

20MSC507P					Inorganic Chemistry II					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
0	0	3	1.5	3	--	--	--	50	50	100

**COURSE OBJECTIVES**

- To understand synthetic inorganic complexes
- To acquire the practical knowledge of qualitative verification of the spectrochemical series
- To gain the practical knowledge of studying optical isomerism of coordination complexes
- To gain an experience in equilibrium studies of inorganic reactions by different methods
- To develop the skills for handling air and moisture sensitive compounds

**1. Synthesis and Characterization of inorganic compounds (Melting point, IR, UV-vis, Magnetic Moment, Conductivity, Cyclic voltammetry etc.) [At least three]**

- a. Reinkey's salt
- b.  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
- c.  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
- d.  $[\text{Ni}(\text{en})_2]\text{Cl}_2$
- e.  $\text{K}_3[\text{Fe}(\text{ox})_3]$
- f.  $\text{K}_3[\text{Cr}(\text{ox})_3]$
- g.  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
- h.  $[\text{Cu}(\text{NH}_3)_4(\text{SO}_4)(\text{H}_2\text{O})]$
- i. Crome alum  $[\text{K}_2\text{SO}_4, \text{Cr}_2(\text{SO}_4)_3, 24\text{H}_2\text{O}]$

2. Comparison of the electronic spectra of  $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ ,  $[\text{Ni}(\text{NH}_3)_6]^{2+}$  and  $[\text{Ni}(\text{en})_3]^{2+}$  and qualitative verification of the spectrochemical series.

3. Synthesis and characterization of  $[\text{Co}(\text{en})_3]\text{Cl}_3$ . Separation of its optical isomers and determination of their optical rotation by using polarimeter.

**4. Equilibrium studies on inorganic reactions [At least two]**

- a. Determination of composition of Fe(III)-sulfosalicylate complex in solution by Mole-Ratio method.
- b. Determination of composition of Fe(II)-1,10-phenanthroline complex in solution by Mole-Ratio method.
- c. Determination of composition of Fe(III)-sulfosalicylate complex in solution by Slope-Ratio method.
- d. Determination of composition of Fe(II)-1,10-phenanthroline complex in solution by Slope-Ratio method.
- e. Determination of composition of Fe(III)-sulfosalicylate complex in solution by Job's method of continuous variation.
- f. Determination of composition of Fe(II)-1,10-phenanthroline complex in solution by Job's method of continuous variation.

**5. Handling of air and moisture sensitive compounds.****COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1** – Develop the skills for synthesis and purification of inorganic complexes.
- CO2** – Learn the skills for characterization of inorganic complexes by different physicochemical techniques.
- CO3** – Demonstrate the practical skills for qualitative verification of the spectrochemical series.
- CO4** – Gain an experience in studying optical isomerism of coordination complexes.
- CO5** – Demonstrate the practical knowledge for equilibrium studies of inorganic reactions by different methods.
- CO6** – Understand the handling of air and moisture sensitive compounds.

## TEXT/REFERENCE BOOKS

1. A Text book of quantitative Inorganic Analysis – A. I. Vogel
2. Standards methods of Chemical Analysis-F. J. Welcher.
3. Experimental Inorganic Chemistry – W. G. Palmer.
4. Manual on Water and Waste Water Analysis, NEERI- Nagpur D. S. Ramteke and C. A. Moghe
5. Inorganic synthesis- King.
6. Synthetic Inorganic Chemistry-W. L. Jolly.
8. Synthesis and Technique in Inorganic Chemistry: A Laboratory Manual, Gregory S. Girolami, Thomas B. Rauchfuss and Robert J. Angelici. University Science Books.
9. Synthetic methods of organometallic and inorganic chemistry ed. by Wolfgang A. Herrmann, Georg Thieme Verlag, New York, 1997, Vol 7 and 8.

## END SEMESTER EXAMINATION QUESTION PAPER PATTERN

### Max. Marks: 100

Laboratory work including maintaining journal book+ mid-sem viva (LW)  
End–sem exam and viva (LE/Viva)

### Exam Duration: 3 Hrs

50 Marks  
50 Marks