

B. Potentiometry (At least 7 experiments are to be carried out)

8. Determination of pK values of phosphoric acid by potentiometric titration with sodium hydroxide using glass electrode.
9. Determination of acidic & basic dissociation constants and isoelectric point of an amino acid.
10. Determination of the potential of an electrochemical cell and mean ionic activity coefficient.
11. Determination of activity coefficient of an electrolyte at different molalities.
12. Determination of pH of buffer solutions with a pH meter & evaluation of pK_a of acids
13. Determination of thermodynamics of a cell reaction
14. Determination of pK_a values of mono, di and tri-acid base.
15. Determination of solubility of insoluble silver halide and the standard electrode potential using quinhydrone electrode
16. Determination of degree of hydrolysis of CH₃COONa and NH₄Cl.
17. Determination of hydrolysis constant of aniline hydrochloride.
18. Verification of Nernst equation for Ag⁺, Cu²⁺ and Zn²⁺ species.
19. Determination of transport number of ions by emf method (Ag⁺, Cd²⁺, NO₃¹⁻, SO₄²⁻)
20. pH titration of (a) HCl versus NaOH, (b) CuSO₄ versus NaOH and (c) HOAC versus NaOH and (d) lead nitrate versus potassium chromate.
21. Potentiometric titration of halides in mixtures (Cl⁻, Br⁻ and I⁻) with silver nitrate.
22. Potentiometric determination of dissociation constants of weak acids.

Course Outcome:

Students will be able to

- Think critically and analyze chemical problems.
- Present scientific and technical information resulting from laboratory experimentation in both written and oral formats.
- Accounts on potentiometric and conductometric titrations.

References

8. B. P. Levitt, Longman, Findlay's Practical Physical Chemistry, J Wiley, London, 1954.
9. Experimental Physical Chemistry, Das & Behera, Tata McGraw Hill, New Delhi, 1983.
10. J.B. Yadav, 16th edition of Advanced Practical Physical Chemistry, Goel publishers, 1989.
11. Experiments in Physical Chemistry, J.C. Ghosh, Bharathi Bhavan, 1974.
12. D.A. Skoog and D.M. West, Fundamentals of Analytical Chemistry, IV Edition, Old Reinhold & Winston, Publication, 1982.
13. B.K. Sharma, Instrumental methods of Chemical analysis, Goel Publishing House, 24th Edition, 2005
14. Gurdeep R. Chatwal, Sham K. Anand, Instrumental Methods of Chemical Analysis, Himalaya Publication, 1979.

ICE 460: Chemistry of household chemicals and cosmetics

Learning Objectives:

1. To learn about the chemistry of the chemicals used in the day today life
2. To provide the learner with knowledge of cosmetics and perfumes with respect to the types

of formulations

UNIT I

15Hr.

Household chemicals: History of household Industry, Basic Theory of Household Chemicals, and Raw material required for household product, Product manufacture in household industry. Role of household product in day to day life. Cleaning agents: Introduction, synthesis and applications of Natural cleaning agents, cleaning action, Floor cleaner, Toilet Cleaner, Bathroom Cleaner, Kitchen Cleaner.

UNIT II

15Hr.

Technology of Soap: Chemistry of soap; Raw material for soap industry and their selection; hard fats yielding and oil yielding soaps; Chemical reactions of soaps; Hard and Soft soaps; Plant and process employed in soap manufacture; Liquid hand wash and liquid dish wash. Preparation of sanitary acid, Preparation of liquid soap, Preparation of white phenyl, Solid soap manufacture Detergents and surfactants Washing action of detergents; Types of detergents; Introduction of surfactants; Types of surfactants.

Unit III

15Hr.

Introduction, history, classifications and sources of cosmetics and perfume. Psychological benefits, fragrance and mood, aromatic substances, types of aromatic substances, chemical constituents of aromatic substances, odours of substances from vegetable, animal and artificial origin.

Additives(thickeners,foam stabilizers, pearlescent agents, conditioning agents, etc.) Oil components; Waxes, Silicone Chemistry oils; Cream bases; Emulsifiers; Humectants; Acrosol Propellants. Production of essential oils with special reference to the following, Eugenol, Geraniol, Jasmone, Civetone. Preparation of herbal face creams using natural resources.

Course outcome

- The students will understand the chemistry and preparation of household chemicals
- The students also learn about the use and benefits of perfumes
- Students would understand the composition of cosmetic products

Recommended Books:

1. Majur Chandrashekar Shetty: Small scale industries and house hold industries in developing economy. Asia Publishing House, 1963 - 232 pages
2. Prasad Giri Raj: Modern Technology Of Perfumes, Flavours And Essential Oils (2nd Edition), NIIR Board, 2004.
3. B.K.Sharma: Industrial chemistry by GOEL Publishing House, 2000
4. Poucher's Perfumes, Cosmetics and Soaps, Publisher: Springer Netherlands Ed by H. Butler 2000.

III SEMESTER

ICH 501: SPECTROSCOPIC TECHNIQUES

Course Objectives:

1. To understand molecular spectroscopy techniques namely vibrational and Raman spectroscopy.
2. To learn the theory and application UV, IR, NMR and mass spectroscopy in structure determination of organic molecule.
3. To learn structure elucidation by solving composite spectral problems.

UNIT I

14 hr