

Analytical Chemistry

5th Semester:

[33L]

UNIT 1: CONVENTIONAL METHODS OF ANALYSIS

15L

- (a) Redox Titrimetric analysis of Fe, Cu, Zn, Cr, Mn. Formol titration, estimation of sugars and vitamin C (principles only).
- (b) Complexometric Titrations – Metal ion indicators, masking, demask agents (examples). Principles for the estimation of (Ca + Mg), (Fe + Al), and (Cu + Zn) in a mixture of complexometry.
- (c) Basic concepts and simple application of chromatography – Thin layer, paper and column chromatography, R_f -values. Ion exchange chromatography (IEC): Ion exchange resins and their ion exchange capacities, deionization of water. Solvent extraction: Definition, types, principle and efficiency; factors affecting extraction, extraction with a metal chelator, gass chromatography, HPLC, extraction with dithiozone.

UNIT 2: INSTRUMENTAL METHODS OF ANALYSIS

10L

- (a) Flame Spectrometry – Introduction, Principles, Elementary Theory and Instrumentation of atomic absorption and atomic emission spectrometry; Determination of Ca and Mg in tap water (application).
- (b) Radiochemical methods and Environmental analysis. Basic instrumentation, Measurement of radioactivity, Neutron activation analysis, Isotope dilution analysis, radiometric titrations, hazards of radiation and safety measures.

UNIT 3: ERROR ANALYSIS AND ANALYSIS OF SAMPLES

8L

- (a) Error Analysis – Errors and their classifications, determinate and indeterminate errors, systematic and random errors, accuracy and precession, distribution of random errors; statistical analysis of data; methods of least squares and standard deviation, confidence interval, significance testing.