

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
M.Pharm Semester –I Examination Feb. - 2012

Subject code: 910001

Date: 10/02/2012

Subject Name: Modern Analytical Techniques

Time: 10.30 am – 01.30 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) Explain the basic principle of atomic spectroscopy. Discuss atomization techniques used in atomic absorption spectroscopy. **06**
 - (b) Enlist the ionization techniques used in mass spectrometry. Discuss MALDI with its application. **05**
 - (c) Explain the prominent mass fragments of the following compounds. **05**
 - i. Cyclohexanone
 - ii. Propyl benzene
 - iii. Methyl benzoate
 - iv. Phenol
- Q.2**
- (a) Explain the terms of Van-de meter equation. Describe eddy and longitudinal diffusion in detail. **06**
 - (b) What is ion exchange chromatography? Discuss the factors affecting the separation in ion exchange chromatography. **05**
 - (c) Describe principle of affinity chromatography. Discuss ligands used in affinity chromatography with its characteristics. **05**
- Q.3**
- (a) Describe principle of radio immunoassay. Discuss ELISA technique in detail. **06**
 - (b) Explain Bragg's law. Describe X-ray sources. **05**
 - (c) Discuss isoelectric focusing. **05**
- Q.4**
- (a) Describe factors affecting the chemical shift. **06**
 - (b) Why are C-13 NMR spectra more difficult to record than H-NMR? Describe proton decoupled technique in detail. **05**
 - (c) How will you differentiate isomers of trichloro benzene on the basis of their decoupled CMR. **05**
- Q.5**
- (a) Explain the following statements: **06**
 - i. TMS is used as reference compound in NMR.
 - ii. On hydrogen bonding stretching frequency in IR gets lowered.
 - iii. R band shows a blue shift on increasing the polarity of the solvent
 - iv. In EMIT step washings are not required.
 - (b) What is reflection spectroscopy? Describe attenuated total reflection (ATR) spectroscopy with its applications. **05**
 - (c) Explain: Reference substance, certified reference material and working standard. Describe storage and documentation of reference standard. **05**

- Q. 6** Write notes on the following: **16**
- Optical rotatory dispersion
 - Size exclusion chromatography
 - COSY NMR
- Q.7** (a) What is thermal method of analysis? Discuss principle and applications of differential thermal analysis (DTA). **06**
- (b) Identify the following compounds on the basis of the spectral data presented here. Show your reasoning for the conclusion arrived at. **10**
- IR: 3400-2600(broad), 1717, 1265, 914, 812, 636 cm^{-1}
NMR: (δ) 3.0 t (2H)
3.6 t (2H)
Above 10 (broad) s (1H) Exchangeable
CMR: 24.3 (t), 38.6 (t), 178.6 (s).
MS: 154, 152, 135, 107, 73 (base), 55.
 - UV: 253 nm(log e 2.5)
IR: 2700, 1710, 1600, 1500, 1450, 750, 700 cm^{-1}
NMR: (δ) 2.8 multiplet (4H)
7.3 s (5H)
9.8 t (1H)
MS: 134(M^+), 105, 91, 78, 39, 29.
