

Unit-III :**12L**

Mass spectrometry: Introduction, theory, measurement techniques (EI, CI, FD, FAB) recording of mass spectrum. types of ions, isotopic contribution, fragmentation process, factors affecting fragmentation, ion analysis, ion abundance. Mass spectral fragmentation of organic compounds of various types, common functional groups, molecular ion, metastable ions, McLafferty rearrangement. Retro-Diels Alder fragmentation, nitrogen rule. High resolution mass spectrometry. Examples of mass spectral fragmentation of organic compounds with respect to their structural determination. studies of inorganic/coordination and organometallic representative compounds Fingerprint applications and the interpretation of Mass spectra Elementary study of GCMS, FTMS, high resolution MS, ESI-MS, MALDI-MS, examples from macromolecules and supramolecules, study of in-organic co-ordination & organometallic compounds.

Unit-I : Oxidation-Reduction

12L

I) Oxidation: oxidation of Hydrocarbos, Epoxidation, Shi Epoxidation, Jacobsen Epoxidation perhydroxylation by KMnO_4 and OsO_4 , ozonolysis, Oxidative cleavage by Lemieux reagent, formation of ketones by Wacker process, Oxidation of aromatic ring by chromic oxide, Oxidation of alcohols (PCC, PDC, Chromic acid, Swern oxidation, Silver carbonate, Manganese dioxide, oppenauer oxidation, CAN) Oxidation of 1,2- Diols (Lead tetra-acetate, CAN, Periodates), Selective oxidation of alkyl side chain in aromatic compounds, alcohols and acid using Cr (IV and VI),

II) Reduction: Selectivity in reduction, Hydrogenation of aromatic rings, Noyori asymmetric hydrogenation, reduction of nitro and nitroso compounds, dissolving metal reduction, Metal based reductions using Li/Na/Ca in liquid ammonia, Hydride transfer reagents from Group III and Group IV in reductions, reduction of aldehydes, ketones to alcohols, reduction of carbonyl group to methylene, reduction of alkene to alkane (diimide), **Non-Metallic Reduction:** Wolf-Kishner & diimide reduction, Metal Hydride reduction using LiAlH_4 , NaBH_4 , BH_3 , Birch Reduction, Enzyme Catalyzed Reduction, Stereo/enantioselective reductions (Chiral Boranes, Corey-Bakshi-Shibata)

Thiiranes.

Unit-III :

121

Formation of C-C bond Principle, disconnection'synthons, electrophilic and nucleophilic carbo species, use of following reaction in carbon carbon bond formation, base catalysed condensation including Claisen, Dieckmann reaction, Perkin, Stobbes, Knoevengel use of malonic and acetoaceti esters., Darzens reaction,prins reaction, use of acetylides,acid catalysed condensation of olefins,F reaction,Fries reaction and diels alder reaction.

Unit-IV :

121