QA-5240

M. Sc. (Sem. III) Examination, December- 2023

Chemistry

Paper - 3.1

CHEM-631

Chromatography
(Common for all Specilization)

Time Allowed : **Three Hours**

Maximum Marks : **70**
Min. Marks : **28**

Note : *This question paper is divided into three sections as under :*

Section-A **Max. Marks - 10**

Will carry 10 marks with 01 compulsory question comprising 10 short answer type questions (maximum 20 words answer) taking two questions from each unit. Each question shall be of one mark.

Section-B ***Max. Marks-25***

Will carry 25 marks with equally divided into five long answer type questions (answer about in 250 words). Students are instructed to attempt five questions by selecting one question from each unit.

Section-C ***Max. Marks-35***

Will carry 35 marks with five long answer type questions comprising one compulsory question of 15 marks and four questions of 10 marks each. Students are instructed to attempt total three questions with one compulsory question (answer about in 500 words) and any two more questions (answer about in 400 words) out of ramaining four questions.

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SECTION - A

1 (i) What is the principle of partition chromatography ?

(ii) Draw the phase diagram of supercritical fluid with proper labellings.

(iii) Define Isocratic Elusion.

(iv) What are spray reagents ? Give two examples.

(v) Explain the experiment performed by M. Tswett.

(vi) Define retention time and its importance.

(vii) Why Guard column is used in HPLC ?

(viii) How will you obtain Deionised water ?

(ix) Which kind of substance can be separated by Electrophoresis ?

(x) How the pH of Buffer affects the electrophoresis ?

1×10=10

SECTION - B

UNIT - I

2 Describe the technique of 2 dimensional (2D) paper chromatography.

OR

Explain the principle of supercritical fluid chromatography and some of its applications.

UNIT - II

3 Describe the various methods used to prepare thin layer on plate in TLC.

OR

Explain the advantages of using high performance thin layer chromatography (HPTLC) and some of its applications.

UNIT - III

4 Write short notes on :

(a) Column Efficiency

(b) Flash Chromatography

OR

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What are carrier gases ? Describe the properties of carrier gases which are useful to select it for gas chromatography ? Write names of commonly used carrier gases and suggest most preferred gas.

UNIT - IV

5 Write a brief note on size exclusion chromatography.

OR

Discuss the various factors affecting separation in Ion Exchange chromatogrpahy.

UNIT - V

6 Discuss the theory and classification of Electrophoresis techniques.

OR

Write a brief note on Instrumentation of capillary electrophoresis.

SECTION - C

7 Define chromatography and provide various classifications of chromatography. Discuss the mechanics of separation involved during various kinds of chromatography in detail.

5+5+5

8 (a) Using any one example, explain the development of thin layer chromatography and discuss its advantages over paper chromatography.

7

(b) Draw the instrumentation diagram of HPTLC. (High Performance thin layer chromatography)

3

9 Describe the various types of detectors used in Gas Chromatographic separation with giving some of its applications.

8+2

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10 What are Ion Exchange Resins ? Describe their classifiction and provide some of its applications.

3+4+3

11 Write short notes on :

(a) Gel staining and de-staining.

(b) Micellar Electro kinetic capillary chromatography.

5+5

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