Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 90012

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025
Seventh Semester
Biotechnology
U19BTV52 – ANALYTICAL TECHNIQUES IN BIOINDUSTRIES
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	State the principle of a pH meter.	2	K1	CO1
2.	Give the use s of thermogravimetry.	2	K1	CO1
3.	Define Beer-Lambert's Law.	2	K1	CO2
4.	List the applications of FTIR in biotechnology.	2	K2	CO2
5.	Write the principle of transmission electron microscopy.	2	K1	CO3
6.	List the uses of Density Gradient Centrifugation.	2	K2	CO3
7.	How will SDS-PAGE be useful for the identification of specific proteins?	2	K2	CO4
8.	List two critical uses of Isoelectric focusing.	2	K1	CO4
9.	State the uses of size exclusion chromatography.	2	K2	CO5
10.	Give the application of Thin-layer chromatography in diagonosis.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Write a note on the design, construction, and working principle of a pH meter.	13	K2	CO1

(OR)

	b)	Explain the construction and working principle of the TDS meter with a suitable diagram.	13	K2	CO1
12.	a)	Enumerate the principles, instrumentation, and applications of atomic absorption spectroscopy.	13	K2	CO2
		(OR)			
	b)	Explain the principles, working and applications of NMR with a suitable example and diagram.	13	K2	CO2
13.	a)	Provide a detailed note on the preparative and analytical ultracentrifuge- explain the principles and clinical uses.	13	K2	CO3
		(OR)			
	b)	How will confocal microscopy be useful to identify the mitochondria in a cell? Explain with a flow diagram.	13	K2	CO3
14.	a)	Write a note on the theory and applications of 2D Electrophoresis and explain its use.	13	K3	CO4
		(OR)			
	b)	Describe the principle, methods, and application of pulse-field gel electrophoresis.	13	K2	CO4
15.	a)	Provide a detailed note on the principles and application of High Performance Liquid Chromatography (HPLC).	13	K3	CO5
		(OR)			
	b)	Gas Chromatography-Mass Spectrometry (GC-MS)- explain its use with a suitable diagram.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explain the method for the isolation of mitochondria from mammalian cells with a detailed note. Also, explain how you will localize the mitochondria using a microscopy technique.	15	K2	CO3
		(OR)			
	b)	How will you identify a protein of interest from a mixture of proteins from a cell lysate? Name the technique and also explain the methodology for the identification of a specific protein.	15	K3	CO5