

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI –600 086
(For candidates admitted from the academic year 2023 – 2024 & thereafter)

M.A/M. Sc. DEGREE EXAMINATION, APRIL 2026
SECOND SEMESTER

COURSE : ELECTIVE
PAPER : APPLICATIONS OF BIOINFORMATICS
SUBJECT CODE : 23BI/PE/AP23
TIME : 3 HOURS **MAX. MARKS: 100**

Q. No.	SECTION A (10 x 1=10 marks)	CO	KL
	All questions to be answered		
1	Which database is a primary sequence repository for nucleotide sequences maintained by NCBI? a) UniProt b) GenBank c) PDB d) Drug Bank	CO1	K1
2	Which file format is commonly used for representing raw polymer sequences in databases? a) PDB format b) FASTA format c) SMILES notation d) CSV spreadsheet	CO1	K1
3	Approximately how many base pairs does the human genome contain? a) 6 billion base pairs b) 5 billion base pairs c) 3 billion base pairs d) 4 billion base pairs	CO1	K1
4	PubMed is most appropriate for retrieving: a) Experimental 3D structures b) Biomedical literature and abstracts related to drugs and biology c) Raw sequencing reads in FASTQ d) Chemical reaction mechanisms only	CO1	K1
5	Genomic information which is used to study individual responses to drugs is known as a) Genomics b) Pharmacogenetics c) Cheminformatics d) Pharmacogenomics	CO1	K1
6	Which database is specifically tailored for pharmacogenomics information linking genes to drug response? a) PharmGKB b) EMBL c) RefSeq d) Protein Data Bank	CO2	K2
7	Antibodies in our body are produced by a) B-lymphocyte b) T-lymphocytes c) Monocytes d) RBC's	CO2	K2
8	Which of the following is NOT the role of MHC? a) Development of humoral and cell-mediated immune responses b) Helps in antigen recognition by T-cells c) Responsible for determining whether transplanted tissue will be compatible or not d) Has specific killing effects	CO2	K2
9	Which database focuses on chemical structures and bioactivity of small molecules? a) KEGG b) PubChem c) UniProt d) RefSeq	CO2	K2
10	eMolecules is most useful for finding: a) Protein 3D coordinates b) Detailed drug chemical, pharmacological and target information c) Raw genomic reads d) Clinical imaging files	CO2	K2

Q. No.	SECTION B Answers in about 50 words	(10 x 2= 20 marks)	CO	KL
11	Write the symbols for nucleotides.		CO3	K3
12	Classify Biological data.		CO3	K3
13	Comment on OMIM database.		CO3	K3
14	List the ways to identify disease genes.		CO3	K3
15	Define personalized medicine.		CO3	K3
16	Write on Insertions/Deletions.		CO4	K4
17	Comment on IMGT database.		CO4	K4
18	Differentiate innate and adaptive immunity.		CO4	K4
19	Define drugs.		CO4	K4
20	Write on 2D molecular structures.		CO4	K4
Q. No.	SECTION C Answer in about 600 words	(4 x 10= 40 marks)	CO	KL
21	a) Explain the different biological data formats. (OR) b) Summarize the bioinformatics perspectives on human diseases.		CO4	K4
22	a) Give a brief account on sequence submission tools. (OR) b) Describe the Entrez and SRS sequence retrieval systems.		CO4	K4
23	a) List the applications and challenges in Pharmacogenetics. (OR) b) Brief on Pharmacogenomics Knowledge Base.		CO5	K5
24	a) Elaborate the cells of the immune system. (OR) b) Discuss the chemical structure databases and tools.		CO5	K5
Q. No.	SECTION D Answer any TWO questions in about 1200 words	(2x 15=30 marks)	CO	KL
25	Explain in detail on the biological sequence database NCBI, EMBL, DDBJ.		CO5	K6
26	Write about the different types of genetic variations.		CO5	K6
27	Discuss the principles of B-cell and T-cell epitope prediction.		CO5	K6
28	Comment on the following: i) MHC polymorphism ii) 3D molecular structures		CO5	K6
