

M.Sc.(Chem.) Semester - 3 (CBCS) Examination**Oct/Nov-2021 (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 (4)**
- (1) Briefly distinguish between normal phase and reverse phase chromatography. 2
 - (2) Define: (a) elution (b) mobile phase 2
- Q.1(B) Answer any two questions out of three. (10)**
- (1) Explain adsorption and partition with figure. 5
 - (2) Briefly elucidate eddy diffusion and longitudinal diffusion. 5
 - (3) Discuss general characteristics of mobile phase and stationary phase in chromatography. 5
- Q.2(A) Answer the following question (4)**
- (1) Define R_f and give its equation. 2
 - (2) List out the factors that affects the separation of components in paper and thin layer chromatography. 2
- Q.2(B) Answer any two questions out of three. (10)**
- (1) Explain various visualization techniques used in paper or thin layer chromatography 5
 - (2) Write a note on circular paper chromatography. 5
 - (3) Explain preparation and activation of traditional TLC plate. 5
- Q.3(A) Answer the following question (5)**
- (1) Discuss sample preparation and use of head space GC in short. 2
 - (2) Which detector is known as universal detector? also name the most commonly used GC detector. 2
- Q.3(B) Answer any two questions out of three (10)**
- (1) Write a note on flame ionization detector. 5
 - (2) Draw schematic diagram of GC and explain role of column and column oven. 5
 - (3) Explain isocratic and gradient temperature programming in GC with suitable example. 5
- Q.4(A) Answer the following question (4)**
- (1) Enlist the applications of HPLC 4

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

- (1) Draw schematic diagram of HPLC, enlist its major components and explain about any two components of the system. 5
- (2) Explain classification of HPLC systems with brief justification. 5
- (3) Calculate and decide, whether sample will pass or fail based on following specifications. 5
 1. No peak should appear between RRT 0.60 to 0.95
 2. No peak should appear after RRT 1.60
 3. Any Individual impurities should be less than 0.1%
 4. Total impurity should be less than 0.25%

Peak	Details	RT (min)	Area Under Curve
1	System peak	1.88	3866
2	Impurity 1	3.76	151.5
3	Impurity 2	5.98	195
4	Product peak	11.02	1,91,113
5	Impurity 3	17.01	99.4

Q.5(A) Answer the following question (4)

- (1) Briefly explain the following (i) Percolation (ii) Maceration 4

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

- (1) Give an account of Super critical fluid extraction. 5
- (2) Write a note on soxhlet extraction. 5
- (3) Name few non-conventional extraction methods, explain any one in detail. 5
