

## M.Sc Sem-3 Examination

501

Chemistry (Analytical)

Time : 2-30 Hours]

November-2024

[Max. Marks : 70

Q.1	(i)	Discuss in detail different types of stationary phases used in liquid chromatography.	07
	(ii)	Write a short note on ion-chromatography.	07
OR			
	(i)	Give a detailed account on preparative chromatography.	07
	(ii)	Compare and discuss HPLC and UHPLC separation tools.	07
Q.2	(i)	Describe some important applications of gas chromatography.	07
	(ii)	Write a short note on headspace gas chromatography.	07
OR			
	(i)	Describe the working of any two detectors used in GC stating their principle.	07
	(ii)	State the types of GC columns. Discuss any two in detail.	07
Q.3	(i)	Compare and discuss the role of SFC vs GC and HPLC in analytical separation.	07
	(ii)	Discuss the application of SFC in the analysis of pharmaceuticals.	07
OR			
	(i)	Describe the principle and instrumentation of SFC.	07
	(ii)	Briefly discuss the fundamentals of chiral and achiral SFC.	07
Q.4	(i)	Discuss extraction, chromatography, and mass detection in quantitative bioanalytical study.	07
	(ii)	Comment on analyte recovery, stability, and matrix effect in bioanalysis.	07
OR			
	(i)	Describe a general pharmacokinetic profile of a drug. Discuss all the terms involved.	07
	(ii)	Name different bioanalytical validation parameters and explain any two in detail.	07
Q.5 Answer any seven out of twelve (each question carries 2 marks)			14
	(i)	Define peak tailing and peak fronting.	

	<b>(ii)</b>	Define: Affinity chromatography.	
	<b>(iii)</b>	State the difference between isocratic and gradient elution modes.	
	<b>(iv)</b>	Comment on higher resolution in capillary columns compared to packed columns.	
	<b>(v)</b>	State the principle of pyrolysis gas chromatography.	
	<b>(vi)</b>	Give the types of injections used in gas chromatography.	
	<b>(vii)</b>	Why CO <sub>2</sub> is a preferred supercritical fluid compared to water or NH <sub>3</sub> .	
	<b>(viii)</b>	Define the triple point for any supercritical fluid.	
	<b>(ix)</b>	Which co-solvents are added to modify the mobile phase polarity in SFC.	
	<b>(x)</b>	Define incurred sample reanalysis.	
	<b>(xi)</b>	Give the composition of human whole blood.	
	<b>(xii)</b>	What do you understand by post-column infusion.	