

GUJARAT TECHNOLOGICAL UNIVERSITY

POST GRADUATE DIPLOMA IN BIOINFORMATICS (DB) - SEMESTER - 1 EXAMINATION - WINTER - 2024

Subject Code:1310104
Subject Name: Bioinformatics
Time:10:30 AM TO 01:00 PM

Date: 30 Dec 2024

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. Molecular Modeling Database (MMDB).
2. Interpro & Prosite.
3. Examples of any two secondary databases and briefly describe their purpose.
4. Sequence annotation & its Significance.
5. UPGMA & its primary purpose in bioinformatics.
6. Maximum Parsimony for phylogenetic tree development.
7. PubChem and its significance in Drug discovery.
8. Concept of QSAR in ligand-based drug design.
9. Pairwise Sequence Alignment.
10. ADME.

Q.2 Answer the following (Any 2 out of 3)

(Marks-2X10=20)

1. Compare and contrast the FASTA and BLAST algorithms for database similarity searching. What are the strengths and weaknesses of each method, and in what scenarios would one be preferred over the other?
2. Write a detailed note on Molecular Modeling and its importance in structural biology.
3. Explain Ramchandran map/plot. How is it useful in Protein structure evaluation?

Q.3 Answer the following (Any 6 out of 8)

(Marks-6X5=30)

1. Describe purpose of the Protein Data Bank (PDB). What types of data does it store? Explain in brief.
2. What is Multiple Sequence Alignment (MSA)? Discuss its applications in evolutionary biology and phylogenetics.
3. Discuss the concept of bootstrapping and jackknife methods in the context of phylogenetic tree evaluation.
4. Discuss the tools and databases associated with DNA barcoding.
5. Explain the significance of torsion angles (phi, psi, and chi) in protein structure.
6. Explain Chou–Fasman method used for the prediction of secondary structures in proteins.

7. Discuss the concept of systems biology and its importance in understanding biological systems.
8. Write a short note on Genbank as Primary Sequence database.
