

UNIT 1

Electro analytical Methods of Analysis: Potentiometry: Introduction, reference electrode, indicator electrodes, ion-selective electrodes and their applications, instrumentation, measurement of cell unit, direct potentiometry, potentiometric titrations, applications.

Polarography: Basic principle, direct current polarography, different kinds of currents, reversible and irreversible waves, pulse and ac polarography, applications. 15 Periods

UNIT 2

Molecular spectro-analytical Methods of Analysis: Colorimetry and Spectro-photometry: Introduction, theory: molecular energy levels, types of molecular transitions, Lambert-Beer's Law and numerical based on that, limitations, types of sources, monochromators and detectors, Instrumentation of single beam and double beam instrument.

Infrared Spectroscopy: Theory, diatomic molecules as a simple harmonic oscillator, instrumentation, sample handling techniques. Fourier Transform Infrared Spectroscopy (FTIR): advantages, instrumentation qualitative and quantitative applications, interpretation of Infrared (IR) spectra. 15 Periods

UNIT 3

Atomic Spectroscopy: Principle, comparison of atomic and molecular spectroscopy, atomic transitions, atomic absorption, atomisation process, types of flames- fuel/ oxidant combinations, instrumentation of spectrophotometers; Interferences: spectral, chemical and ionisation, applications. Atomic emission spectroscopy (AES): Flame photometer and its instrumentation, analysis using standard addition method, applications. 8 Periods

UNIT 4

Separation methods: Theory of chromatography, Principle, instrumentation and application of Thin layer chromatography (TLC), High pressure thin layer chromatography (HPTLC), Electrophoresis: Theory, Principle, Instrumentation of Horizontal and vertical electrophoresis.

10 Periods

UNIT 1

Chapter 22, 23, 25- Skoog, Holler and Crouch, Instrumental Analysis, Cengage Learning

Chapter 21, 22 and 23- H.H. Willard et al., Instrumental Methods of Analysis, CBS Publishers

Chapter 13, 15 and 16- Jeffery G.H. et al., Vogel's Text of Quantitative Chemical Analysis, Longman Scientific and Technical, New York.

UNIT 2

Chapter 6,7,8,13, 14, 16, 17- Skoog, Holler and Crouch, Instrumental Analysis, Cengage Learning

Chapter 5, 6, 7, 11 - H.H. Willard et al., Instrumental Methods of Analysis, CBS Publishers

UNIT 3

Chapter 9, 10- H.H. Willard et al., Instrumental Methods of Analysis, CBS Publishers.

Chapter 9, 10- Skoog, Holler and Crouch, Instrumental Analysis, Cengage Learning
Chapter 21- Jeffery G.H. et al., Vogel's Text of Quantitative Chemical Analysis, Longman Scientific and Technical, New York.

UNIT 4

Chapter 26, 30- Skoog, Holler and Crouch, Instrumental Analysis, Cengage Learning
Chapter 10, 11 –Wilson K. And Walker J., Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press

Essential Books:

1. Skoog, Holler and Crouch, Instrumental Analysis, Cengage Learning .
2. H.H.Willard, Instrumental Methods of Analysis, CBS Publishers
3. Jeffery G.H. et al., Vogel's Text of Quantitative Chemical Analysis, Longman Scientific and Technical, New York.
4. Wilson K. And Walker J., Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press.

Suggested Books:

1. Skoog & Lerry, Instrumental Methods of Analysis, Saunders College Publications, New York
2. D.C. Harris, Quantitative Chemical Analysis, W.H.Freeman
3. Christian G.D, Analytical Chemistry, John & Sons, Singapore
4. Skoog, West and Holler, Analytical Chemistry, Saunders College Publications, New York
5. Vogel's Textbook of Qualitative Chemical Analysis, ELBS
6. S.E. Manahan, Fundamentals of Environmental Chemistry, Lewis Publishers
7. J.A. Dean, Analytical Chemistry Notebook, McGraw Hill
8. R.A.Day and A.L. Underwood, Quantitative Analysis, Prentice Hall of India
9. John H. Kennedy, Analytical Chemistry: Principles, Saunders College Publication
10. W.Kemp, Organic Spectroscopy, ELBS

Practicals:

1. Determination of pK_a value for bromophenol blue using double beam spectrophotometer.
 2. Spectrometric determination of iron using double beam spectrophotometer.
 3. Determination of concentration of sodium, calcium, lithium and potassium in sample using flame photometer.
 4. Determination of concentration of standard potassium ions in sample by standard addition method (Flame photometer).
 5. Thin layer chromatographic (TLC) separation of samples from different origin (biological/pharmaceutical/food)
 6. Group finding of Organic compound by IR spectroscopy
 7. Spectrum analysis using FT-IR.
- a) Qualitative analysis
 - b) Quantitative analysis

8. Analysis of various compounds using atomic absorption system.

a) Qualitative analysis

b) Quantitative analysis

9. Separation of macromolecules using Agarose gel electrophoresis

10. To use potential measurements to quantify the hydrogen peroxide concentration in an unknown sample

