22BCU521N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch – **BIOCHEMISTRY**

COMPUTATIONAL TECHNIQUES IN 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 is the correct full form of URL? a) Universal Research Locator b) Uniform Resource Locator c) Uniform Retrieval Link d) Universal Resource Link	K1	CO1
	2	Which of these formats is primarily used for scientific document exchange due to its fixed formatting? a) HTML b) PDF c) XML d) HTTP	K2	CO1
2	3	Which of the following is NOT a tool provided by NCBI? a) BLAST b) Entrez c) ClustalW d) PubChem	K1	CO1
	4	Infer the symbol future which the FASTA format starts with which symbol? a) @ b) # c) > d) $	K2	CO1
3	5	Show the full form of SRS in bioinformatics a) Simple Retrieval System b) Sequence Retrieval System c) Systematic Resource Search d) Sequence Reference Server	K1	CO1
	6	Which of the following databases is not maintained by EMBL-EBI? a) GenBank b) ENA c) Ensembl d) Swiss-Prot	K2	CO1
4	7	Which of the following methods performs local alignment? a) Needleman–Wunsch b) Smith–Waterman c) CLUSTALW d) PHYLIP	K1	CO1
	8	Relate the use of Dot plot analysis a) Homologous regions and repeats b) GC content c) Gene expression levels d) DNA melting points	K2	CO2
5	9	What information does a PDB file Contains? a) Protein sequences b) Protein structures c) protein atomic coordinates d) protein kinetics	K1	CO2
	10	Infer the representations of phi and psi angles in a Ramachandran plot a) Hydrogen bonds b) Torsion angles of peptide backbones c) Van der Waals interactions d) Covalent bond lengths e) Ionic bonds	K2	CO2

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.	Differentiate between HTML and XML with examples.	K3	CO1
		(OR)		
	11.b.	Compare modem-based and Wi-Fi-based Internet connections.		
2	12.a.	Identify the main applications of bioinformatics.	K3	CO2
		(OR)		
	12.b.	Explain how PubMed helps researchers access scientific literature.		
3	13.a.	Describe the steps for submitting a new DNA sequence using Webin.	K4	CO2
		(OR)		
	13.b.	Discuss the relationship among NCBI, EMBL, and DDBJ.		
4	14.a.	Analyse the working principle of the BLAST algorithm with its components.	K4	CO3
		(OR)		
	14.b.	Dissect the process of multiple sequence alignment using CLUSTALW.		
5	15.a.	Apply the PASS tool to predict potential bioactivity of a compound.	K5	CO3
		(OR)		
	15.b.	Evaluate how docking can be applied to find a potential inhibitor for an enzyme.		

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 benefits of using UMLG in computational biology research.	K4	CO2
2	17	Evaluate the principles and challenges of bioinformatics.	K4	CO1
3	18	Propose a workflow for identifying disease-related genes using databases from NCBI.	K4	CO2/ CO3
4	19	Evaluate the basic steps involved in performing an NGS run and assess its merits and demerits.	K5	CO3
5	20	Evaluate how structure-based drug design validates potential drug candidates.	K5	CO3

Z-Z-Z END