	**Answer the following (Any 2 out of 3)**	**(Marks-2X10=20)**

1. What is sequence analysis? Differentiate the pairwise sequence alignment and Multiple Sequence alignment, Describe any one method/ algorithm used in either for global or local sequence alignment.
2. Describe any one phylogenetic tree construction algorithm (step by step) with an example.
3. Image Processing and data normalization in Microarray data analysis.

Q.3	**Answer the following (Any 6 out of 8)**	**(Marks-6X5=30)**

1. What are Primers? Describe the general steps and specifications used in designing a PCR primer.
2. Describe Sanger Sequencing and Next Generation Sequencing techniques.
3. Describe homology-based protein tertiary structure prediction methods.
4. Describe BLAST algorithm.
5. Explain any two Classification Algorithms applicable in Bioinformatics Studies.
6. Differentiate between PAM and BLOSUM matrices.
7. Write a comparative note on transcriptomics and proteomics.
8. What is DNA Barcoding, write its applications and databases?

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