

## PHYSICAL AND INORGANIC CHEMISTRY

### UNIT – I

#### Physical Chemistry :

Introduction to physical chemistry: The nature of gaseous state: States of matter gas, liquid, solid. Gas laws – Boyle's law, Charles law, Gay – Lussac's law, Avagadro's hypothesis. Dalton's law of Partial pressures, Graham's law – Combined gas law – ideal gas – kinetic theory of gases – Deviations from the ideal gas law – Van der Wal's equation – real gases.

### UNIT – II

Colloids: Definition, classification, formation and properties of colloids - Dialysis and Ultrafiltration; Chemical energy: Heat of reaction – Definition, endothermic and exothermic reactions – Hess'law. First law of thermodynamics; Chemical equilibra: Arrhenius theory, ionization of water, ionic product of water , pH, pOH, Pk - Bronsted–Lowry theory of acids and bases, acid-bases indicators.

### UNIT III

#### Inorganic Chemistry :

Atomic structure - Discovery of the sub-atomic particles: electrons, protons, neutrons; Radioactivity – Bequerel and Curies, types of radiation. Determination of nucleus of atom, isotopes, Bohr theory; quantum numbers-n,l,m and s; electronic configurations – orbital designations – s, p, d, f orbitals. Shapes of s and p orbitals.

### UNIT IV

Types of chemical bonds: Ionic bonding - Covalent bonding – Orbital hybridisation ( $Sp^3$ ,  $Sp^2$ ,  $Sp^1$  only) - Multiple valency - electronegativities and electron affinities - Geometry of simple covalent compounds - coordinate covalent bonds.

### UNIT V

Crystallography: Solids (Crystalline & Amorphous) – Unit cell - Characteristic parameters – Body centered cubic structure (eg. Cscl) – Face centered cubic structure (eg. Nacl)

#### Reference Books:

1. B.R..Puri, L.R.Sharma and Madan S.Pathania, *Principles of Physical Chemistry*, Shoban Lal Nagin Chand and Co., Delhi.
2. P.L.Soni & Mohankatyal, *Text Book of Inorganic Chemistry*, 20th revised edition, Sultan Chand, 1992.
3. R.B.Puri & L.R.Sharma, *Principles of Inorganic Chemistry*, Sultan Chand, 1989.
4. Vogel's *Text Book of Quantitative Chemical Analysis*, E.L.B.S.
5. R.D.Madan, *Modern Inorganic Chemistry*, S. Chand and Company (Private) Ltd., 1987.
6. G. S. Manku, *Theoretical Principles of Inorganic Chemistry*, Tata McGraw Hill, New Delhi.
7. J.D.Lee , *Concise Inorganic Chemistry*, 5 th Edition., Blackwell Science Ltd, Oxford, 2002.
8. J.E Spice, *Chemical bonding and structure*, 1964.
9. M.J. Winter, *Chemical bonding*, 1996.