CHEMISTRY

CODE-05

Note :- The students will be expected to solve simple structural, sysnthetic, Mechanistic conceptual and numerical problems based on and relevant to the syllabus. They are also expected to be acquainted with SI units.

PAPER-1

Atomic structure and chemical bonding-Quantum theory, Schrodinger equation, particle in a box, hydrogenatom. Hydrogen moleculeion, Elements of vallence, bond and molecular orbital theory (idea of bonding, non-bonding and antibonding orbitals) Sigma and Pibonds.

Chemical Kinetics-Kinetics of reactions involving free radicals, Kinetics of polymerization and Photochemical reactions.

Surface Chemistry and Catalysis-Physical absorption is otherms, surface area determination, heterogeneous catalysus acid base and enzime catalysis.

Electrochemistry-Lomic equilibra, Theory of strong electrolytes, Debye, Huckel theory of activity coecients electrolytic conduction galvanic cells memberance equalibria and fuel cells. Electrolysis and overvoltage.

Thermodynamics-Laws of Thermodynamics and application to physicachemical processes, systems of variable compositions.

Electronic structure of Transition Metal Complexes-Crystal fields theory and modifications, complexes of Piacceptor ligands, organometallic compounds of transition metals.

Lanthanides and Actinides- Separation Chemistry, Oxidation State, magnetic properties.

Reaction in non-acqueous solvents.

PAPER-II

Physical Organic Chemistry:- Electronic displacements- Inducive, electromeric, mesomeric and hyper conjugative effects. Electrophile nucleophiles and free redicals Resonance and its application to organic compounds. Effect of structure on the disconciation constants of organic acids and basis Hydrogen bond and its effects on the properties of organic compounds.

Modern concepts of organic reaction mechanism- addition substitution elimination and rearrangement reaction involving free radicals. Mechanisms of aromatic substitution. Benzene intermediates.

alipathic Chemistry:-Chemistry of simple organic compounds beloging to the following classes-alkanes Alkynes. Alkyl halides, alcohols, thiols aldehydes, ketones, and their derivatives, eithers, amions, amine acids, hydroxy acids, un-struated acids, dibasic acids.
Synthetical and uses of the following :

Acetoacetic and malonic esters, organometalic compounds of magnesium and lithium, ketene carbene and diazomethane.

Carbohydrates:- Classification, configuration and general reaction or simple monosaccharides chemistry of glucose, frustose and sucrose.

Stereo Chemistry:- Elements of symmetry and simple symmetry operation, optical and geometrical Isomerism in simple organic molecules E.Z. and R.S. nortaions. Conformations of simple organic molecules. Stero chemistry of inorganic co-ordination compounds.

Automatic Chemistry.- Benezene, Toluene and their helegeon, hydroxy, nitro and amini dervatives Sulphonic acids, Zylenes,

Benzaldehyde. Salicyladehyde, acetophenone, benzonic, Pathalic saliculic, cinnamic and mandelic acids, reduction products of nitrobenzene, Diazonium salts and their synthetic uses.

Structure, synthesis and important reactions of naphthlenes anthracene, Phenantherene, Pyridune and quinoline.

Basic concepts regarding the following materials of economic and medical importance Cellulose and starch coaltar, chemicals, organic polymers. Oils and fats, petrochemicals, Vitamins,hormones, alkaloids. (fermentation products including antibiotics, proteins).

Organic Photochemistry.- Energy level diagrams, quantum yield, photochemistry of simple organic molecules.

Polymers:- Physical chemistry of polymers, Molecular weight averages and group analysis, sedimentation light seattering and viscoisity of polymer solution. Alloys and intermetallic.