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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET UNIVERSITY)

M.Sc. (Fourth Semester – Regular/ Supplementary) Examinations, April – 2026

24MASPE24001/24MPSPE24011

Biotechnology and Genetic Engineering (Life Science)

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Why restriction endonucleases are called “molecular scissors”? Explain with reasoning.	CO1	K2
b. Why are plasmids preferred as cloning vectors in prokaryotes?	CO2	K3
c. Why is cDNA preferred over genomic DNA for cloning eukaryotic genes in bacteria?	CO3	K3
d. Analyze how hybridoma technology ensures monoclonal antibody production.	CO4	K4
e. Analyze how herbicide-resistant crops benefit agriculture.	CO5	K4

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Explain the scope and milestones of genetic engineering, highlighting their impact on modern biotechnology.	10	CO1	K4
(OR)			
b. Explain the role of restriction enzymes in recombinant DNA technology with suitable examples	5	CO1	K3
c. Explain the methods for isolation, purification and quantitative analysis of DNA	5	CO1	K3
3.a. Describe various cloning vectors (plasmid, bacteriophage, cosmid) and evaluate their advantages and limitations.	10	CO2	K4
(OR)			
b. Discuss the process of gene cloning in prokaryotes.	5	CO2	K3
c. Explain cloning strategies using linkers and adapters.	5	CO2	K4
4.a. Discuss various gene transfer methods (physical, chemical) and evaluate their efficiency	10	CO3	K5
(OR)			
b. Describe the steps involved in cDNA synthesis and its significance.	5	CO3	K3
c. Discuss the construction and screening of gene libraries.	5	CO3	K4
5.a. Explain hybridoma technology in detail and analyse its applications in monoclonal antibody production.	10	CO4	K4
(OR)			
b. Describe the production of transgenic plants with suitable examples.	5	CO4	K3
c. Explain protoplast fusion and its applications in crop improvement.	5	CO4	K4
6.a. Discuss the applications of transgenic plants in improving disease resistance, herbicide tolerance and crop quality.	10	CO5	K5
(OR)			
b. Explain different types of gene therapy and their applications.	5	CO5	K3
c. Compare traditional vaccines with genetically engineered vaccines.	5	CO5	K4

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