

M.Sc.(Chem.) Semester - 3 (CBCS) Examination**Oct/Nov-2022 (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.

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- Q.1 (A)** Answer the following question **04**
1. Which types of materials are being used as stationary phase in following types of chromatographic techniques?
 - i. Gas Chromatography
 - ii. HPTLC
 - iii. Paper Chromatography
 - iv. High Performance Liquid Chromatography
 2. Briefly explain Bonded Phase and Immobilized stationary phase
- Q.1 (B)** Answer any two questions out of three. **10**
1. Explain the phenomena of adsorption in detail.
 2. Discuss eddy diffusion with diagram.
 3. Define mobile phase and stationary phase, discuss general characteristics of mobile phase and stationary phase in chromatography.
- Q.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.
- Q.2 (B)** Answer any two questions out of three. **10**
1. Discuss about various visualization techniques used in paper chromatography
 2. Differentiate between TLC and HP-TLC, Why HP-TLC is superior than TLC technique?
 3. Discuss instrumentation of HP-TLC
- Q.3 (A)** Answer the following question **04**
1. Define the following terms and give its equation
(i) Peak Asymmetry (ii) Resolution
 2. Explain the classification of Gas Chromatographic technique with suitable example.
- Q.3 (B)** Answer any two questions out of three **10**
1. Write a note on flame ionization detector.
 2. Describe the role of Headspace in Headspace Gas Chromatography.
 3. Explain isocratic and gradient temperature programming in GC with temperature graph and importance of gradient programming.
- Q.4 (A)** Answer the following question **04**
1. Give ideal characteristics of mobile phase and stationary phase for HPLC.
 2. Draw representative HPLC chromatogram indicating following: Mobile phase peak pattern, Product peak, Related substance peak, Area under curve, Peak maxima, Peak width, Integration start and end point

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

1. Give the principle and applications of HPLC (8-10 applications)
2. Write a note on Refractive Index detector.
3. Calculate and decide, whether sample will pass or fail based on following specifications.

Passing conditions: No peak should appear after RRT 2.5 and minimum purity of product should be more than 98.70%

Peak No	Area under Curve	Retention Time	Name	Remarks
1	911	3.21	Et. acetate	Impurity
2	5,16,988	6.66	LOX	Product
3	5010	8.31	ME2CPC	Impurity
4	222	10.88	BMPPA	Impurity
5	329	16.52	Unknown	Impurity

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

1. Define extraction, its types and short outline on its applications.

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

1. Briefly explain the following (i) Decoction (ii) Maceration
2. Give the examples of non-conventional extraction methods, explain any one in detail.
3. Discuss hot continuous extraction in detail.
