

SYLLABUS

SCAS - ~~307~~ 317

Andhra University
Department of Inorganic and Analytical Chemistry
M.Sc. (Final) Chemistry Syllabus for 3rd Semester

Specialization - Analytical Chemistry

Paper - IV ~~Spectroscopic Methods of Analysis~~

(Effective from 2008-09 Admitted batch)

MSW
Instrumental Methods of Analysis
Spectroscopic Methods of Analysis

Unit - I : Spectroscopic Methods - 1

- (a) **UV-Visible Spectroscopy:** laws of absorption, deviation from Beer's law, single and double beam spectrophotometers-instrumentation, sources of radiation, detectors, qualitative analysis by absorption measurements, general precautions in colorimetric determinations, determination of certain metal ions by using ligands - Fe^{2+} , Fe^{3+} , Al^{3+} , NH_4^+ , Cr^{3+} , Cr^{6+} , Co^{3+} , Cu^{2+} , Ni^{2+} and anions - NO_2^- , PO_4^{3-} using suitable reagents, simultaneous determinations of dichromate and permanganate in a mixture, spectrophotometric titrations, principle of diode array spectrophotometers.
- (b) **Spectrofluorimetry:** Theory of fluorescence, phosphorescence, factors affecting the above, quenching, relation between intensity of fluorescence and concentration, instrumentation, application with reference to Al^{3+} , chromium salts, fluorescence, thiamin (B1) and riboflavin (B2) in drug samples.

Unit - II : Spectroscopic Methods - 2

- (a) **Infrared spectroscopy:** units of frequency, wavelength and wave number molecular vibrations, factors influencing vibrational frequencies, instrumentation, sampling techniques, detectors, characteristic frequencies of organic molecules, qualitative and quantitative analysis with reference to (petroleum refinery and polymer industry), selected molecules like CO, CO_2 , non-destructive IR method for the analysis of CO and other organic compounds, principles of Fourier transform IR.
- (b) **Raman Spectroscopy:** Raman effect and spectra, differences between Raman spectra and IR spectra, instrumentation, Raman spectra of CO, CO_2 , N_2O , H_2O .

Unit - III : Spectroscopic Methods - 3

- (a) **NMR Spectroscopy:** resonance condition, origin of NMR spectra, instrumentation, chemical shift, factors affecting chemical shift, shielding, spin-spin splitting, mechanism for spin-spin coupling, interpretation of NMR spectra of typical organic compounds, factors influencing NMR spectra, fast chemical reactions, magnitude of I, nuclei with quadrupole moments, FT NMR, study of isotopes other than proton- ^{13}C , ^{15}N , ^{19}F , ^{31}P , ^{11}B , double resonance, spin tickling, shift reagents, applications.

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