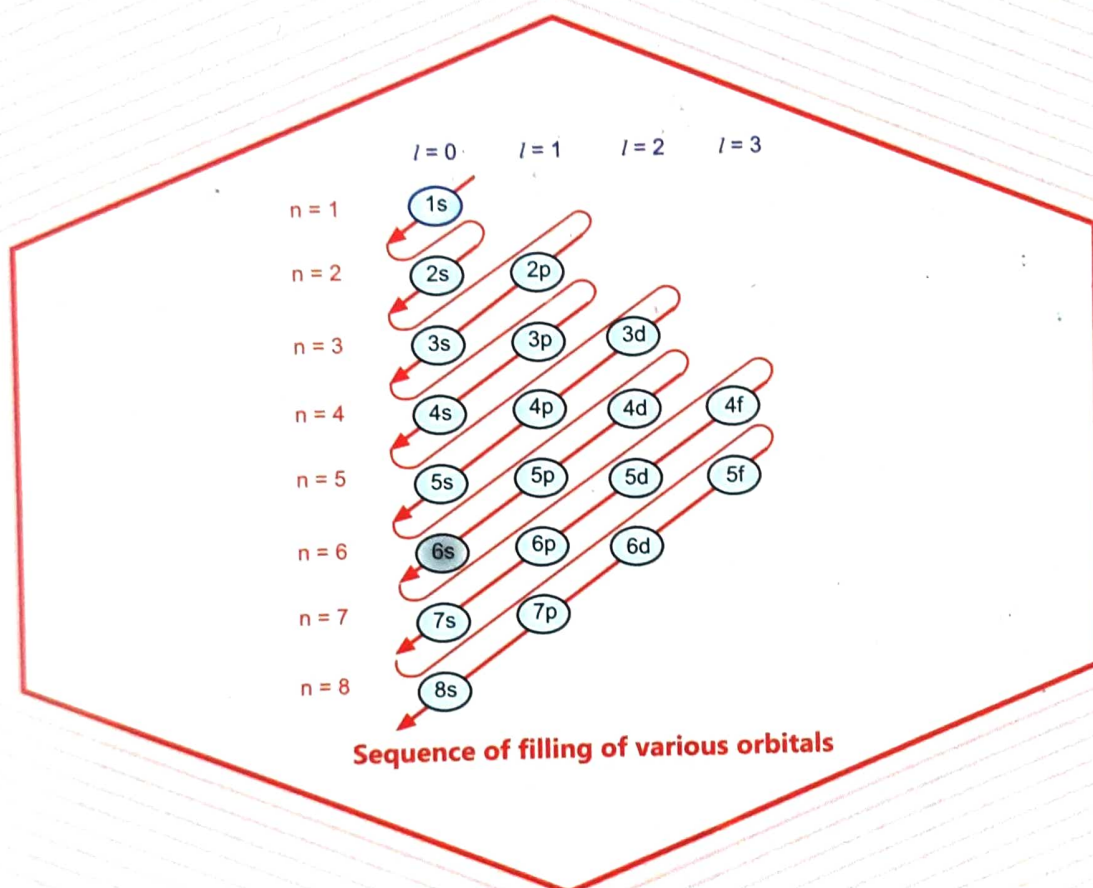


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**B.Sc. Part-I : Semester-I**

# INORGANIC CHEMISTRY

(CHEMISTRY : DSC-3A : PAPER-I)



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**FOR**  
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***As Per New Revised Syllabus of***  
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# Syllabus

## Unit I: Atomic Structure and Periodicity of Elements (09)

- 1.1 Bohr's Theory of Hydrogen Atom and its Limitations
- 1.2 Wave Particle Duality
- 1.3 Heisenberg's Uncertainty Principle
- 1.4 Quantum Numbers and their Significance
- 1.5 Shapes of s, p and d Atomic Orbitals
- 1.6 Electrons Filling Rules in Various Orbitals: (a) Aufbau's Principle (b) Hund's Rule of Maximum Multiplicity (c) Pauli's Exclusion Principle
- 1.7 Electronic Configuration of Elements. Stability of Empty, Half-filled and Completely Filled Orbitals
- 1.8 Periodicity of Elements: General discussion of the following Properties of the Elements with reference to s-block elements:  
(a) Electronic Configuration (b) Atomic Radii (c) Ionic Radii  
(d) Ionization Energy (e) Electron Affinity (f) Electronegativity  
(g) Metallic Characters (h) Reactivity (i) Oxidation State (j) Melting and Boiling Points (k) Chemical Properties.

## Unit II: Chemical Bonding and Molecular Structures

### (A) Ionic Bonding (07)

- 2.1 Definition and Formation of Ionic Bond. General Characteristics of Ionic Bonding
- 2.2 Energetics in Ionic Bond Formation
- 2.3 Born-Haber Cycle for NaCl and its Applications
- 2.4 Fajan's Rule, Applications of Fajan's Rule for
  - Polarizing Power and Polarizability
  - Ionic Character in Covalent Compounds
  - Bond Moment, Dipole Moment and Percentage Ionic Character

## Unit III: Chemical Bonding and Molecular Structure

### (B) Valence Bond Theory (VBT) (07)

- 3.1 Concept of Hybridisation, Different Types of Hybridisation and Geometry of following molecules
  - Linear Geometry -  $\text{BeCl}_2$  ( $sp$  Hybridisation)
  - Planar Trigonal Geometry -  $\text{BF}_3$  ( $sp^2$  Hybridisation)
  - Tetrahedral Geometry -  $\text{SiCl}_4$  ( $sp^3$  Hybridisation)
  - Trigonal Bipyramidal Geometry -  $\text{PCl}_5$  ( $sp^3d$  Hybridisation)
  - Octahedral Geometry -  $\text{SF}_6$  ( $sp^3d^2$  Hybridisation)
  - Pentagonal Bipyramidal Geometry -  $\text{IF}_7$  ( $sp^3d^3$  Hybridisation)



## **Unit IV: Chemical Bonding and Molecular Structures**

### **(C) Molecular Orbital Theory (MOT)**

- 4.1 LCAO Method, Formation of Bonding, Anti-bonding and Non-bonding Molecular Orbitals
- 4.2 Conditions for Successful Overlap, Types of Overlaps - s-s, s- $p_x$ ,  $p_x$ - $p_x$ ,  $p_y$ - $p_y$  and  $p_z$ - $p_z$  overlaps
- 4.3 Bond Order and its Significance
- 4.4 Energy Level Sequence for Molecular Orbital when  $n = 1$  and 2
- 4.5 Molecular Orbital Diagrams for Homonuclear Diatomic Molecules 1<sup>st</sup> & 2<sup>nd</sup> Period Elements ( $\text{He}_2$ ,  $\text{Li}_2$ ,  $\text{B}_2$ ,  $\text{N}_2$ ,  $\text{O}_2$ ).
- 4.6 Molecular Orbital Diagrams for Heteronuclear Diatomic Molecules ( $\text{CO}$ ,  $\text{NO}$ ).



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