

CC-2/MCC-3

Session: 2023-24			
Part A - Introduction			
Subject	Chemistry		
Semester	II		
Name of the Course	Chemistry-II		
Course Code	B23-CHE-201		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC/MCC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	4.0		
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: 1. Able to understand the theories which governs the shape, structure and ionic behavior, polarizability, ionic structures and concept of Lattice energy of crystals of molecules. 2. To know the basics of rates of chemical reactions ,the laws and solubility behavior of solutes in different compositions of solvents 3. To know about alkanes, alkene, cycloalkanes and their chemical reactions. 4. To understand about weak interactions and bonding in metals. 5*. Hand on practice for estimation and determination of viscosity, specific refractivity properties of some compounds.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75

Max. Marks:70+30* Internal Assessment Marks:20+10* End Term Exam Marks: 50+20*		Time:03+03*
Part B- Contents of the Course		
<u>Instructions for Paper- Setter</u> Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.		
Unit	Topics	Contact Hours
I	Covalent Bond Valence bond theory approach, shapes of simple inorganic molecules and ions based on valence shell electron pair repulsion (VSEPR) theory and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements. Molecular orbital theory of homonuclear (N₂, O₂) and heteronuclear (CO and NO) diatomic molecules, dipole moment and percentage ionic character in covalent bond. Ionic Solids Ionic structures (NaCl, CsCl, ZnS (Zinc blende), CaF₂) size effects, radius ratio rule and its limitations, Concept of Lattice energy, Born- Haber cycle, Solvation energy and its relationship with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan's rule.	11
II	Chemical Kinetics Concept of reaction rates, rate equation, factors influencing the rate of reaction, Order and molecularity of a reaction, integrated rate expression for zero, first, Half-life period of a reaction, Arrhenius equation. Distribution Law Nernst distribution law – its thermodynamic derivation, Nernst distribution law after association and dissociation of solute in one of the phases, of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride	12

III	Alkanes and Cycloalkanes Nomenclature, classification of carbon atoms in alkanes and its structure. Isomerism in alkanes, sources. Methods of formation: Wurtz reaction, Kolbe reaction, Corey- House reaction and decarboxylation of carboxylic acids, physical properties. Mechanism of free radical halogenation of alkanes: reactivity and selectivity. Nomenclature of Cycloalkanes, Baeyer' s strain theory and its limitations, theory of strainless r ings. Alkenes Nomenclature of alkenes and its structure. Methods of formation: dehydration of alcohols, dehydrohalogenation of alkyl halide, Hofmann elimination and their mechanism. The Saytzeff rule and relative stabilities of alkenes. Chemical reactions: electrophilic and free radical additions, addition of halogens, halogen acids, hydroboration–oxidation, oxymercuration-reduction, ozonolysis and hydration. Markownikoff' s rule of addition.	11
IV	Hydrogen Bonding and Van der Waals forces Hydrogen Bonding – Definition, types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Van der Waals forces. Metallic Bond and semiconductors Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators). Semiconductors – Introduction, types, and applications.	11
V*	Complexometric titrations: Determination of Mg^{2+} by EDTA. Paper Chromatography: Qualitative Analysis of any one of the following Inorganic cations and anions by paper chromatography (Pb^{2+}, Cu^{2+}, Ni^{2+}, Cl^-, Br^-, and PO_4^{3-} and NO_3^-). - To determine the viscosity of given liquid using Ostwald's Viscometer. - To determine the specific refractivity of at least two liquids by Refractometer. - Separation of mixture of two Organic Compounds by TLC.	30

