Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. PHARM. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 910001 Date: 07/01/2013

Subject Name: Modern Analytical Techniques

Time: 10.30 am - 01.30pm Total Marks: 80

Instructions:

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

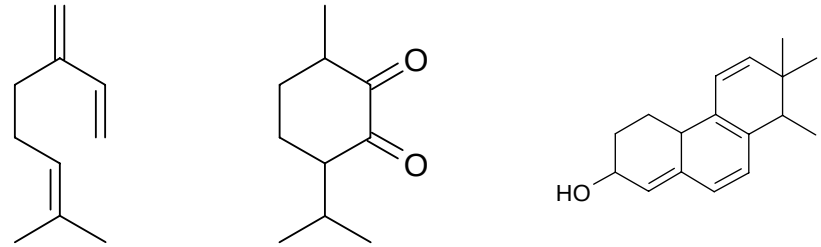
Q.1 (a) What do you means by frequency domain and time domain spectrum. Describe Michaelson interferometer with diagram. **06**

(b) Explain in brief Derivative UV spectroscopy with its application. **05**

(c) What do you mean by Radio Immuno Assay? Discuss principle and method used in ELISA technique. **05**

Q.2 (a) Calculate the λ_{max} of following compounds **06**

(i) (ii) (iii)



(b) How can you differentiate following pair of compounds using IR spectroscopy? **05**

i. Acetone and acetylene

ii. Acetaldehyde and methanol

(c) Describe storage, handling and documentation of reference standard. **05**

Q.3 (a) Enumerate factors responsible for the band broadening in chromatographic column. Discuss Eddy and Longitudinal diffusion. **06**

(b) Explain the term capacity factor, tailing factor and resolution. **05**

(c) Describe the principle and technique of Ion exchange chromatography. **05**

Q.4 (a) What is chemical shift? Discuss the factors affecting chemical shift. **06**

(b) Describe hydrogen decoupling and off resonance decoupling technique in CMR. **05**

(c) How can you differentiate isomer of trichloro benzene on the basis of their proton decouple CMR spectra? **05**

Q.5 (a) Discuss principle, instrumentation and application of Differential Scanning Calorimetry (DSC). **06**

(b) What do you mean by X-ray powder diffraction? Explain Bragg's law. **05**

(c) Discuss optical rotatory dispersion (ORD) and circular dichroism(CD). **05**

Q. 6 (a) Enlist the ionization techniques used in mass spectroscopy. Discuss MALDI technique. **06**

(b) How can you differentiate the isomer of pentanol using mass spectroscopy? **05**

(c) Discuss isoelectric focusing technique. **05**

Q.7 (a) What is plasma? Describe inductive coupled plasma emission spectroscopy. **06**

(b) Identify the compound on the basis of spectral data presented below and show the reason for the same **05**

UV (nm) : 280
IR (cm^{-1}) : 3400, 3050, 2980, 1600, 1500, 1420, 1300, 750, 700
NMR (δ) : 1.2 Triplet (3H)
3.1 Quartet (2H)
3.3 Singlet (1H)
6.5–7.5 multiplet (5H)
Mass(m/e) : M^+ 121

(c) Identify the compound on the basis of spectral data presented below and show the reason for the same **05**

UV (nm) : below 220
IR (cm^{-1}) : 3500, 3400, 1680, 1400
NMR (δ) : 1.2 Triplet (3H)
2.25 Quartet (2H)
6.5 broad singlet (2H)
Mass(m/e) : 73, 57, 55, 44 (base), 29

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