

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
OCT/NOV-2024 (AS PER SYLLABUS YEAR JUNE-2019)
Separation Techniques (Core (New))

Time: 2:30 Hours

Marks: 70

Instructions:

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

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

- 1) Define chromatography and give its historical account in brief.

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

- 1) Enlist various modes of separation in chromatography; explain any one in detail.
- 2) Explain affinity chromatography with figure.
- 3) What is ion-exchange chromatography? Briefly explain cation and anion exchangers

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

- 1) Give the principle of paper chromatography; What are the factors that influence the separation of components in paper chromatography?

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

- 1) Describe visualization techniques used in paper chromatography.
- 2) Discuss instrumentation of HP-TLC in detail with schematic diagram.
- 3) Discuss the advantages and limitations of paper chromatography compared to other chromatographic techniques like thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC).

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

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

Peak No	Name	Retention Time (min)
1	Methanol	1.98
2	Impurity – E	4.65
3	Ranitidine Hydrochloride	8.90
4	Impurity - C	11.30
5	Impurity - J	15.59

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

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

- 1) Describe the role of headspace in headspace gas chromatography.
- 2) Write a note on Thermal Conductivity Detector (TCD).
- 3) Give the principle of gas chromatography, discuss merits and demerits of gas chromatography.

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

- 1) What is peak asymmetry?
- 2) Name the various detectors used in HPLC analysis.

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

- 1) What is elution? Explain isocratic and gradient elution with example and graph of time vs mobile phase composition.
- 2) Discuss classification of HPLC instruments.
- 3) Write a note on Diode Array Detector.

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

- 1) Define solvent extraction. What are the key principles governing this process?

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

- 1) Briefly explain the following (i) Digestion (ii) Percolation
- 2) Describe the different types of extraction techniques commonly used in analytical chemistry, with examples of each.
- 3) Explain Soxhlet extraction with labelled diagram.
