

# RESTRUCTURED INORGANIC SYLLABUS (CEMG)

## MODULE – 1

### ATOMIC STRUCTURE & PERIODICITY –(14L)

- Wave Nature of electrons, de Broglie equation, Schrödinger Wave Equation (preliminary idea), radial wave functions and radial distribution curves, s, p, d orbitals and their shape (qualitative idea).
- Exchange energy and extra stability of half-filled & full-filled orbitals; effective nuclear charge and its calculation using Slater's rules.
- Modern Periodic Table, trends in atomic & ionic radii, trends in Ionization Energy, Electron Affinity & Electronegativity (Pauling's scale only).
- Ionic potential & diagonal relationship in the Periodic Table, IUPAC Nomenclature ( $Z > 100$ ).

## MODULE – 2

### BONDING – (10 L)

- Radius ratio, its applications and limitations, lattice energy, Born-Landé equation (no deduction, application only), Born-Haber cycle & its applications; polarization & Fajan's rules.
- VSEPR Theory, Hybridization, resonance, bond moment, dipole moment, Hydrogen bonding & its applications, Van der Waal's forces.
- MOT – simple MO energy level diagram of  $\text{Li}_2$ - $\text{N}_2$ ,  $\text{O}_2$  &  $\text{F}_2$ ; Band Theory & bonding in metals (qualitative idea only).

## MODULE – 3

### ACID – BASE & COORDINATION CHEMISTRY – (16L)

- Bronsted – Lowry definition, Lewis definition, HSAB principle (all elementary ideas with examples)
- Acid Base equilibrium, Ostwald's Dilution Law, strength of weak acids and bases,  $K_w$  of water, pH – concept, salt hydrolysis (strong acid/weak base, weak acid/strong base, weak acid/weak base) Henderson's equation (numerical problems), buffer capacity, acid – base titrations, indicators & choice of indicators in acid – base titrations.
- Double and complex salts, Werner's theory, type of ligands (mono, bi, tri....), chelates, macrocyclic ligands, applications of chelates in chemical analysis, applications of chelates in chemical analysis, role of macrocyclic ligands in biological systems, IUPAC nomenclature of coordination complexes.