

M.Sc.(Chem.) Semester - 3 (CBCS) Examination**Nov/Dec-2023 (NEW COURSE)****Separation Techniques (Core (New))****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1(A) Answer the following question. (04)

- 1) Explain the phenomenon of partition in brief.
- 2) Define chromatography and give its historical account in brief.

Que.1(B) Answer any two questions out of three. (10)

- 1) Enlist various modes of separation in chromatography; explain any one in detail.
- 2) Write step-to-step process to prepare column for column chromatography.
- 3) Define mobile phase and stationary phase, discuss general characteristics of mobile phase and stationary phase in chromatography.

Que.2(A) Answer the following question. (04)

- 1) Explain any one paper chromatographic technique and list out the factors that affects the separation of components in paper chromatography.

Que.2(B) Answer any two questions out of three. (10)

- 1) Discuss various visualization techniques used in paper chromatography
- 2) Discuss instrumentation of HP-TLC in detail with schematic diagram.
- 3) Answer the following.
(A) State major technical differences between TLC and HPTLC.
(B) Explain prewashing and activation of TLC plate.

Que.3(A) Answer the following question. (04)

- 1) Find Relative Retention Time (RRT) for all peaks against product peak.

Peak No	Peak Name	Retention Time (min)	Remarks
1	Methanol	2.22	Diluent
2	Emtricitabine	9.10	Product
3	(2R,5S) Emtricitabine Carboxylic Acid	10.88	Impurity-1
4	Emtricitabine dimer	12.40	Impurity-2
5	5-fluoro cytosine	14.91	Impurity-3

- 2) Give overview of gases used in gas chromatography.

Que.3(B) Answer any two questions out of three. (10)

- 1) Describe the role of Headspace in Headspace Gas Chromatography.
- 2) Explain Electron Capture Detector (ECD) in detail.
- 3) Give the principle of Gas chromatography, Draw the schematic diagram and list out its major components, explain any two components in detail.

Que.4(A) Answer the following question. (04)

- 1) Write various factors that affects the Retention Time (RT) in HPLC
- 2) Explain Eddy diffusion.

Que.4(B) Answer any two questions out of three. (10)

- 1) Discuss classification of HPLC instruments.
- 2) Draw the schematic diagram of HPLC and discuss the role of following in brief:
(A) column oven, (B) guard column, (C) degassing unit.
- 3) Write a note on Photo Diode Array (PDA) detector.

Que.5(A) Answer the following question. (04)

- 1) Write advantages and limitations of microwave assisted extraction in detail.

Que.5(B) Answer any two questions out of three. (10)

- 1) Briefly explain the following (i) Maceration (ii) Percolation
- 2) Discuss classification of various extraction techniques.
- 3) Explain Soxhlet extraction with labelled diagram.
