

## **PAPER – III: Foundation for Chemistry**

### **UNIT-I**

Titrimetric analysis: Acid-base titrations, redox titrations, complexometric titrations, precipitation titrations-principle, example and corresponding indicators, Pri., Sec.-standards.

### **UNIT-II**

Treatment of analytical data: Errors, classification, accuracy, precision, SD, MD, Student-T test F-test, Gaussian distribution

### **UNIT-III**

Reactive Intermediates: Generation, Structure, Stability and reactivity of Carbocations, Carbanions, free radicals, Carbenes, nitrenes and Benzyne; Electrophiles, Nucleophiles, Catalysts-definition and examples.

Nature of bonding in organic molecules: Localised and Delocalized covalent bonds, Delocalised chemical bonding conjugation, cross conjugation, hyper conjugation, tautomerism.

### **UNIT-IV**

Symmetry and Group theory in Chemistry - Symmetry elements, symmetry operation, definition of group, sub group, relation between order of a finite group and its sub group. Point symmetry group. Schoenflies symbols, representation of groups by Matrices (representation for the  $C_n$ ,  $C_{nv}$ ,  $C_{nh}$ ,  $D_n$  etc. groups to be worked out, explicitly). Character of a representation. The great orthogonality theorem (without proof) and its importance. Character tables and their use. Application of group theory in IR and Raman spectroscopy.

### **UNIT-V**

Environmental chemistry:

Classification of environmental segments, types of pollutions, acid rains, Global warming Chemistry of Biomolecules: Definition, functional uses and examples for Carbohydrates, lipids (fats and oils), enzymes. Chemistry of purines and pyrimidines, Nucleic acids - Structure and functions of DNA & RNA.

### **REFERENCES:**

1. Vogel's text book of quantitative analysis. Addition Wesley Longmann Inc.
2. Quantitative analysis R.A Day and A.L.Underwood. Prentice Hall Pvt.Ltd.
3. Principles of computer programming (Fortran 77 IBM PC)V.Rajaraman, Prentice Hall.
4. An introduction to Digital computers.V.Rajaraman and T.Radhakrishnan
5. Fundamentals of Analytical Chemistry - Skoog and West.
6. Basics of computers for Chemists, P.C.Jurs.