

Your Roll No

Department of Botany
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B.Sc. (HONS WITH RESEARCH) / B.Sc. BOTANY
V SEMESTER EXAMINATION DECEMBER 2025

Paper Name: **Genomics and Proteomics**

Paper Code: **BBO-MIC501**

Time: **2½ hours**

Maximum Marks: **60**

Note: This paper has 3 sections A, B, and C.

Section A: Answer all the questions. **Section B:** Attempt any 4 out of 6.

Section C: Attempt any 2 out of 3.

Abbreviations used:

CO-Course Outcomes

CLO 1: explain genomic organization in prokaryotes and eukaryotes and application of genetic and physical mapping in genome sequencing project of a particular plant species;

CLO 2: assimilate the principles, methods and applications of forward and reverse genetics, functional genomics, epigenetics, metagenomics and transcriptomics;

CLO 3: appreciate concepts of proteome and proteomics, proteomic technologies and functional proteomics; and

CLO 4: enumerate various application of proteomics in research and development

BTL-Bloom's Taxonomy Levels

1- Remembering, 2-Understanding, 3-Applying, 4-Analyzing, 5-Evaluating, 6-creating

SECTION A

Very Short Answer Questions (Answer **ALL** 15 questions)

(15 x 1 = 15 marks)

Q.No.	Questions	Marks	CLO	BTL
1	What is molecular docking?	1	4	2
2	ICAT and MudPIT are abbreviations of...	1	4	1
3	What is bioinformatics?	1	4	3
4	In TOF we are talking about the time of flight of...	1	3	2
5	Protein chip and array are same? Do you agree or disagree.	1	3	2
6	What is the purpose of using an Immobilized pH Gradient (IPG) strip in 2D gel electrophoresis?	1	3	2
7	What is "Top-Down" proteomics?	1	4	1
8	Name two databases for proteomics study.	1	3	1
9	What is haplotype?	1	1	1
10	Which platform is widely used for short-read sequencing?	1	1	1
11	Name two common Next-generation Sequencing platforms.	1	1	1
12	What is the full form of WMS in metagenomics?	1	2	1

Please turn over

13	What is chromatin remodeling?	1	2	2
14	Define molecular phylogeny.	1	2	1
15	What is the purpose of 16S rRNA gene sequencing in metagenomics?	1	1	2

SECTION B

Short Answer Questions (Attempt any **FIVE** of the following) (5 x 5 = 25 marks)

Q.No.	Questions	Marks	CLO	BTL
1	Explain the major applications of reverse genetics	5	2	4
2	Discuss at least three important applications of epigenetic and metagenomic studies in environmental sciences.	5	2	3
3	Briefly comment on <i>Arabidopsis</i> genome.	5	1	2
4	Discuss protein-DNA interaction	5	4	3
5	Differentiate 1D from 2D electrophoresis	5	3	2
6	Explain the process of protein digestion and its significance in proteomic analysis.	5	3	5

SECTION C

Long type Question (Attempt any **two** out of three) (2 x 10 = 20 marks)

Q.No.	Question	Marks	CO	BTL
1.	Describe mass spectrometry and how does it help in paleoproteomics?	10	3, 4	2
2. i	Explain the role of proteomics in food science.	05	4	3
ii.	Describe any two major techniques used in functional genomics and explain their applications.	05		2
3.	Describe the Human Genome Project with reference to its goals, methodology, sequencing techniques, key achievements, ethical issues (ELSI), and its importance in modern biology.	10	1	2, 3
