

9. Determination of the ion exchange capacity of a resin

References:-

1. A.I. Vogel : A Text book of Quantitative Inorganic Analysis, (ELBS), 1978.
2. I. M. Kolthof and E.P. Sandell: Quantitative Chemical Analysis. McMillan, 1980.
3. Lobinski and Marczenko, Comprehensive Analytical Chemistry, Vol.30, Elsevier, 1996.

AC P 508: Organic Chemistry Practicals – III

COURSE OUTCOME:

- Enable the students to understand and learn the principle of quantitative estimation of different types of organic molecules,
- methods of organic preparations using multistep synthetic protocol,
- isolation and purification of intermediate and final products,
- use of computers in the study of conformation and geometry of some simple organic molecules.

Quantitative Determination: of sugars, amino acids, phenols, amines by various methods. Determinations of acid & ester and acid & amide in the given mixtures.

Multi Step Organic Synthesis: Synthesis of Ethyl resorcinol from Resorcinol, ϵ -Caprolactam from cyclohexanone, p-Aminobenzoic acid from p-Nitrotoluidine, s-Tribromobenzene from aniline, Benzanilide from Benzophenone, Benzylic acid from Benzoin, 2,5-Dihydroxy acetophenone from Hydroquinone, 2,4-Dinitrophenylhydrazine from Chlorobenzene, m-Nitrobenzoic acid from Benzoic acid, 2,4-Dinitrophenol from Chlorobenzene, o-Aminobenzoic acid from Phthalic anhydride

Separation Techniques: Separation of components from mixture of organic compounds by fractional crystallization, fractional distillation, adsorption, Paper and TLC. Their purification and characterization.

Applications of computers in the study of conformation and geometry of some simple organic molecules

References:

1. Elementary Practical Organic Chemistry-Vol. III quantitative Organic Analysis- A.I. Vogel
2. Experimental Organic Chemistry- Vol. I & II- P.R.Singh, Tata McGraw-Hill, 1981.
3. Practical Organic Chemistry- IV Ed- Dey & Sitaraman (Allied)
4. Laboratory Experiments in Organic Chemistry- Adam, Johnson & Wicon (McMillan, London), 1979.
5. Experimental Organic Chemistry- H.D. Durst & G.E. Goke (McGraw-Hill) 1980.
6. Computers and their applications to Chemistry, Ramesh Kumari (Narosa).
7. Short Manual to the Chemical Drawing Program-ChemDraw®- Stefan Bienz (CambridgeSoft).

AC P 509: PHYSICAL CHEMISTRY PRACTICALS – III

COURSE OUTCOME:

- Includes large number of kinetic experiments from which students are made to choose four experiments which illustrate different principles of chemical kinetics.
- They are also expected to learn concepts of thermodynamics by carrying out four experiments from the respective section.
- The paper also includes experiments from spectroscopy and two experiments to be carried out from this section.
- They are trained in Chemical kinetics, chemical thermodynamics and spectroscopic techniques in this course

A. Kinetics and Catalysis (Any FOUR of the following reaction systems to be studied)

(Determination of reaction order and activation parameters, study of salt/solvent/catalytic effects and formulation of reaction scheme and deduction of rate laws).

1. Kinetics of acid catalysed hydrolysis of methyl acetate.
2. Saponification of ethyl acetate by conductivity method.
3. Reaction between potassium persulphate and potassium iodide (including the study of salt effect, dielectric constant effect and catalysis by Ag^+ / Fe^{2+} / Cu^{2+} ions).
4. Decomposition of diacetone alcohol by NaOH.
5. Kinetics of (i) Reaction between iodine and acetone and (ii) iodination of aniline.
6. Decomposition of H_2O_2 (including the study of catalytic effect).
7. Reaction between Chromic acid and oxalic acid.
8. Heterogeneous decomposition of ammonia.
9. Surface tension-concentration correlation for solutions (Gibbs equation).
10. Determination of activity of surfaces, free volume of catalysts and surface area of catalysts.

B. Thermodynamics Experiments (Any Four experiments to be carried out)

8. Determination of activities of an electrolyte and non – electrolyte by cryoscopy.
9. Determination of partial molar volumes of (a) Salts – water and (b) alcohol – water (methanol & ethanol) systems by density method.
10. Determination of specific heat of liquids and solutions by calorimetry.
11. Cryoscopic and ebullioscopic analysis of the given mixture of urea and glucose.
12. Study of adsorption of picric acid on charcoal using a calorimeter.

C. Spectrophotometry (Any Two experiments are to be carried out)

1. Determination of pKa values of indicators.
2. Determination of Hammett's acidity function.
3. Spectroscopic investigation of partition coefficient of iodine between H_2O and CHCl_3 .
4. Study of the effect of ionic strength on the pH of the given acid with the help of indicators using buffer solution by colorimetric method.
5. Determination of composition and stability constant of metal complexes by Fe^{3+} and salicylic acid, $\text{Ni}(\text{II})$ and 1,10-phenanthroline).
6. Simultaneous determination of Manganese and chromium in a solution of dichromate and permanganate mixture

References:

1. Willard, Merritt, Dean & Settle: Instrumental Methods of analysis (Van Nostrand, N.Y) 1981.
2. Sawyer and Roberts : Experimental Electrochemistry for Chemists (Wiley, N.Y) 1974.
3. B.P. Levitt : Findlay's Practical Physical Chemistry, (Longman, London), 1973.
4. J. B. Yadav : Advanced Physical Chemistry Experiments (Goel Publishing House), 1988.
5. F. J. Welcher (Ed): Standard methods of Chemical Analysis (Krieger, N.Y) 1975.

4th SEMESTER

AC H 551: COORDINATION CHEMISTRY