

GUJARAT TECHNOLOGICAL UNIVERSITY

M. Pharmacy Sem-I Examination January 2010

Subject code: 910001**Subject Name: Modern Analytical Techniques****Date: 19 / 01 / 2010****Time: 12.00 – 3.00 pm****Instructions:****Total Marks: 80**

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

- Q.1** (a) Explain the term resolution, column selectivity and capacity factor. Describe the options for changing the selectivity α . **08**
- (b) Explain the principle of size exclusion chromatography. Describe stationary phases used in SEC. **08**
- Q.2** (a) Enlist the factors affecting the efficiency of chromatographic separation. Discuss longitudinal diffusion. **06**
- (b) Describe chemical ionization technique with its advantages and disadvantages. **05**
- (c) Give chemical shift values and spin-spin splitting for the following compounds: **05**
- i. Benzyl acetate ii. Ethanol iii. Ethyl methyl ether
- Q.3** (a) What is plasma? Discuss inductively coupled plasma emission spectroscopy. **06**
- (b) What is enzyme immune-assay? Describe double sandwich ELISA technique for antigen measurement. **05**
- (c) How will you differentiate o, m and p xylene on the basis of their proton decoupled CMR spectrum. **05**
- Q.4** (a) Describe the factors affecting the chemical shift. **06**
- (b) Describe methods used for simplification of complex spectra. **05**
- (c) Describe theory and application of derivative spectroscopy. **05**
- Q.5** (a) Explain the following statements: **06**
- i. Maldi is used to determine the molecular weight of proteins.
- ii. Anilinium cation exhibits UV spectrum almost similar to benzene.
- iii. C 13 NMR spectra are more difficult to record than PMR
- iv. The value of capacity factor k' should be between 1 to 10.
- (b) Describe storage, handling and documentation of reference standard. **05**
- (c) Describe with diagram, principle and working of Michelson interferometer. **05**
- Q. 6** Write short notes on the following: **16**
- a. HPTLC
- b. Isoelectric focusing
- c. Mc-lafferty rearrangement
- Q.7** (a) Describe technique of Affinity chromatography. **06**

(b) Identify the following compounds on the basis of the spectral data presented here. Show your reasoning for the conclusion arrived at. **10**

i. UV: 265 nm ($\epsilon = 450$)

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.

ii. UV: Not more than 210

IR: 2980, 2800, 2170, 1745, 1200 cm^{-1}

NMR: (δ) 1.3 t (3H)

3.5 s (2H)

4.3 q (2H)

MS: 113(M^+), 86, 68, 67.
