

CH P 566: PHYSICAL CHEMISTRY PRACTICALS-III

Course Outcome

- Enables the students to learn different principles of chemical kinetics.
- The course also enables students to understand the use spectrophotometry in determination of physicochemical parameters of molecules.
- It enables students to get hands on training on the use of electrochemical techniques namely, conductometry, potentiometry and polarography.
- This course enhances the skill of students in quantitative analysis.

a. Kinetics and Catalysis (Any six experiments to be carried out)

1. Saponification of ethyl acetate by conductivity method: Determination of thermodynamic parameters.
2. Reaction between potassium persulphate and potassium iodide: Determination of order w.r.t. KI
3. Reaction between potassium persulphate and potassium iodide: Determination of order w.r.t. $K_2S_2O_8$.
4. Reaction between potassium persulphate and potassium iodide: Determination of effect of ionic strength.
5. Reaction between potassium persulphate and potassium iodide: Determination of thermodynamic parameters.
6. Reaction between potassium persulphate and potassium iodide: Effect of dielectric constant.
7. Decomposition of diacetone alcohol by NaOH: Determination of order w.r.t. NaOH.
8. Decomposition of diacetone alcohol by NaOH: Determination of thermodynamic parameters.

b. Instrumentation methods (Any six experiments to be carried out)

i) Spectrophotometric Experiments

1. Determination of pK_a value of an indicator.
2. Determination of composition and Stability constant of metal complex [Fe(III) - Salicylic acid complex].

ii) Electrochemistry

a. Conductometry

1. Titration of a mixture of acetic acid, monochloro and trichloroacetic acids with NaOH.
2. Determination of concentrations of sulphuric acid, acetic acid and copper sulphate in a mixture by conductometric titration with NaOH.

b. Potentiometry & pH metry

1. Potentiometric titration of (a) Non aqueous system and (b) mixture of strong (HCl) and weak acid (HOAc) with NaOH / NH_4OH and to find the strength of the acids in mixture.
2. Determination of acidic and basic dissociation constants and isoelectric point an amino acid pH metrically.
3. pH/potential titration of mixture of bases (Na_2CO_3 & $NaHCO_3$) with standard HCl.

c. Polarography Experiments

1. Determination of the half-wave potential of Cd (II), Cu (II) & Zn (II) ions individually and in mixtures.

Any other experiments of interest.

References

1. Practical Physical Chemistry, A. Findlay and B. P. Levitt, Prentice Hall, Press (1973).
2. Practical Physical Chemistry, 3rd edn., A. M. James and F. E. Prichard, Longman Publication, (1974).
3. Experimental Physical Chemistry, 7th edn., Daniels and Farrington, McGraw Hill Book Co., New York, (1970).
4. Experimental Physical Chemistry, R. C. Das and B. Behera, Tata McGraw Hill Education, (1983).
5. Advanced Practical Physical Chemistry, J. B. Yadav, Krishna prakashan Media Publication, (2016).
6. Experiments in Physical Chemistry, J. C. Ghosh, Bharathi Bhavan, New Delhi (1974).
7. Practical Physical Chemistry, B. Viswanathan and P. S Raghavan, Viva Books, New Delhi, (2017).

