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: 90007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

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.	Write the principle of pH measurement using pH indicators.	2	K1	CO1
2.	Define turbidity. What is its significance in water quality?	2	K2	CO1
3.	When would you choose to use a spectrophotometer over a colorimeter?	2	K3	CO2
4.	What is Fourier Transform Infrared (FTIR) spectroscopy?	2	K2	CO2
5.	Explain the difference between compound and simple microscopes.	2	K2	CO3
6.	What factors affect the rate of sedimentation?	2	K1	CO3
7.	How does SDS PAGE differ from native PAGE?	2	K4	CO4
8.	What is the significance of the isoelectric point of a protein?	2	K3	CO4
9.	Brief the concept of ligand-binding in affinity chromatography.	2	K3	CO5
10.	Relate and contrast GC-MS and LC-MS.	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss different types of reference electrodes used in pH meters and their specific applications.	13	K1	CO1
		(OR)			
	b)	Define spectrofluorimetry and describe its working principle. How is it used in the analysis of biological samples?	13	K2	CO1
12.	a)	What are the fundamental properties of electromagnetic radiation? Explain how these properties interact with different types of matter.	13	K3	CO2
		(OR)			
	b)	Describe the working principle of atomic absorption spectroscopy (AAS). How does it differ from other spectroscopic techniques?	13	K3	CO2
13.	a)	Compare and distinguish the Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) in terms of working principle, image formation, and applications.	13	K3	CO3
		(OR)			
	b)	Explain in detail about the principle and procedure of differential centrifugation. How is it used to separate subcellular organelles?	13	K2	CO3
14.	a)	Describe the principle and procedure of two-dimensional polyacrylamide gel electrophoresis (2D PAGE). How does it differ from one-dimensional electrophoresis?	13	K3	CO4
		(OR)			
	b)	Explain the basic principle of electrophoresis. Discuss the different factors that affect the movement of molecules during electrophoresis.	13	K3	CO4
15.	a)	Describe the steps involved in affinity chromatography, including sample loading, washing, and elution.	13	K2	CO5
		(OR)			
	b)	What is chromatofocusing? Describe the principle behind this chromatographic technique.	13	K1	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	How is Beer-Lambert's Law applied in quantitative chemical analysis? Explain its significance and limitations in spectrophotometric analysis.	15	K2	CO2
		(OR)			
	b)	Explain its principle and discuss the applications of HPLC in pharmaceutical analysis, environmental testing, and food safety.	15	K3	CO5