

CBCS SCHEME

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BBT401

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2026 Molecular Biology and Genetic Engineering



Time: 3 hrs

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the mechanism of DNA replication in prokaryotic cells.	10	L2	CO1
	b.	Illustrate the base excision and nucleotide excision repair mechanisms.	10	L3	CO1
OR					
Q.2	a.	Explain the process of translation in prokaryotes.	10	L2	CO1
	b.	Distinguish between Co-translational and Post translational protein targeting mechanisms.	10	L3	CO1
Module – 2					
Q.3	a.	What are Ribozyme's? Explain with suitable examples.	10	L2	CO2
	b.	Describe lac operon regulation by positive and negative control.	10	L3	CO2
OR					
Q.4	a.	Discuss the chromatin remodelling mechanisms to regulate eukaryotic gene expression.	10	L3	CO2
	b.	Describe the role of hormonal control of gene expression of steroid hormone and auxin.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the construction and screening of YAC vectors.	10	L2	CO2
	b.	Design a cloning strategy for inserting a gene of interest using restriction enzymes, linkers and adapters.	10	L4	CO2
OR					
Q.6	a.	Justify the functions and roles of reverse transcriptase and ligases in genetic engineering.	10	L4	CO2
	b.	Explain the principle and steps involved in ligase-free cloning and TA – cloning.	10	L2	CO2

Module – 4

Q.7	a.	Justify Agrobacterium tumefaciens as natural genetic engineer.	10	L3	CO3
	b.	Distinguish between Southern, Northern and Western blotting.	10	L4	CO3
OR					
Q.8	a.	Illustrate Electroporation and lipofection.	10	L3	CO3
	b.	Polymerase chain reaction is a crucial technique in genetic engineering. Justify.	10	L4	CO3

Module – 5

Q.9	a.	Explain the genetic engineering approaches used for microbial production of insulin and antibiotics.	10	L3	CO4
	b.	Discuss the principle and mechanism of action of CRISPR- Cas9 gene editing technique with applications.	10	L4	CO4
OR					
Q.10	a.	Describe with suitable case studies plants and animals as bioreactors for recombinant proteins production.	10	L3	CO4
	b.	Illustrate and evaluate the role of RNAi in gene silencing.	10	L4	CO4
