QP Code:R251B033 | Reg. No | | | | | | | | | | | AY 24

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

M.Tech. (First Semester) Regular Examinations, February – 2025

24MBTPE11021 –Analytical Techniques in 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)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	What is the principle behind phase-contrast microscopy?	CO1	K2
b.	Mention one key application each of IR and NMR spectrophotometry.	CO2	K3
c.	Differentiate between adsorption chromatography and partition chromatography.	CO3	K2
d.	Differentiate between differential centrifugation and density gradient centrifugation.	CO4	K3
e.	What are the advantages of using radioisotopes in biochemical research?	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Explain the principle of operation and instrumentation of bright-field microscopy.	5	CO1	K2
b.	Explain the principle and instrumentation fluorescence microscopy.	5	CO1	K3
	(OR)			
c.	Compare and contrast scanning electron microscopy (SEM) and transmission electron microscopy (TEM) in terms of their working principles, instrumentation, and applications.	10	CO1	K3
3.a.	Explain the principle and applications of fluorescence spectrophotometry	5	CO2	K3
b.	Discuss the basic principle and applications of X-ray crystallography.	5	CO2	K3
	(OR)			
c.	Explain the principle, instrumentation and applications of MALDI-TOF MS.	10	CO2	K4
4.a.	Explain the working principle and applications of affinity chromatography.	5	CO3	K3
b.	Give a note on classification of chromatography.	5	CO3	K3
	(OR)			
c.	Describe the principle, instrumentation, and applications of gas-liquid chromatography (GLC).	10	CO3	K4
5.a.	Discuss in detail the different types of density gradient centrifugation.	5	CO4	K3
b.	What is relative centrifugal force (RCF), and how is it calculated? Why is it preferred over revolutions per minute (RPM)?	5	CO4	K3
	(OR)			
c.	Explain the principle, instrumentation, and applications of preparative centrifugation. How does it differ from analytical centrifugation?	10	CO4	K4
6.a.	Explain the principle and applications of 2D electrophoresis in proteomics research.	5	CO5	K3
b.	Compare Southern blotting and Northern blotting in terms of their target molecules and applications.	5	CO5	K3
	(OR)			
c.	Discuss the principle and different steps involved in the Polymerase Chain Reaction (PCR). Explain its applications in molecular biology.	10	CO5	K4

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