CBCS SCHEME

USN | | | | | | | | | | |

18CH46

Fourth Semester B.E. Degree Examination, June/July 2023
Instrumental Analysis

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain theory and procedure of Thin Layer Chromatography (TLC). **(06 Marks)**

b. Discuss the various detection methods used in column chromatography. **(06 Marks)**

c. Elucidate the different techniques employed in paper chromatography. **(08 Marks)**

OR

2 a. Discuss the classification of chromatographic methods based on the mechanism of separation. **(08 Marks)**

b. Write notes on the following:
(i) Filters papers used in paper chromatography
(ii) Gel filtration **(06 Marks)**

c. Discuss the theory and detection methods of paper chromatography. **(06 Marks)**

Module-2

3 a. Explain theory and instrumentation of HPLC. **(08 Marks)**

b. Discuss in detail the preparation and operation of columns used in gas chromatography. **(08 Marks)**

c. Write a note on derivatization. **(04 Marks)**

OR

4 a. What is gas chromatography? Explain the principle and instrumentation of gas chromatography. **(08 Marks)**

b. Explain electron capture and flame ionization detectors used in gas chromatography. **(08 Marks)**

c. Discuss the principle of HPTLC. Mention its advantages. **(04 Marks)**

Module-3

5 a. Give an explanatory note on chromophores and auxochromes. **(06 Marks)**

b. Define electromagnetic spectrum. Discuss instrumentation of IR spectroscopy. **(06 Marks)**

c. Calculate the λ_{max} values for the following:

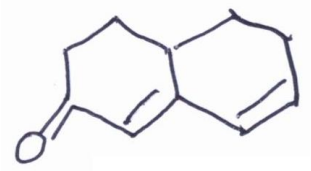

Fig.Q5(c)(i)

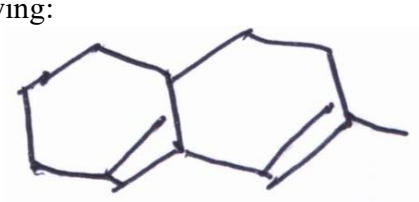

Fig.Q5(c)(ii) **(08 Marks)**

OR

6 a. State Beer's and Lambert's laws. Derive an expression for Beer-Lambert's law and mention its limitations. **(08 Marks)**

b. Discuss the different modes of molecular vibrations. **(04 Marks)**

c. Explain the principle and instrumentations of UV-visible spectroscopy. **(08 Marks)**

Module-4

7	a.	Explain the theory and instrumentation of mass spectroscopy.	**(08 Marks)**
	b.	Discuss electron impact and chemical ionization techniques.	**(08 Marks)**
	c.	Write a note on plasma desorption.	**(04 Marks)**

OR

8	a.	Discuss the different modes of fragmentation in mass spectroscopy.	**(06 Marks)**
	b.	Explain 'Field Ionization' and Fast Atom Bombardment (FAB). Mention their advantages.	**(08 Marks)**
	c.	Explain the GC/mass spectroscopy and mention its advantages.	**(06 Marks)**

Module-5

9	a.	Discuss theory and instrumentation of NMR spectroscopy.	**(08 Marks)**
	b.	Discuss: (i) Chemical shift (ii) Spin-spin coupling	**(06 Marks)**
	c.	Write notes on: (i) Nuclear over Hauser effect (ii) Coupling constant	**(06 Marks)**

OR

10	a.	Explain shielding and de-shielding effects with example.	**(06 Marks)**
	b.	Explain ^{13}CNMR spectro and its applications.	**(06 Marks)**
	c.	Write notes on: (i) Proton exchange reaction (ii) 2D-NMR	**(08 Marks)**

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