

SET-A

Roll No: _____

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M.Sc. BIOCHEMISTRY EVEN-SEMESTER (II) EXAMINATION, MAY 2025**Paper Code: MBC 201****(Molecular Biology-II)**

Time: 2½ h

Max Marks: 60

Note: This paper has 3 Sections, A, B, and C. Attempt all three sections. Section A: Answer all the questions; Section B: Answer any two; Section C: Answer all the questions, each question in this section has an internal choice .

Abbreviations: CLO- Course Learning Outcome, PLO- Program Learning Outcome, BTL- Bloom Taxonomy Level: BT level 1- Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create.

SECTION AAttempt All Questions

(10 x 1 = 10 Marks)

Q No. 1	OBJECTIVE QUESTIONS (Do as directed)	BTL	CLO	PLO
i.	The transposable elements of bacteria are generally retrotransposons. (True / False)	3	2	3
ii.	Non-sense mutations result in the premature termination of protein synthesis. (True/False)	2	3	3
iii.	Chromatin immunoprecipitation (ChIP) is a technique used to study _____.	1	1	2
iv.	The two main classes of transposable elements are _____ and _____.	1	2	3
v.	Histone modifications, such as acetylation and methylation, cannot regulate chromatin functions. (True/False)	3	3	2
vi.	Which of the following is not a transcription factor DNA-binding motif? a) Beta-barrel b) Helix-loop-helix c) Leucine zipper	4	1	3

	d) Zinc finger			
vii.	A riboswitch regulates gene expression by: a) Activating enhancers b) Modifying DNA sequences c) Alternative splicing d) Binding small metabolites to change mRNA structure	3	4	3
viii.	Name one antibiotic that inhibits protein synthesis and its target.	2	1	2
ix.	Which test uses <i>Salmonella typhimurium</i> to detect mutagenic compounds? a) Ames test b) Comet assay c) Micronucleus assay d) HPRT assay	4	2	3
x.	The Britten-Davidson model includes all of the following except: a) Sensor genes b) Integrator genes c) Repressor genes d) Producer genes	1	3	2

SECTION B

Answer ANY TWO of the following questions

(2 x 10 = 20 Marks)

Q. No 2	LONG ANSWER QUESTIONS	BTL	CLO	PLO
a)	Describe in detail about transposition mechanism of IS-10. Make a flow chart or figure to explain it.	3	4	2
b)	Discuss about mating-type switching in <i>Saccharomyces cerevisiae</i> . Why silent cassettes itself do not get modified by same mechanism.	1	3	3
c)	Discuss two important challenges faced by aminoacyl-tRNA synthetases.	3	1	3
d)	Elaborate on the molecular mechanisms through which steroid hormones influence transcription.	5	2	2

SECTION C

Attempt ALL SIX questions

(each question has an internal choice)

(6 x 5 = 30 Marks)

Q No. 3	SHORT ANSWER QUESTIONS (Write Short Notes)	BTL	CLO	PLO
a)	Discuss about nucleotide excision repair mechanism/ OR	4	4	2

	Role of HATs and HDACs in gene expression.			
b)	Write a short note on Chip and Chip-seq and its application/ OR Compare and contrast about mutation in coding and non-coding region of eukaryotic genome.	2	3	3
c)	Role of epigenetic mechanism in oncogenesis/ OR Short note on direct repair system with examples.	3	2	3
d)	Outline the steps involved in the comet assay and its interpretation/ OR Write a short note on the initiation of translation in prokaryotes.	1	1	2
e)	Explain the concept and structure of the lac operon with its regulatory elements/ OR What are the experimental techniques to detect DNA-binding sites?	3	3	3
f)	Discuss the steps involved in the termination of translation in prokaryotes/ OR Discuss the control of translation with emphasis on the role of guanine nucleotides.	5	2	3

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END OF THE QUESTION PAPER

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