

Note: 1) Attempt any five questions.

2) All questions carry equal marks.

Q.1. (a) Discuss the following terms in relation to High Performance Liquid Chromatography: (HPLC)

- i) Retention time ii) Resolution iii) Column Efficiency
iv) Reverse Phase Column v) HETP

(b) Draw a neat labeled diagram of a binary HPLC system and explain its working.

(c) Enumerate Pharmaceutical applications of HPLC.

Q.2. (a) Explain with reference to I.R. Spectrophotometry:

- i) Why all compounds are not infra red active?
ii) Why we obtain less absorption bands than theoretical number of absorption bands
iii) Why overtones appear.

(b) Explain different types of stretching and bending modes of vibrations of carbon dioxide molecule.

(c) How will you distinguish the following pairs of compounds on the basis of I.R. Spectra?

- i) Aniline and Phenol.
ii) Acetone and Ethanol.
iii) Benzamide and Benzoic acid.

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Q.3. (a) Explain the following terms with suitable examples:

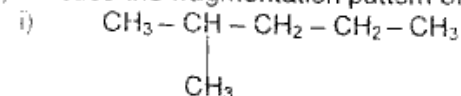
- i) Chemical shift ii) Anisotropy iii) Spin Spin Coupling
iv) Coupling Constant v) Solvent shift

(b) What are advantages and disadvantages of Fourier transform NMR instrument over normal NMR instruments?

(c) Discuss the NMR Spectra of $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$.

(a) Write an account of ion sources employed in mass spectrometry. Explain the instrumentation and working of deuterium ion mass spectrophotometer.

Discuss the fragmentation pattern of any two of the following:



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Q.5. Discuss the protocol of Radio immune Assay techniques. What are its limitations? Discuss pharmaceutical applications of RIA.

Q.6. (a) Derive a mathematical expression for Beer's law. Under what circumstances Beer's law fails? What are necessary precautions to be observed for successful implementation of Beer's law?

(b) Exemplify the pharmaceutical applicability of Beer's law to pharmaceutical analysis.

Q.7. Write theory, instrumentation, working and pharmaceutical application of any two of the followings.

- i) Electrophoresis.
ii) Differential Scanning Calorimetry.
iii) Transmission Electron Microscopy.

Q.8. Write short notes on any three of the followings:

- i) Uses of Fluorescence in Pharmaceuticals.
ii) ESR.
iii) Gel Chromatography.
iv) Isothermal temperature programming in GLC.
v) Cytometry.

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