Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. Pharm. – SEMESTER – I • EXAMINATION – SUMMER • 2015

Subject Code: 910001 **Date: 19-05-2015**

Subject Name: Modern Analytical Techniques

Time: 02:30 pm - 05:30 pm **Total Marks: 80**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	(a)	Why are C-13 NMR spectra more difficult to record than H-NMR? Describe proton decoupled and off resonance technique in detail.	**05**
	(b)	Discuss principle of enzyme immunoassay. Describe double sandwich ELISA technique for antigen measurement.	**05**
	(c)	Explain the following statements in brief (Any 3): 1. High purity carrier gas is extremely important for good GC analysis result. 2. Aldehydic proton appears at high delta value. 3. Anilinium cation exhibits UV spectrum almost similar to benzene. 4. I^{125} is most favored tracer in RIA.	**06**
Q.2	(a)	What are the thermal methods of analysis? Give suitable classification of thermal methods of analysis. Discuss principle, instrumentation and applications of DSC.	**10**
	(b)	What is electrophoresis? Describe iso-electric focusing with its application.	**06**
Q.3	(a)	What do you mean by time domain and frequency domain spectra? Describe principle and working of Michelson interferometer with diagram.	**08**
	(b)	What is plasma? Discuss inductively coupled plasma emission spectroscopy.	**08**
Q.4	(a)	What is mass spectrometry? Enlist ionization techniques used in MS. Discuss chemical ionization technique.	**06**
	(b)	Give chemical shift values and spin-spin coupling for the following compounds. i. Benzyl acetate ii. 2-Methyl-1-propanol iii. Propylamine	**05**
	(c)	Discuss the expected mass fragments of the following. (i) Acetone (ii) Benzyl bromide	**05**

Q.5 (a) What do you mean by exclusion limit in SEC? Describe principle and applications of size exclusion chromatography. **08**

(b) Describe principle and techniques of affinity chromatography. **08**

Q. 6 (a) Identify the following compounds on the basis of the spectral data presented here. Show you're reasoning for the conclusion arrived at. **08**

1. UV: 265 nm (€ = 450)
   IR: 3330, 2970, 2880, 1515, 1465, 813 cm^{-1}
   NMR: (δ) 1.12 d (6H) J=7.0 Hz
   2.28 s (3H)
   2.82 heptate (1H) J=7.0 Hz
   7.02 s (4H)
   CMR: 21.3, 24.2, 38.9, 126.6, 134.8, 145.7
   MS: M^+ 134, 119, 77.

2. UV: 270 nm (€ = 1450)
   IR: 3500, 3000, 1612, 1595, 1507, 1223, 813 cm^{-1}
   NMR: (δ) 2.3 s (3H), 5.1 s (1H), 7.1 s (2H), 8.2 s (2H)
   MS: 108, 107, 79, 77, 51.

(b) Discuss the factors responsible for band broadening in column chromatography. **08**

Q.7 Write notes on the following (Any THREE): **16**

a. Chemical shift
b. Optical rotatory dispersion
c. HPTLC
d. Reference standards

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