[This question paper contain ..... printed pages]

Your roll No.....

Serial No.	:	**7233**
Unique Paper Code	:	2163010022
Name of the Paper	:	PLANT GENOMICS, PROTEOMICS AND BIOINFORMATICS
Name of the Course	:	Botany
Semester	:	VIII

Duration: 2 Hours Maximum Marks: 60

Instructions for Candidates

a) Write your Roll No. on the top immediately on receipt of this question paper.
b) Question No.1 is compulsory.
c) Attempt any **FOUR** questions in all.
d) All parts of the question must be answered together.
e) Draw diagrams wherever required.

Q. 1 (a) Define the following **(any five)**: (1x5 = 5)

(i) Orthologous sequences

(ii) Conserved domain

(iii) Database

(iv) Primer

(v) e-value

(vi) Guide RNA (gRNA)

(b) Match the following: (1x5 = 5)

(i) MALDI-ToF	(a) Example of nucleotide database
(ii) GenBank	(b) Search engine
(iii Entrez	(c) Introns and repetitive DNA
(iv) Non-coding DNA	(d) Mass spectrometry technique

(v) Histone acetylation (e) Activation of gene expression

(c) Expand the following **(any five)**: (1x5 = 5)

(i) DDBJ
(ii) KEGG
(iii) PDB
(iv) NCBI
(v) HMP
(vi) SDS-PAGE

Q. 2 Write short notes on **any three** of the following: (5x 3 = 15)

(a) Illumina sequencing

(b) Genomics ethics

(c) X-ray crystallography

(d) BLAST

Q. 3 Differentiate between (**any three**): (3x 5 = 15)

(a) Primary and secondary structure of protein

(b) Eukaryotic and prokaryotic genome

(c) Genetics and epigenetics

(d) Local and global sequence alignment

Q. 4. (a) Define bioinformatics. Elaborate on its scope and significance in modern biological research, with specific reference to its applications in genomics and proteomics. (8 marks)

(b) Define molecular phylogeny. Discuss its fundamental principles, commonly used methods, and applications in understanding evolutionary relationships. (7 marks)

Q. 5 (a) What is the CRISPR-Cas9 system? Describe its stepwise mechanism in genome editing, supported with suitable diagrams. (8 marks)

(b) Define *metagenomics*. Discuss its applications in the biodegradation of environmental pollutants and the restoration of ecosystems. (7 marks)