

9. Describe transcriptional regulation in eukaryotes. Include roles of nucleosome positioning, chromatin remodeling and histone modifications. 14



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M. Sc. (NEP-2020)

EXAMINATION, 2025

(Second Semester)

BOTANY

M24-BOT-204

Molecular Genetics

Time : 3 Hours]

[Maximum Marks : 70

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. Explain the following : $7 \times 2 = 14$
- (a) What is the C-value paradox ?
 - (b) What is the significance of semi-conservative DNA replication ?
 - (c) What is a frameshift mutation ?
 - (d) What is cis-trans test ?
 - (e) What is a promoter ?
 - (f) What is the Shine-Dalgarno sequence ?
 - (g) What do you understand by attenuation in the trp operon ?

Unit I

2. Explain the mechanism of transposition. Illustrate your answer with examples from bacteria and Drosophila. 14
3. Write short notes on the following : $2 \times 7 = 14$
- (a) Semi-conservative nature of DNA replication
 - (b) Different forms of DNA.

Unit II

4. Explain the different types of mutations. How are mutants isolated in the laboratory ? 14
5. Discuss different types of DNA repair mechanisms with emphasis on mismatch and excision repair. 14

Unit III

6. Describe the process of transcription in prokaryotes highlighting initiation, elongation and termination steps. 14
7. Write short notes on the following : $2 \times 7 = 14$
- (a) Processing of mRNA
 - (b) Deciphering of genetic code using experimental evidences.

Unit IV

8. Describe the regulation of the trp operon in prokaryotes with reference to repression and attenuation. 14