Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
M. Pharm. SEMESTER–I • EXAMINATION – WINTER-2016

Subject Code: 910001 **Date: 30/12/2016**
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 following statements **10**
(i) Reverse phase chromatography is more commonly used in analysis of drugs and pharmaceuticals.
(ii) The number of peaks obtained in IR is always less than 3N-6
(iii) TMS is used as reference compound in NMR.
(iv) In EMIT step washings are not required
(v) R band shows a blue shift on increasing the polarity of the solvent.

(b) Discuss principal of Ultra Violet spectroscopy. **06**

Q.2 **(a)** What is chemical shift? Discuss the factors affecting the chemical shift. **06**

(b) Write in brief about Gas chromatography **05**

(c) Discuss ORD and Cotton effect **05**

Q.3 **(a)** How will you differentiate between following pairs of compounds using IR spectroscopy. Give appropriate wave number for prominent peaks. **06**
(i) CH_3CH_2OH and CH_3COCH_3
(ii) CH_3CH_2COOH and C_6H_5CHO
(iii)CH_3CHO and $CH_2=CHCH_2OH$

(b) Explain Bragg's law. Describe X-ray sources. **05**
(c) Write in brief about HPTLC **05**

Q.4 **(a)** Give fragmentation patterns of the following compounds **06**
(i) Benzyl alcohol (ii) Phenol
(ii) Propyl Benzene (iv) Ethyl secondary butyl ether
(b) Describe in brief Principle and Instrumentation of Mass spectroscopy **05**
(c) Explain: (i) FT-NMR (ii) Principle of atomic spectroscopy **05**

Q.5 **(a)** Give chemical shift values and spin-spin splitting for the following compounds **06**
(i) Ethyl methyl ether (ii) Ethyl ethyl ketone (iii) Ethylacetate
(b) Write note on C-13 NMR spectroscopy. **05**
(c) What is thermal method of analysis? Discuss principle and applications of DTA. **05**

Q. 6 **(a)** Write note on ion exchange chromatography. **06**

(b) Enlist the factors affecting the efficiency of chromatographic separation. Discuss longitudinal diffusion. **05**

(c) Write note on Emission spectroscopy **05**

Q.7 **(a)** Theory and principles of electrophoresis **06**

(b) Identify the following compounds on the bases of the spectral data presented here. Show the reasons for the conclusions to be taken by you. **05**

Molecular formula: C_2H_3N

UV: λmax = is less than 220 nm

IR: 3010-2950, 2255, 1370 cm^{-1}

NMR: (δ) 1.8 singlet

(c) Identify the following compounds on the bases of the spectral data presented here. Show the reasons for the conclusions to be taken by you. **05**

Molecular formula: $C_5H_7O_2N$

UV: λmax = not more than 220 nm

IR: 2990-2940, 2265(m), 1745(s), 1200(s), 1125(s) cm^{-1}

NMR: (a) t (3H) (δ) 1.3

(b) s (2H) (δ) 3.5

(c) q (2H) (δ) 4.25

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