QP Code: R252G025 | Reg. No | | | | | | | | | | | AY 24

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

M.Sc. (Second Semester - Regular) Examinations, July – 2025

24MBIPC12001– Genetic Engineering

(Biotechnology)

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.	What are phagemids?	CO2	K1
b.	Justify the use of Klenow fragment in genetic engineering.	CO3	K5
c.	What is the role of primer in PCR?	CO1	K1
d.	What is CRISPR?	CO2	K3
e.	What are the applications of DNA microarrays?	CO1	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Compare and contrast between Far western and Southwestern blotting.	7	CO2	K4
b.	Briefly discuss the different types of radioactive and non-radioactive probes.	3	CO1	K2
	(OR)			
c.	With the help of flow chart and suitable diagram illustrate the process of Southern blotting.	5	CO2	K2
d.	Explain the working mechanism of fluorescence *in situ* hybridization (FISH). Add a note on the types of FISH.	5	CO2	K2
3.a.	Briefly discuss M13 vectors and their application?	5	CO1	K2
b.	Between GST-vector and pET vector, which one would to choose for purification of your protein of interest and why?	5	CO3	K5
	(OR)			
c.	Imagine you are a researcher aiming to clone and express a large mammalian gene encoding protein ‘X’. Design a Yeast Artificial Chromosome (YAC) vector for this purpose.	5	CO3	K6
d.	Briefly describe Ti plasmid plant vector using suitable diagram.	5	CO2	K2
4.a.	With the help of suitable diagrams, illustrate the working of Nested PCR.	5	CO3	K3
b.	Compare and contrast between enzymatic and chemical sequencing of DNA.	5	CO2	K4
	(OR)			
c.	Briefly discuss the process of chemical synthesis of oligonucleotides.	5	CO1	K2
d.	With the help of a flow chart, illustrate megaprimer method of site-directed mutagenesis.	5	CO3	K3
5.a.	With the help of suitable diagram, explain the process of phage display.	5	CO2	K2
b.	You are a researcher who wants to identify whether the protein ‘X’ interacts with the DNA. Design an experiment to identify this protein-DNA interaction.	5	CO3	K6
	(OR)			
c.	Compare and contrast between transformation and transfection.	5	CO1	K4
d.	Illustrate the process of c-DNA library preparation with the help of suitable flow chart	5	CO2	K3

	or diagram.			
6.a.	Explain the process of creating knock-out mice model and justify its use in genetic engineering.	5	CO3	K4
b.	With the help of suitable diagram explain the working of siRNA-based gene silencing.	5	CO3	K2
	(OR)			
c.	What are the different methods of genetic manipulation used in *Drosophila* model?	5	CO1	K3
d.	Why the introduction of GM crops in market debated?	5	CO3	K4

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