

R.T.M NAGPUR UNIVERSITY NAGPUR
SEMESTER PATTERN PROPOSED SYLLABUS

SUBJECT CHEMISTRY

B.Sc. –I, Semester - I

CH – 101: Paper- I (Inorganic Chemistry)

Unit-I (7.5 Hrs)

(A) Atomic Structure :Idea of de-Broglie matter Waves, Heisenberg's uncertainty principle.Schrodinger wave equation, significance of Ψ and Ψ^2 , Quantum numbers, shapes of s, p, and d orbitals, Aufbau principle, Pauli's exclusion principle and Hund's rule of maximum

multiplicity.Electronic Configuration of elements and ions ($Z = 1$ to 30)

(B) Periodic Properties: Atomic and ionic radii, ionization energy, electron affinity and electronegativity- Definition, trends in periodic table. Factors affecting ionization potential. Pauling's and Mulliken's scale of electronegativity. Effective nuclear charge and Slater's rule with some numericals.

Unit-II (7.5 Hrs)

(A) Ionic bond :Introduction to Ionic bonding with respect to formation (Kossel Theory), Lattice energy and Born- Habercycle with numericals. Solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajans rule.

(B)Covalent Bond: Valence Bond Theory, Formation of Hydrogen molecule with Potential energy diagram Limitations of VBT, directional characteristics of covalent bond, overlap criterion and bond strength. Bond energy, bond length, Bond order and Bond angle. Various types of hybridization involving s, p, d orbitals and shape of inorganic molecules.

Unit – III (7.5 Hrs)

(A) s- block elements- Electronic configuration, Comparative study with respect to atomic and ionic radii, Ionization potential, reducing properties. Application of s-block elements(Na, K and, Ca) in biosystem.Diagonal Relationships (Li-Mg).Hydrogen bonding .Classification and effect of Hydrogen bonding on viscosity, solubility, Melting point and Boiling point.

(B) Chemistry of Noble Gases: Chemical properties of the noble gases, Preparation, chemical

properties, structures, bonding and applications of Xenon fluorides (XeF_2 , XeF_4 , XeF_6).

Structure and bonding in XeOF_2 and XeOF_4

Unit- IV

(7.5 Hrs)

(A) p-block elements – Introduction to p-block elements with respect to following compounds: Hydrides: Comparative study with respect to structure of NH_3 , PH_3 , AsH_3 and SbH_3 .

Oxides: Structure of P_2O_3 , P_2O_5

Oxyacids of Phosphorous: Structure of H_3PO_3 and H_3PO_4

Peroxyacids of sulphur: Preparation and structure of Caro's and Marshall's acids.

Hydrides of boron: Structure and bonding of diborane, structure of borazine.

(B) Food Adulteration and Detection: Definition, Conditions of adulteration, Types of adulteration (intentional, unintentional, natural) . Chemical contamination, Simple tests for the detection of food adulteration in tea leaves and coffee, spices (turmeric and chili powder) and milk..

