

SUBJECTCODE:1SC2030201	TITLEOF PAPER: INORGANIC CHEMISTRY-II
COURSETYPE: CORECOURSE	

Course Objective: To impart knowledge and training in chemistry at advanced level, make aware with recent analytical technique, use of reagent sand reactions in laboratory, synthesis and study of materials, the exploration of their properties and development of ways to use the mineral life.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	2	4	2	6	60	40	30	20	150

UNIT	DISCRIPTION IN DETAIL	WEIGHTAGE
I	Metal-Ligand Equilibrium solution Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry.	25%
II	Reaction Mechanism Energy profile of a reaction, reactivity of a metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetic of octahedral substitution, acid hydrolysis, factor affecting the acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favor of conjugated mechanism, anation reaction, reaction without metal ligand bond cleavage. Substitution reaction in square planar complexes, the trans effect. Mechanism of the substitution reaction, redox reaction, electron transfer reaction, mechanism of one electron transfer reaction, outer sphere type reaction, cross reaction and Marcus –Hush theory, inner sphere type reaction.	25%
III	Mossbauer Spectroscopy Basic applications of Mossbauer spectroscopy, hyperfine structure, quadruple splitting, instrumentation and applications of Mossbauer spectroscopy, problems related to Mossbauer spectra.	25%
IV	Bio-inorganic Chemistry Metalloporphyrins (enzymes) definition, hemoglobin and myoglobin, cytochrome, vitamin B12 (cyanocobalamin), zincmetalloenzymes, nitrogen fixation, essential and trace elements in biological system, biochemistry of non-metals K, Na pump (action of bath ions), toxic metals and their toxicity. Co-ordination compounds in medicine, Chelation therapy, gold compounds and rheumatoid arthritis, anticancer drugs – platinum complexes, gold complexes, metallocenesetc, antimicrobial agents, metal complexes as radiodiagnostic agents, magnetic resonance imaging.	25%

LEARNING OUTCOMES

To provide the basic knowledge of very important concepts of the inorganic chemistry (group theory, organometallics, and reagents in inorganic chemistry and reaction mechanism of transition metal complexes). To provide overview of the applications of the concepts in applied field. Students will be able to understand the geometry and structure of different molecules. They can understand bonding nature of different compound. How to make reagent and its properties also can understand reaction mechanisms.

PRACTICALS

Inorganic Chemistry

Preparation of selected inorganic compounds and their studies by IR, Electronic spectra, Mossbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds.

REFERENCES:

1. Group theory and symmetry in chemistry, L. H. Hall (McGraw Hill)
2. F. A. Cotton, Chemical Applications of Group theory, Wiley Eastern 2nd Edn. 1992
3. V. Ramkrishnan & M. S. Gopinadhan, Group theory in Chemistry Vishal Pub. 1996.
4. Group Theory and its Chemical Applications P. K. Bhattacharya, Himalaya Publishing House
5. Advanced inorganic chemistry F. A. Cotton
6. Mechanism of Inorganic Reactions, F. Basolo and R. G. Persons, Wiley Pub
7. Inorganic chemistry by J. D. Lee
8. Advanced in inorganic chemistry by Puri, Sharma and Kaliya
9. Inorganic chemistry, principle of structure and reactivity, 4th Edition; James E. Huheey: Elsevier.
10. Advanced Inorganic Chemistry; F. A. Cotton and G. Wilkinson