

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VII SEMESTER B.Sc. HONOURS CHEMISTRY Time: 2Hrs/Week

Code CH7251(2) Revised Syllabus Under CBCS 2020-21 Marks: 50

Inorganic Chemistry-I: Advanced Studies in Complexes and Group Theory

Practical Syllabus

I.

Course Objectives: To train students in the skill of metal complex synthesis and systematic semi micro analysis of six radical inorganic mixtures.

Course Outcomes:

On successful completion of this practical course, student shall be able to:

- List out, identify and handle various equipment in Chemistry lab.
- Understand the basic concepts of qualitative analysis of inorganic mixture.
- Apply the concepts of common ion effect, solubility product and concepts related to qualitative analysis.
- Acquire skills in elimination interfering anion.
- Identification of less familiar cation.

II. Syllabus:

Synthesis of Inorganic Metal Complexes:

Synthesis of 3d transition metal complexes of tetrahedral, square planar and octahedral geometries

(i) Tetra ammine copper (II) sulphate monohydrate

(ii) Potassium tris(oxalato) ferrate (III) trihydrate

(iii) Tris(thiourea)copper(I) sulphate

1. **Systematic Semimicro Qualitative Analysis of Inorganic six radical mixtures** In systematic Semi micro qualitative inorganic analysis, inorganic mixture contains three cations and three anions. The analysis involves identification and confirmation of cations and anions containing one less familiar cation (Tungsten, Molybdenum, Zirconium, Thorium, Titanium, Uranium, Cerium, Vanadium, Lithium, Berkelium etc.) and one interfering anion.

Anions: CO_3^{2-} , S^{2-} , SO_3^{2-} , Cl^- , Br^- , I^- , NO_3^- , SO_4^{2-} , CH_3COO^- , $\text{C}_2\text{O}_4^{2-}$, $\text{C}_4\text{H}_4\text{O}_6^{2-}$, PO_4^{3-} , CrO_4^{2-} , AsO_4^{3-} , F^- , BO_3^{3-}

Cations: Ammonium (NH_4^+)

1 st group: Hg, Ag, Pb, Tl, W

2nd group: Hg, Pb, Bi, Cu, Cd, As, Sb, Sn, Mo

3rd group: Fe, Al, Cr, Ce, Th, Ti, Zr, V, U, Be

4th group: Zn, Mn, Co, Ni

5th group: Ca, Ba, Sr

6th group: Mg, K, Li

Note: A minimum of 4 inorganic mixtures must be analysed in this Semester.

III. Co-Curricular Activities

Mandatory: (Lab/field training of students by teacher (lab:10+field:05):

1. **For Teacher:** Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of involves identification and conformation of cations and anions containing one less familiar cation and one interfering anion.
2. **For Students:** Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observes the synthetic reactions. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Field work/project work Report: 05.
4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.
5. Unit tests (IE).

IV. Reference Books:

1. Practical Inorganic Chemistry, G. Mairand B. W. Rockett.
2. Practical Inorganic Chemistry by G. Pass H. Sutchiffe, 2nd edn John Wiley & Sons.
3. Experimental Inorganic/Physical Chemistry, M.A. Malati, Horwood Publishing, Chichester, UK (1999)
4. Vogel's textbook of semi micro qualitative analysis, 5th Edition by G. Svehla.

