Teaching Plan 2024

B.Sc.Physical Science VIth Semester

Inorganic Chemistry

Prof **Arkaja Goswami**

Month	Week Dates	Topics Of Teaching
January 2024	24/25	Definition, Classification and characteristics of organometallic compounds based on the nature of metal carbon Bonds including example.
	31/1	Preparation ,Properties,bonding and structure of mononuclear carbonyl and polynuclear carbonyl of 3d metal.
February 2024	7/8	Description of EAN (Effective atomic no) rule as applied for mononuclear carbonyls and poly nuclear carbonyls.
	14/15	Pi electron acceptor characteristics in reference to carbon monoxide.
	21/22	Synergistic effect (VB approach) for formation of different bond in CO molecule.
	28/29	Molecular orbital configuration of CO molecule suggested by Coulson considering synergistic effect.
March' 2024	6/7	How and why molecular diagram of CO can be referred to for synergistic effect .to IR frequencies.

	13/14	Bioinorganic chemistry. Brief Discussion on bio-inorganic chemistry. General discussion on the role of metal ions.
	20/21	Role of Na/K Pump dealing with all kinds of biological functioning.
April 2024	3	Role of Magnesium ions in energy production and Structure of chlorophyll.

Month	Week Dates	Topics to be Covered
	4	Role of Calcium in blood clotting step by step, stabilization of protein structure and it's role in bones formation.
	10/11	Brief discussion on concept of oxidation states. General oxidation states shown by different groups. Application of oxidation states, how to calculate for 3-D series transition metals.
	17/18	Detailed discussion on oxidation states shown by Chromium and Iron. Their stable compounds and reasons.
	24/25	Detailed discussion on oxidation states shown by Cobalt and Nickel. Their stable compounds and reasons.
May 2024	1/2	Preparation and properties of peroxo complexes of Chromium, Dichromate, Potassium Permanganate.
	8/9	Preparation and properties of compounds Potassium Ferocynide, Sodium nitroprusside, and some other compounds.

	9	Questions related to syllabus to be discussed in detail and with a written test.

Section A: Inorganic Chemistry (Lectures:30)

Unit 1:

Chemistry of 3d metals

General discussion of 3d metals. Oxidation states displayed by Cr, Fe, Co, Ni and Cu.

A study of the following compounds (including preparation and important properties):

$K_2Cr_2O_7$, $KMnO_4$, $K_4[Fe(CN)_6]$.

(Lectures: 6)

Unit 2:

Organometallic Compounds

Definition and classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds). Structure and bonding of methyl lithium and Zeise's salt. Structure and physical properties of ferrocene. 18-electron rule as applied to carbonyls. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. π-acceptor behaviour of carbon monoxide (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.

(Lectures: 12)

Unit 3:

Bio-Inorganic Chemistry

A brief introduction to bio-inorganic chemistry. Role of metal ions present in biological systems with special reference to Na^+, K^+ and Mg^{2+} ions: Na/K pump; Role of Mg^{2+} ions in energy production and chlorophyll. Brief introduction to oxygen transport and storage (haemoglobin-myoglobin system). Brief introduction about toxicity of metal ions ($Hg^{2+}$and Cd^{2+}).

(Lectures: 12)