UKA TARSADIA UNIVERSITY

M. Pharm Semester I Examination – January 2012

040030101/040040101/040050101/040060101 – MODERN ANALYTICAL TCHNIQUES

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-I

Q-1 (A) Answer the following: [07]

I) Enlist the ionization techniques used in mass spectrometry.
II) Why ^{12}C do not give NMR spectra?
III) Which are the gases used in chemical ionization technique?
IV) Give the value of IR absorption band for non hydrogen bonded hydroxyl group.
V) Give the names of relaxation processes take place in NMR.
VI) Define Nitrogen rule.
VII) What do you mean by base peak in mass spectrum?

Q-1 (B) Answer the following in brief: (Any 4) [08]

I) How will you differentiate o, m and p-xylene on the basis of their proton decoupled CMR spectra.
II) How will you differentiate 1*, 2* and 3* butanol with the help of mass fragmentation?
III) How would you distinguish intra and inter molecular hydrogen bonding by IR spectroscopy.
IV) Give chemical shift values and spin-spin splitting for Benzyl acetate
V) Why FT-IR measure the spectrum faster than conventional IR?
VI) Explain Bragg's law.

Q-2 Answer the following: [10]

A) Why are C-13 NMR spectra more difficult to record than H-NMR? Describe proton decoupled and off resonance technique in detail.

A) What do you mean by time domain and frequency domain spectra? Describe principle and working of Michelson interferometer with diagram.

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

UV: 260nm (ϵ= 300)
IR: 3030, 2906, 1600, 760, and 690 cm^{-1}
NMR: (δ) 2.1 quintplet 22 sq.
2.7 triplet 19 sq.
3.4 triplet 21 sq.
7.3 singlet 52 sq.
MS: m/e 200, 198(M^+), 91

B) UV: 321nm (ϵ= 10,000) in ethanol, on addition of one drop of 1N NaOH solution show peak at 400nm (ϵ =20,000) and 305 nm (ϵ = 8500).

IR: 3330, 3090, 1620, 1590, 1330, 855, 760 and 695 cm^{-1}
NMR(δ): 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 note on the followings (Any 2) [10]

A) Inductively coupled plasma spectroscopy

B) X-ray diffraction spectroscopy

C) MALDI and its applicatons

Section-2

Q-4 (A) Define following [07]

I) Cotton effect II) Zone Electrophoresis (ZE) III) Octane rule

IV) Ligand V) Retention time VI) Selectivity factor VII) DTA

Q-4 (B) Explain the following statements in brief: (Any 4) [08]

I) Decrease in diameter of packing particles result in improved efficiency.

II) Spacer arm is used in affinity chromatography

III) IRMA is more sensitive than RIA.

IV) CD curves are obtained for optical isomers having chromophoric group.

V) Columns have to be changed more often in GC than that of HPLC.

VI) RP-HPLC is widely used in analysis of pharmaceuticals.

Q-5 Answer the following: [10]

A) Discuss principle of enzyme immunoassay. Describe double sandwich ELISA technique for antigen measurement.

OR

A) What is the thermal method of analysis? Give suitable classification of thermal method of analysis. Discuss principle, instrumentation and applications of DSC.

B) What do you mean by exclusion limit in SEC? How the molecular weight of unknown compound is determined by SEC?

OR

B) What is electrophoresis? Describe iso-electric focusing with its application.

Q-6 Write note on the followings (Any 2) [10]

A) Describe the options available for changing in selectivity 'α'.

B) Reference standard.

C) Describe principle and applications of affinity chromatography.

****