

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024****Subject Code:3150407****Date:02-12-2024****Subject Name: Fundamentals and Applications of 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. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) What is single letter code for tyrosine, lysine and glutamic acid?	03
	(b) Explain in detail multiple sequence alignment.	04
	(c) Compare CATH and SCOP	07
Q.2	(a) What are various features and functionality to use pymol? How can you visualise structural differences among homologous proteins using pymol.	03
	(b) Discuss and draw structures of super secondary structures.	04
	(c) Explain the database that classifies proteins in families based on structure	07
	OR	
	(c) Write about the features of DDBJ and PDB in brief.	07
Q.3	(a) Explain the method of phylogenetic analysis.	03
	(b) What is QSAR?	04
	(c) What is molecular docking? Give examples of docking softwares	07
	OR	
Q.3	(a) Discuss score calculation in BLAST	03
	(b) Compare BLAST variants	04
	(c) Explain the global and local alignments by taking examples. What is heuristic method?	07
Q.4	(a) Which databases will give you information regarding genetic diseases?	03
	(b) Compare cladogram and phylogram	04
	(c) Discuss the methods for secondary protein structure prediction	07
	OR	
Q.4	(a) Explain various resources offered by EBI.	03
	(b) Why do we introduce the gaps and count scores?	04
	(c) Discuss Hidden Markov models for gene prediction in detail	07
Q.5	(a) What is the meaning of next generation sequences?	03
	(b) What are provision for graphics in python?	04
	(c) Give a brief idea about microarrays. Explain the workflow with neat diagram	07
	OR	
Q.5	(a) Enlist gene prediction tools.	03
	(b) Classify the biological databases. (give only list).	04
	(c) Differentiate between needleman-wunsch and smith-waterman algorithm	07
