

AMCT02 INSTRUMENTAL METHODS OF ANALYSIS

UNIT-1 INTRODUCTION OF SPECTROMETRY

- 1.1 Properties of electromagnetic radiation- wave properties
- 1.2 Components of optical instrument-
- 1.3 Sources of radiation- wavelength selectors- sample containers- radiation transducers
- 1.4 Signal process and read outs- signal to noise ratio- sources of noise
- 1.5 Enhancement of signal to noise- types of optical instruments
- 1.6 Principle of Fourier Transform optical Measurements.

UNIT-2 MOLECULAR SPECTROSCOPY

- 2.1 Molecular absorption spectrometry-
- 2.2 Measurement of Transmittance and Absorbance
- 2.3 Beer's law- Instrumentation- Applications- Theory of fluorescence and Phosphorescence
- 2.4 Instrumentation- Applications- Theory of Infrared absorption spectrometry-
- 2.5 IR instrumentation- Applications- Theory of Raman spectroscopy
- 2.6 Instrumentation- applications.

UNIT-3 MAGNETIC RESONANCE SPECTROSCOPY AND MASS SPECTROMETRY

- 3.1 Theory of NMR- environmental effects on NMR spectra- chemical shift-
- 3.2 NMR-spectrometers- applications of ^1H and ^{13}C NMR
- 3.3 Molecular mass spectra- ion sources- Mass spectrometer.
- 3.4 Applications of molecular mass-
- 3.5 Electron paramagnetic resonance- g values- instrumentation.

UNIT-4 SEPARATION METHODS

- 4.1 General description of chromatography
- 4.2 Band broadening and optimization of column performance
- 4.3 Liquid chromatography- Partition chromatography- Adsorption chromatography
- 4.4 Ion exchange chromatography- size exclusion chromatography
- 4.5 Affinity chromatography- principles of GC and applications
- 4.6 HPLC- Capillary electrophoresis- Applications.

UNIT-5 ELECTRO ANALYSIS AND SURFACE MICROSCOPY

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

Reference Book:

1. Instrumental Methods of Analysis. D.A. Skoog, F. James Holler, Stanley, R.Crouch. Cengage Learning – 2007