647510 **BSCmiMJ208x-4C** **Seat No :_____**

B.Sc. Semester - 4 (NEP-2020) Examination
March/April-2025
MIC: Molecular Biology and Bioengineering (Major-8)

Time: 2:00 Hours **Marks: 50**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que-1	(a) Discuss the different models of DNA replication.	(05)
	(b) Explain the structure and architecture of a gene in both prokaryotes.	(05)
	OR	
Que-1	(a) Why is DNA considered the universal genetic material?	
	(b) Explain function of any three enzymes involved in DNA replication	
Que-2	(a) Explain the role of ribosomes in translation.	(05)
	(b) Describe the lac operon model in brief.	(05)
	OR	
Que-2	(a) What are post-translational modifications?	
	(b) What are the different levels of gene expression and regulation?	
Que-3	(a) Differentiate between homologous and site-specific recombination.	(05)
	(b) Explain in brief: Process of natural transformation.	(05)
	OR	
Que-3	(a) Differentiate between specialized and generalized transduction.	
	(b) What are transposable genetic elements, and how do they contribute to genetic variation?	
Que-4	(a) What is vector? Explain with examples.	(05)
	(b) What is site directed mutagenesis? Explain its applications.	(05)
	OR	
Que-4	(a) Describe the principle of genomic DNA isolation in bacteria.	
	(b) What is genetic engineering? Discuss its applications in modern era	
Que-5	(a) Briefly explain the Mendelian Laws of Inheritance.	(05)
	(b) Explain the structure and function of the genetic code.	(05)
	OR	
Que-5	(a) Explain the experiment of discovery of bacterial conjugation.	
	(b) Write a note on Phagmid vector.	

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