

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch – **BIOTECHNOLOGY**

BIOINFORMATICS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following databases is primarily focused on nucleotide sequences? a) UniProt b) GenBank c) PDB d) KEGG	K1	CO1
	2	Which of the following diseases is commonly studied in relation to specific SNPs? a) Influenza b) Heart disease c) Common cold d) Broken bones	K1	CO1
2	3	BLOSUM matrices are primarily used for _____. a) Protein structure prediction b) DNA sequencing c) Protein sequence alignment d) Gene expression analysis	K2	CO2
	4	A common software tool used for phylogenetic analysis is _____. a) BLAST b) MEGA (Molecular Evolutionary Genetics Analysis) c) Geneious d) RAxML	K2	CO2
3	5	What is the common challenge in genome annotation? a) Lack of sequencing technology b) Difficulty in determining gene functions for non-coding regions c) Overlapping genes in prokaryotic genomes d) All of the above	K1	CO3
	6	In a mapping database, what does the term "coordinate system" refer to? a) The numerical representation of nucleotide sequences b) The framework used to describe the position of genes on a chromosome c) The method of protein alignment d) The statistical model used in gene prediction	K2	CO3
4	7	In a beta sheet, how are the strands held together? a) Ionic bonds b) Hydrogen bonds c) Covalent bonds d) Hydrophobic interactions	K2	CO4
	8	In homology modeling, what does the term "template" refer to? a) The sequence of the target protein b) The known structure of a homologous protein used for modeling c) The software used to generate models d) The final model of the protein	K2	CO4
5	9	What is the primary goal of drug design? a) To synthesize all known compounds b) To create effective and safe therapeutic agents c) To analyze protein structures d) To conduct clinical trials	K1	CO5
	10	Cytoscape allows integration with which type of external data? a) Genomic data b) Transcriptomic data c) Proteomic data d) All of the above	K1	CO5

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the RNA databases, and how do they contribute to bioinformatics?	K2	CO1
		(OR)		
	11.b.	Illustrate the applications of EST and STS databases in research.		
2	12.a.	Construct and Discuss the key differences between PSI-BLAST and PHI-BLAST in their algorithms.	K3	CO2
		(OR)		
	12.b.	Apply with the algorithm in substitution matrices of BLOSUM and PAM.		
3	13.a.	Construct and explain the concept of Open Reading Frame (ORF) prediction in genome analysis.	K3	CO3
		(OR)		
	13.b.	Organize and discuss about tools and techniques used for restriction mapping.		
4	14.a.	Analyze the importance of protein sequence analysis and its physical properties.	K4	CO4
		(OR)		
	14.b.	List out the molecular visualization tools and their importance.		
5	15.a.	Compare the roles of CellDesigner and Cytoscape in systems biology and bioinformatics.	K4	CO5
		(OR)		
	15.b.	Explain the concept of molecular docking in drug discovery.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze the importance of bioinformatics resources, specifically MEDLINE and OMIM, in the study of human diseases.	K4	CO1
2	17	Categorize the concept of phylogenetic analysis, types methods and its importance.	K4	CO2
3	18	Determine the various tools and software used in metagenomics data analysis and their applications.	K5	CO3
4	19	Explain the organization of levels of protein structure.	K5	CO4
5	20	Elaborate concept of structure-based drug designing methodologies, and applications.	K6	CO5

Z-Z-Z END