CHM 112(P): Chemistry Practical

Chemistry Lab- I (2 credit) + Chemistry Lab- II (2 credit)

Total Credit – 4, Hours – 120, Marks = 100

Course Outcomes:

After the completion of this course, student will be able to-

CO-1. Gain the knowledge of safety and hazard and develop the aptitude to analyse the chemical properties.

CO-2. Understand the principles of semi-micro qualitative analysis.

CO - 3. Know the reactions of cation and anion in inorganic qualitative analysis.

CO-4. Analyse which cation and anion is present in the salt.

CO-5. Evaluate the different types of titrations and their principles.

CO-6. Modify the different technics involved in titrations.

CO-PSO mapping (connecting COs with PSOs)

CO	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	PSO-6
CO-1	3	3	2	2	2	3
CO-2	3	3	2	3	2	3
CO-3	2	3	3	2	3	2
CO-4	3	2	3	3	2	3
CO-5	3	2	3	3	2	3
CO-6	3	2	2	3	3	2

Chemistry Lab- I (2 credit)

Credit – 2, Hours – 60, Marks - 50

Safety Practices in the chemistry laboratory, identification of different apparatus, knowledge about toxic chemicals and safety precautions in their handling, how to proper uses of different glass wares.

(I) Titrimetric analysis

(a). Calibration of glassware and use of apparatus to be discussed

1. Calibration of 10 ml pipette

2. Calibration of 25 ml burette

3. Calibration of 100 ml measuring flask

(b). Preparation of solutions of different Normality, Molarity and %V/V, %W/V, %W/W to be discussed

(II) Acid base titrations

(a). Principle of Acid base titration to be discussed

(b). Preparation of standard solutions of 0.1N Succinic acid, 0.1N Hydrous & Anhydrous Oxalic acid, 0.1N NaOH.

1. Std. Succinic acid (0.1N) → NaOH/ KOH

2. Std. hydrous & anhydrous Oxalic acid (0.1N) → NaOH/ KOH

3. Std. NaOH (using Succinic acid) (0.1N) → HCl

(III) REDOX TITRATION

(a). Preparation of standard solutions of (0.01N) $KMnO_4$ & (0.01N) $K_2Cr_2O_7$

1. Std. $KMnO_4$ (0.05N) → $FeSO_4 . 7H_2O$ / $FeSO_4(NH_4)_2 SO_4 .6H_2O$
2. Std. $K_2Cr_2O_7$, (0.05N → $FeSO_4 . 7H_2O$ / $FeSO_4(NH_4)_2 SO_4 . 6H_2O$

(IV) Complexometry Titration

a). Preparation of standard solutions of (0.01M) EDTA

1. Ca^{++} / Mg^{++} → Std. EDTA (0.01M)

(V) Viva-Voce questions

Chemistry Lab- II (2credit)

Credit – 2, Hours – 60, Marks - 50

Inorganic Qualitative analysis

Concept of basic principles of Inorganic Qualitative analysis, ionic product (IP), solubility product (K_{sp}), common ion effect, chemical equations.

Inorganic salts (minimum requirement 20 salts)

K^+, NH_4^+, Na^+, Cu^{+2}, Cd^{+2}, Fe^{+2}, Fe^{+3}, Al^{+3}, Cr^{+3}, Mn^{+2}, Co^{+2}, Ni^{+2}, Zn^{+2},Ca^{+2}, Ba^{+2}, Sr^{+2}, Mg^{+2} in the form of Cl^-, Br^-, I^-, NO_3^-, NO_2^{-1}, SO_4^{-2}, SO_3^{-2}, S^{-2}, PO_4^{-3}, CO_3^{-2}, CrO_4^{-2}, $Cr_2O_7^{-2}$, O^{-2}.

Demonstration

Introduction to chromatography, Principle of paper chromatography, Concept of stationary phase, mobile phase/ developer, solute/ elute, visualizing agent, and R_f value to be discussed.

1. 1^{st} group cations: Ag, Pb, Hg ions
2. 2^{nd} group cations: Cu, Cd ions

Viva-Voce questions

REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language BookSociety) Longman. 5^{th} Ed., New York.
2. 'Analytical Chemistry' by Dhruba Charan Dash, 2011, 2^{th} Ed., PHI Learning Private Ltd, New Delhi.

3. ‘Analytical Chemistry’ by Gary D. Christian, 1986, 4th Ed., John Wiley & Sons.
4. ‘Advanced Practical Inorganic Chemistry’ by Gurdeep Raj, 9th Ed., Goel Publishing House, Meerut.
5. ‘Advanced University Practical Chemistry’ by P. C. Kamboj, Vishal Publishing Co., Jallandhar – Delhi.
6. ‘Vogel’s Qualitative analysis’ by G. Svehla, Pearson Education Ltd., Seventh Edition, 2009.