U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code:19BT5DCBAT **Max Marks: 100**
Course: Bioanalytical Techniques **Date: 07.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1	a)	In a chromatographic analysis of a sample a peak for component A has a retention time of 8.36 min with a baseline width of 0.96 min. Component B elutes at 9.54 min with a baseline width of 0.64 min. What is the resolution between the two peaks?	**04**
	b)	Mention variables that affect column efficiency.	**04**
	c)	What are the criteria that should be adopted for choice of solvents in chromatography?	**06**
	d)	Outline the procedure of Affinity Chromatography.	**06**

UNIT - II

2	a)	Compare horizontal and vertical gel electrophoresis. For DNA/RNA partition which electrophoresis is suitable?	**06**
	b)	Illustrate essential steps for quantitative analysis of serum immunoglobulins. Add a note on issues associated with it.	**08**
	c)	Discuss a suitable case study to justify the use of Isoelectric Focussing in clinical context.	**06**

UNIT - III

3	a)	Outline the process of sample preparation in Scanning Electron microscope.	**06**
	b)	Summarize the basic principle of Atomic Force microscopy.	**06**
	c)	What is meant by thermal analysis? List out the properties that can be investigated by thermal analysis.	**08**

OR

4	a)	Illustrate the workflow of Mass Spectrometry.	**10**

	b)	What are the types of rotors used in ultracentrifuge?	**06**
	c)	A centrifuge rotor is spinning at 25,000. The 'top' of the cell is 5.5 cm from the rotor's central axis, and the 'bottom' of the cell is 9.5 cm from the central axis. What are the g forces on a particle found at the top and at the bottom of the tube?	**04**

UNIT - IV

5	a)	With suitable schematic diagram explain instrumentation and principle for NMR spectroscopy.	**08**
	b)	State the importance of Electron density and difference-electron density maps in structure elucidation.	**06**
	c)	Using Bragg equation solve the following: If the wavelength striking a crystal at a 38. 3° angle has a wavelength of 1. 54 Å, what is the distance between the two layers. You can have suitable assumptions.	**06**

OR

6	a)	A researcher would like to select a suitable technique for the structural analysis of a sample knowing that his sample contains unpaired electrons. Identify a suitable spectroscopic technique that can be used. Explain its principle, instrumentation, working, and applications.	**10**
	b)	Explain principle of IR and Raman spectroscopy. How does Raman Spectroscopy differ from IR Spectroscopy?	**10**

UNIT - V

7	a)	With suitable block diagram discuss working principle of scintillation type detector.	**10**
	b)	What are the safety measures to be followed while handling radioisotopes.	**05**
	c)	List ant five applications of radioisotopes in biological science.	**05**

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