

# UKA TARSADIA UNIVERSITY

040030101/040040101/040050101/040060101/0400120101 - Modern Analytical Techniques  
M.Pharm. (QA) / M.Pharm. (Pharmaceutics) / M.Pharm. (Pharmacology) / M.Pharm. (PA)/  
M.Pharm. (PT) Semester 1

Time : 10:00 am to 1:00 pm

Date : 21/12/2013

Duration: 3 Hours

Max. Marks: 70

## Instructions:

1. Attempt all questions.
2. Write each section in a separate answer book.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks.
5. Draw diagrams/figures whenever necessary.

## SECTION 1

- Q.1 a.** Explain the following statement (Any Four): (08)
- i. Aldehydic proton appears at high delta value.
  - ii. OH stretching frequency is higher than that of NH stretching frequency
  - iii. Molecular ion peak is not obtained for sugars using EI source but it can be obtained by FAB
  - iv. Cyclobutanol gives six signals in PMR Spectrum.
  - v. On conjugation carbonyl group shows bathochromic shift in UV while in IR it shifts to lower wave number.
  - vi. FT-IR scans spectra faster than conventional IR
- b.** What do you mean by time domain and frequency domain spectra? Give the limitations of conventional IR spectroscopy. (03)

- Q.2 a.** Why are carbon 13 NMR spectra more difficult to record than H-NMR? Describe hydrogen decoupling and off resonance decoupling techniques used in CMR spectroscopy with example. (06)

OR

- a.** What is chemical shift? Enlist factors affecting the chemical shift. Describe anisotropic effect with example.
- b.** Identify the compound on the basis of spectral data presented below. Show your reasoning for the conclusion arrived at (06)

(i) IR: 2700, 1710, 1500, 1600, 1450, 750, 700  $\text{cm}^{-1}$   
NMR: ( $\delta$ ) 2.8 multiplet (4H)  
7.3 s (5H)  
9.8 t (1H)  
MS: 134, 105, 91, 78, 39, 29.

(ii) UV: 321nm ( $\epsilon = 10,000$ ) in ethanol, on addition of one drop of 1N NaOH solution show peak at 400nm ( $\epsilon = 20,000$ ) and 305 nm ( $\epsilon = 8500$ ).  
IR: 3330, 3090, 1620, 1590, 1330, 855, 760 and 695  $\text{cm}^{-1}$   
NMR: ( $\delta$ ): 6.5 s (1H), 7.1 d (2H), 8.2 d (2H)  
MS: m/e, 139, 109, 93, 81, 65 (base) 53, 39.

- Q.3.** Write notes on the following (Any Three) (12)
- |   |                     |
|---|---------------------|
| <b>a.</b> Michelson interferometer                  | <b>b.</b> MALDI     |
| <b>c.</b> Inductively Coupled Plasma emission torch | <b>d.</b> Pulse NMR |

## SECTION 2

- Q.4 a.** Classify the immunochemical methods of analysis. Explain principle of enzyme immuno assay. Describe double sandwich ELISA technique for antigen measurement ELISA. (07)
- OR
- a.** Describe principle of affinity chromatography. Discuss ligand and immobilization techniques used in affinity chromatography.
- b.** Describe the options available for changing selectivity ' $\alpha$ '. (04)
- Q.5 a.** Describe principle, stationary phase used and applications of Size exclusion chromatography. (07)
- OR
- a.** Give suitable classification of thermal method of analysis. Describe principle, instrumentation and applications of DSC.
- b.** Describe the factors affecting Ion exchange chromatography. (05)

**Q. 6** Write notes on the following (**Any Three**)

(12)

- a.** Storage and documentation of reference standard
- b.** Eddy diffusion
- c.** Circular dichroism
- d.** Isoelectric focusing.

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