



JAX-003-1103001

Seat No. _____

M. Sc. (Sem. III) (CBCS) Examination

December - 2019

Chemistry : C - 301

(Advance Chromatographic Techniques)

(Common) (New Course)

Faculty Code : 003

Subject Code : 1103001

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) All questions carry equal marks.

- 1 Answer the following : (any seven) 14
- (a) Draw the block diagram of HPTLC and write their functioning.
 - (b) Write the classification of chromatography.
 - (c) Discuss the properties of CO₂ as an SFC.
 - (d) Mention the difficulties arise when GC is coupled with MS.
 - (e) Define elution, isocratic and gradient elution.
 - (f) Give the mechanism of ion exchange.
 - (g) Explain total volume of gel bed (V_t) and solvent volume inside the gel particles (V_i).
 - (h) Give the principle of gas chromatography and its advantages.
 - (i) Define hyphenated techniques. Give their name and mention advantages of them.
 - (j) In a chromatographic analysis of lemon oil a peak for limonene has a retention time of 8.36 min with a base line width 0.96 min, terpinene elutes at 9.54 min with base line width 0.64 min. What is the resolution between two peaks ?

- 2 Answer the following : (any two) 14
- (a) Write a note on gel matrix used in gel chromatography.
 - (b) Answer the following :
 - (i) Define number of theoretical plates and plate height. If retention time is 407 s, base width of the band is 13 s, column length is 12.2 m then find the number of plates and plate height.
 - (ii) What is resolution ? Derive relation between plates number and resolution.
 - (c) Give the principle of NPD, ECD and FID detectors.
- 3 Answer the following : 14
- (a) Give a brief account on gas chromatographic instrument.
 - (b) Discuss advantages of SFC over HPLC and its limitation.
- OR**
- 3 (a) Discuss the interface of GC-MS in detail. 14
- (b) What are mass analyzer ? Discuss TQM in detail.
- 4 Answer the following : 14
- (a) Discuss the properties of SFC and why CO₂ is used best SFC ?
 - (b) Give the application of ion exchange chromatography in detail.
- 5 Answer the following : (any two) 14
- (a) Discuss types of CO₂ extraction in detail.
 - (b) Give a brief account on atmospheric pressure chemical ionization.
 - (c) Discuss partial beam ionization in detail.
 - (d) Define separation factors and capacity factors in 25.0 cm long column. The solvent took 2.35 min to run through the column where as two compounds X and Y took 9.87 min and 10.63 min with peak half width 45.6 sec. and 53.4 sec. respectively.
- Calculate :
- (i) Capacity factor for X and Y.
 - (ii) Separation factor α .
 - (iii) Average number of plates and plate height.
 - (iv) Resolution.