QP Code: S253A019 | Reg. No | | | | | | | | | | | AY 23

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

B. Tech (Third Semester – Regular and Supplementary) Examinations, Nov.,2025

23BBTPC23001 – Fundamentals of Biology & Biotechnology

(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.	Differentiate between smooth and rough endoplasmic reticulum.	CO1	K1
b.	State the difference between euchromatin and heterochromatin.	CO2	K1
c.	What are the main chemical differences between DNA and RNA?	CO3	K1
d.	What is the purpose of using polynucleotide kinase in molecular cloning?	CO4	K1
e.	Name two examples of artificial chromosome vectors.	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Describe the structure of the plasma membrane based on the Fluid Mosaic Model and discuss the roles of lipids and proteins in maintaining its dynamic nature.	7+3	CO1	K3
	(OR)			
b.	Explain how chloroplast structure supports the light and dark reactions of photosynthesis.	5	CO1	K2
c.	Discuss the interrelationship between the endoplasmic reticulum and Golgi apparatus in secretion.	5	CO1	K2
3.a.	Write short notes on protein sorting and targeting in eukaryotic cells.	5	CO2	K3
b.	Discuss the prophase-I and significances of its sub-phases.	5	CO2	K2
	(OR)			
c.	Explain the steps involved in cell signalling pathways, starting from ligand–receptor binding to the generation of a cellular response. Illustrate how G-protein–coupled receptors (GPCRs) mediate signal transduction.	6+4	CO2	K3
4.a.	Experimental evidence over time confirmed DNA as the hereditary material." – Elaborate and evaluate the impact of these findings on the development of modern genetics.	10	CO3	K3
	(OR)			
b.	Describe in detail the structure of DNA, comparing A, B and Z conformations	5	CO3	K3
c.	Describe the methods used to estimate DNA concentration and purity and discuss how yield analysis is performed.	5	CO3	K3
5.a.	Discuss the historical milestones that led to the evolution of modern biotechnology	5	CO4	K2
b.	The development of molecular tools revolutionized biotechnology." — Justify this statement with examples of key enzymes and their applications.	5	CO4	K2
	(OR)			

c.	Explain the mechanism, classification and nomenclature of restriction endonucleases and describe how they are used to create recombinant DNA molecules.	8+2	CO4	K3
6.a.	Elaborate on the criteria for choosing a suitable vector for gene cloning in E. coli.	5	CO5	K2
b.	Explain the structure and applications of pBR322	5	CO5	K2
	(OR)			
c.	Describe the principles and steps involved in gene cloning, emphasizing the role of different types of vectors.	10	CO5	K2

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