

Syllabus

Unit-I

UV Visible Spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation: Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications: Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications.

Unit-II

IR Spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations.

Instrumentation: Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications.

Flame Photometry: Principle, interferences, instrumentation and applications.

Atomic Absorption Spectroscopy: Principle, interferences, instrumentation and applications

Nepheloturbidometry: Principle, instrumentation and applications.

Unit-III

Introduction to Chromatography

Adsorption and Partition Column Chromatography: Methodology, advantages, disadvantages and applications.

Thin Layer Chromatography: Introduction, Principle, Methodology, R_f values, advantages, disadvantages and applications.

Paper Chromatography: Introduction, methodology, development techniques, advantages, disadvantages and applications.

Electrophoresis: Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications.

Unit-IV

Gas Chromatography: Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications.

High Performance Liquid Chromatography (HPLC): Introduction, theory, instrumentation, advantages and applications.

Unit-V

Ion Exchange Chromatography: Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications.

Gel Chromatography: Introduction, theory, instrumentation and applications.

Affinity Chromatography: Introduction, theory, instrumentation and applications.

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