8. Kinetics of sodium formate – iodine reaction.

9. Determination of the latent heat of evaporation of carbon tetrachloride.

10. Preparation of colloidal solutions.

11. Verification of F & L adsorption isotherms for acetic acid on activated charcoal.

12. To study the adsorption of iodine on charcoal from alcoholic solution.

13. To study the effects of gelatin solution on the precipitation values.

14. Comparison of detergent action of detergents and determination of interfacial tension.

15. Thermodynamic prediction and measurement of the solubility of naphthalene in benzene.

Study of association of benzoic acid in benzene/toluene. Any other relevant experiments of interest.

REFERENCES:-

1. Practical Physical Chemistry- B Viswanathan & P.S Raghavan,(ViVa Books, Delhi) 2005.
2. Findlay's Practical Physical Chemistry- B. P. Levitt (Longman, London).
3. Experiments in Physical Chemistry– James and Prichard.
4. Experimental Physical Chemistry - Daniels et al.
4. Experimental Physical Chemistry-Das & Behera (Tata McGraw Hill, New Delhi)1983.
5. Advanced Practical Physical Chemistry–Yadav (1989).
6. Experiments in Physical Chemistry–J. C. Ghosh (Bharathi Bhavan)1974.

3rd SEMESTER

AC H 501: COORDINATION CHEMISTRY

COURSE OUTCOME:

- In this course, students will learn metal and non metal ions in biological systems,
- Biological nitrogen fixation, Photocatalysis, Transport and storage of dioxygen,
- Metal storage and Transport, Metalloproteins as enzymes, Therapeutic uses of metals,
- Metal complexes as drugs, Treatment of toxicity due to inorganics.

UNIT – I **[15Hours]**

Therapeutic uses of Metals - Metals in medicine: Metals and human biochemistry, general requirements. Disease due to metal deficiency and treatment: Iron, zinc, copper, sodium,
potassium, magnesium, calcium and selenium . Metal complexes as drugs and therapeutic agents: Antibacterial agents, antiviral agents, metal complexes in cancer therapy, metal complexes for the treatment of rheumatoid arthritis,
vanadium in diabetes, metal complexes as radio diagnostic agents Treatment of toxicity due to inorganics: General aspects of mechanism of metal ion toxicity, (i) Mechanism of antidote

complex with poison, rendering it inert: arsenic, lead, mercury, iron, copper (ii) Antidote accelerated metabolic conversion of poison to non-toxic product: cyanide and carbon monoxide

UNIT -II: **[15 Hours]**

Metal ions in biological systems-essential and trace metals, ion transport across membranes, active transport of ions across biological membranes, ionophores . Biological nitrogen fixation, Molybdenum nitrogenase Model compounds, in vitro fixation of nitrogen through dinitrogen complexes. Metal complexes in transmission of energy-chlorophylls. photosystems I ans II in cleavage of water, model systems.

UNIT-III: **[15Hours]**

Transport and storage of dioxygen- heme proteins, oxygen uptake, functions of haemoglobin, myoglobin, hemerythrin and hemocyanins, synthetic oxygen carriers . Metal storage and transport – ferritin, transferrin and ceruloplasmin. Electron transfer proteins-cytochromes, iron-sulphur proteins. Metalloproteins as enzymes – carboxy peptidase, carbonic anhydrase, alcohol dehydrogenase, catalases, peroxidases, cytochrome P 450, superoxide dismutase, copper oxidases, vitamin B_{12} coenzyme.

References:

3. M.N.Hughes: Inorganic Chemistry of Biological Processes, (2^{nd}edn.) Wiley, 1988.
4. I.Bertini. H.B.Gray, S.J.Lippard and J.S.Valentine: Bioinorganic Chemistry, Viva Books, 1998.
5. J.E Huheey, R.L.Keiter and A.L.Keiter: Inorganic Chemistry(4^{th}edn),Addison Wesley, 2000.
6. K. Hussain Reddy, Bioinorganic Chemistry - New Age International Ltd. (2003).
7. R.W. Hay, Bioinorganic Chemistry - Ellis Horwood Ltd., (1984)
8. Asim K Das, Bioinorganic chemistry, Books & Allied (P) Ltd.

AC H 502: SYNTHETIC REAGENTS AND HETEROCYCLIC CHEMISTRY

COURSE OUTCOME:

- Students will learn the preparation, properties, reactions and uses of organometallic reagents such as organolithium, organomagnesium, organozinc, organocadmium, organomercury, organoindium, organosilicon, organoborane, organotin and organopalladium reagents.
- Students will know the uses of Gillman's reagent, LDA, DCC, 1,3-dithiane, TMSI, DDQ, SeO_2, Wikinson's catalyst, PTCs, Baker's yeast, PPA, TMS-CN, hydrosilane, chloramines-T, Woodward-Prevost hydroxylation, and crown ethers in organic synthesis and functional group transformation.
- Students will understand the systematic nomenclature of various types of heterocyclic compounds with multiple examples.
- Students will get the sound knowledge on the structure, synthesis and reactions of various three, four, five, six and seven membered simple and fused heterocyclic compounds.

UNIT- I: Reagents in Organic Synthesis-I **[15 Hours]**

Organometallic Reagents: Preparation and properties of Organolithium and organomagnesium compounds. Their uses in organic synthesis and in the preparation of Organometallic