

B.Sc. Semester - 5 (NEP-2020) Examination**Oct/Nov - 2025****BIT: Genetics and Molecular Biology (Major-12)****Time: 2:00 Hours****Marks: 50****Instructions:**

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

Que.1	(1)	Write a detailed note on Structure and function of DNA.	(05)
	(2)	Explain Mendel's Law of Independent Assortment with an example.	(05)
OR			
Que.1	(1)	Discuss the experimental evidence proving DNA as the universal genetic material.	(05)
	(2)	Explain the semi-conservative model of DNA replication.	(05)
Que.2	(1)	Write a note on the lac operon for transcriptional regulation.	(05)
	(2)	Explain post-translational modifications and their significance in protein function.	(05)
OR			
Que.2	(1)	Describe the mechanism of transcription in prokaryotes.	(05)
	(2)	Explain the Types of gene regulation in prokaryotes.	(05)
Que.3	(1)	Differentiate between generalized and specialized transduction with diagrams.	(05)
	(2)	Explain the mechanism of bacterial conjugation in Gram-negative bacteria.	(05)
OR			
Que.3	(1)	Describe the process of natural transformation and competence in bacteria.	(05)
	(2)	Write a note on transposable genetic elements with examples.	(05)
Que.4	(1)	Explain about pBR322 vector used in recombinant DNA technology.	(05)
	(2)	Write a note on colony hybridization technique for the detection of recombinant molecules	(05)
OR			
Que.4	(1)	Explain the steps involved in genetic manipulation of prokaryotic cells.	(05)
	(2)	Describe site-directed mutagenesis and its applications in genetic engineering.	(05)
Que.5	(1)	Define gene. Explain gene structure with neat diagram.	(05)
	(2)	Explain the regulation of tryptophan biosynthesis – The trp operon.	(05)
OR			
Que.5	(1)	Explain the mechanism of electroporation and its applications in gene transfer.	(05)
	(2)	Discuss the applications Genetic engineering.	(05)
