OC P 418: PHYSICAL CHEMISTRY PRACTICALS - I

(**Any 12 experiments are to be carried out)**

Course Outcome

- Experiments have been designed which make use of the concepts of electrochemistry, thermodynamics, and solution chemistry.
- Students get hands on experience in use of instruments such as potentiometer, conductometer, pH meter, spectrophotometer, refractometer, viscometer etc and will be able to test the theoretical concepts.

1. Verification of Nernst equation for Ag^{+}, Cu^{2+} and Zn^{2+} species and Determination of thermodynamic parameters of an electrode reaction by EMF method.
2. Determination of pK values of dibasic acids by potentiometric/pH metric method
3. Potentiometric titration of halides in mixtures (Cl^{-}, Br^{-} and I^{-}) with silver nitrate
4. Composition of zinc ferrocyanide complex by potentiometric titration.
5. Conductometric titrations of displacement and precipitation reactions.
6. Spectrophotometric determination of dissociation constant.
7. Determination of equivalent conductance and dissociation constants of weak acid and base.
8. Determination of solubility of lead iodide at different T & hence molar heat of solution
9. Determination of degree of hydrolysis of CH_3CO_2Na and NH_4Cl by conductivity method.
10. Measurements of the conductance of a weak acids (a) HOAC from strong electrolytes (NaOAc, HCl and NaCl), (b) HCOOH from strong electrolytes (HCOONa, HCl and NaCl) and to calculate the ionization constant of the acid.
11. Determination of pK_a of acids by pHmetry
12. Study of variation of viscosity of a liquid with temperature
13. Determination of molecular weight of polymers by viscometric measurements.
14. Determination of the composition of a solution by S.T. measurements.
15. Determination of the Critical Micelle Concentration by surface tension/conductometric measurements.
16. Determination of vapour pressure of organic compounds by gas saturation method
17. Determination of Specific and molar refractivity of liquids and parachor value of a species by refractometric method.

Any other relevant experiments of interest.

References

1. Findlay's Practical Physical Chemistry, Alexander 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 College, (1970).
4. Experimental Physical Chemistry, R. C. Das and B. Behera, Tata McGraw Hill, (1983).
5. Advanced Practical Physical Chemistry, J. B. Yadav, Krishnaprakashan 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, (2017)