

OBT751 ANALYTICAL METHODS AND INSTRUMENTATION

DETAILED SYLLABUS

UNIT I SPECTROMETRY

Properties of electromagnetic radiation- wave properties – components of optical instruments– Sources of radiation – wavelength selectors – sample containers – radiation transducers – Signal process and read outs – signal to noise ratio - sources of noise – Enhancement of signal to noise - types of optical instruments – Applications.

UNIT II MOLECULAR SPECTROSCOPY

Molecular absorption spectrometry – Measurement of Transmittance and Absorbance – Beer's law – Instrumentation - Applications -Theory of fluorescence and Phosphorescence – Theory of Infrared absorption spectrometry – IR instrumentation – Applications – Theory of Raman spectroscopy – Instrumentation – applications.

UNIT III NMR AND MASS SPECTROMETRY

Theory of NMR — chemical shift- NMR-spectrometers – applications of ^1H and ^{13}C NMR- Molecular mass spectra – ion sources. Mass spectrometer. Applications of molecular mass - Electron paramagnetic resonance- g values – instrumentation.

UNIT IV SEPARATION METHODS

General description of chromatography – Band broadening and optimization of column performance- Liquid chromatography – Partition chromatography – Adsorption chromatography – Ion exchange chromatography -size exclusion chromatography- Affinity chromatography- principles of GC and applications – HPLC- Capillary electrophoresis – Applications.

UNIT V ELECTRO ANALYSIS AND SURFACE MICROSCOPY

Electrochemical cells- Electrode potential cell potentials – potentiometry- reference electrode – ion selective and molecular selective electrodes – Instrument for potentiometric studies – Voltametry – Cyclic and pulse voltametry- Applications of voltametry. Study of surfaces – Scanning probe microscopes – AFM and STM.

TEXT BOOKS

1. Skoog, D.A. F. James Holler, and Stanky, R.Crouch “Instrumental Methods of Analysis”.Cengage Learning , 2007.
2. Willard, Hobart, etal., “Instrumental Methods of Analysis”. VIIth Edition, CBS, 1986.
3. Braun, Robert D. “Introduction to Instrumental Analysis”. Pharma Book Syndicate, 1987.
4. Ewing,G.W. “Instrumental Methods of Chemical Analysis”, Vth Edition, McGraw-Hill, 1985

SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

Notes

Syllabus

Question Papers

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www.Binils.com

REFERENCE

1. Sharma, B.K. "Instrumental Methods of Chemical Analysis: Analytical Chemistry" Goel Publishing House, 1972.
2. Haven, Mary C., etal., "Laboratory Instrumentation ". IVth Edition, John Wiley, 1995