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M.Sc. BOTANY
I SEMESTER EXAMINATION DECEMBER 2025

Paper Name: **Cell and Molecular Biology**

Paper Code: **MBO-CC102**

Time: **2 ½ hours**

Maximum Marks: **60**

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

Section A: Answer **all the questions**. Section B: Attempt any **05 out of 06**

Section C: Attempt any **02 out of 03**

Abbreviations used:

CLO-Course Learning Outcomes

CLO 1: relate the structure with the function of various cell organelles of plant cells (evaluate);

CLO 2: explain the nuclear, mitochondrial and chloroplast genomes (understand);

CLO 3: examine mechanisms of cell cycle regulation and cell death processes (analyze); and

CLO 4: describe replication and repair mechanism of DNA, synthesis and processing of RNA and protein, expression and regulation of genes at transcription, translation and post-translational level (understand/evaluate).

BLT-Bloom's Taxonomy Levels

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

SECTION A

Very Short Type Question (15 questions)

15 x 1 = 15 marks

Q. No.	Questions	Marks	CLO	BTL
1	Name the two major components of the lipid bilayer	1	1	2
2	What is the function of lysosomes?	1	1	1
3	Define nucleosome.	1	2	1
4	What is apoptosis?	1	3	1
5	State one function of the Golgi apparatus.	1	1	1
6	What is a gene family?	1	4	1
7	Name the phases of the cell cycle.	1	3	3
8	What is the role of RNA polymerase?	1	4	2
9	Define replication fork.	1	4	1
10	What is the genetic code?	1	4	1
11	State the role of aminoacyl-tRNA synthetase.	1	4	3
12	Name two semi-autonomous organelles in eukaryotic cells?	1	2	3
13	Write one function of peroxisomes.	1	1	1
14	What is the function of nucleolus?	1	1	1
15	Patch clamp device is used for?	1	1	2

SECTION B

Short Type Question. (Attempt any five out of six)

5 x 5 = 25 marks

Q. No.	Question	Marks	CLO	BTL
1	Discuss the architecture of the plasma membrane with emphasis on membrane models.	5	1	2
2	Explain the ultra-structure and functions of chloroplast.	5	2	1
3	Explain the trp operon mechanism and how attenuation regulates transcription.	5	4	3
4	Differentiate between euchromatin and heterochromatin.	5	2	4
5	Explain the mechanism of mismatch repair and nucleotide excision repair.	5	4	2
6	Describe cell-cycle regulatory checkpoints and their significance.	5	3	3

SECTION C

Long type Question (Attempt any two out of three)

2 x 10 = 20 marks

Q. No.	Question	Marks	CLO	BTL
1	Describe the complete process of eukaryotic DNA replication, emphasizing regulation of replication origins.	10	4	1
2	Elaborate the mechanisms of translation initiation, elongation, and termination, integrating the role of major post-translational modifications in protein maturation.	10	4	2
3	Explain in detail the events of meiosis, highlighting mechanisms ensuring genetic variability.	10	3	2

*****End of Question Paper*****