

PAPER-III(D)
ELECTROANALYTICAL AND SEPARATION
METHODS

Time: 3 Hrs.

M.M. 100

Note: The paper will be divided into THREE sections.

Section-A : Ten questions (short type answer) two from each Unit will be asked. Each question will be of one mark and the candidates are required to attempt all questions. **Total 10 marks**

Section-B : Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 10 marks. **Total 50 marks**

Section-C : Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 20 marks. **Total 40 marks**

UNIT-I

Polarographic techniques - A.C. polarography, square wave and pulse polarography, oscillopolarography

Voltammetry - Reversible and irreversible electrode process, equation for cathodic and anodic waves, current controlled by linear diffusion towards special surfaces, Ilkovic equation, kinetic and catalytic

currents, coupled chemical reactions and their significance.

UNIT-II

Voltammetric sweep techniques - Single sweep technique, cyclic voltammetry, differential pulse polarography, anodic stripping voltammetry (ASV), differential pulsed anodic stripping voltammetry, advanced chromotechniques.

Ion selective electrodes - Principles, construction and selection, general applications, applications in analysis of common ions.

UNIT-III

Separation techniques -

Adsorption and partition chromatography - (a) Definition of terms, techniques and chemical concepts, (b) Column adsorption chromatography, (c) Partition chromatography-column, paper and TLC

UNIT-IV

High performance liquid chromatography - Introduction, choice of the system, instrumentation and applications.

Gas liquid chromatography - Introduction, choice of the system, instrumentation, qualitative and quantitative analysis of mixtures.

Gel permeation/size exclusion chromatography - introduction, theory and applications.

UNIT-V

Ion-exchangers - Theory, action of ion-exchange resins, ion-exchange chromatography, exchange capacity, ion-exchange resins and liquid ion-exchange resins, applications of cation and anion ion-exchangers.

Solvent extraction - Introduction, principles, factors that influence solvent extraction, ion association complexes and applications of solvent extraction.

Books Recommended :

1. Analytical Chemistry, G.D Christian, J. Wiley.
2. Fundamental of Analytical Chemistry, D.A Skoog, D.M. West and F.J. Holler, W.B. Saunders.
3. Analytical Chemistry-Principles and Techniques, L.G. Hargis, Prentice Hall.
4. Analytical Chemistry-Principles, J.H. Kennedy, W.B. Saunders.
5. Principles of Instrumental Analysis, D.A Skoog and J.L. Loary, W.B. Saunders.
6. Quantitative Analysis, R.A Day, Jr. and A.L. Underwood, Prentice Hall
7. Environmental Solution Analysis, S.M. Khopkar, Wiley Eastern.
8. Basic Concept of Analytical Chemistry, S.M. Khopkar, Wiley Eastern.
9. Handbook of Instrumental Techniques for Analytical Chemistry, F. Settle, Prentice Hall
10. Instrumental Methods of Analysis, Chatwal and Anand.
11. Vogel's Textbook of Quantitative Inorganic Analysis, L. Barret et al. ELBS (Longmann's Ed.)