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INORGANIC CHEMISTRY

Asper Gondwana University CBCS Syllabus

B.Sc. Semester III

Dr. Mahendra Pratap Singh Tomar

South Asian Academic Publications
Andhra Pradesh

B.Sc. Part II (Semester – III) (CBCS)

Paper – I (Inorganic Chemistry)

UNIT-I

(A) Hydrides of boron: Structure and bonding in diborane and borazine, Classification and applications of carbides.

(B) Basic Properties of Iodine, interhalogen compounds: Preparation and structure of CIF, CIF_3, IF_5 & IF_7.Polyhalides: Classification and structure of I_3^-, I_5^-, I_7^- and ICl^-

(C) Oxy Acids of Sulphur: Preparation and structure of Caro's and Marshal Acid.

(D) Study of Silicates: Classification, Preparation, properties and structure of tetra sulphur tetranitride, S_4N_4

UNIT-II

(A) Ionic Solids: Ionic structures, radius ratio effect & coordination number, Limitation of radius ratio rule, Lattice energy and Born-Haber cycle. Solvation energy and solubility of ionic solids, polarizing power and polarizability of ions, Fajan's rules.

(B) Metallic Bonding: Free electron theory and properties of metals, valency bond theory and band theory to explain nature of conductors, insulators & semiconductors (intrinsic and extrinsic).

(C) Acids and Bases: Bronsted Lowery Concept, Lux-Flud Solvent system and Lewis concept of acid and bases.

UNIT-III

(A) Chemistry of First Transition Series Elements: Properties of the element of first transition series with reference to their electronic configuration, atomic and ionic radii, ionisation potential, Variable oxidation state, Magnetic properties, Colour, Complex formation tendency and Catalytic activity.

(B) Chemistry of Element of Second and Third Transition Series: Electronic configuration of 4d and 5d transition series. Comparative treatment with 3d-analogous (Groups Cr-Mo-W, Fe-Rn-Os, Co-Rh-Ir, Ni-Pd-Pt) in respect of oxidation states, magnetic behaviour and stereochemistry.

UNIT-IV

(A) Chemistry of Lanthanides: Position of Lanthanides, electronic configuration, oxidation state, atomic and ionic radii, Lanthanide contraction and its consequences, complex forming tendency. Occurrence and isolation of lanthanides (ion exchange and solvent extraction methods).

(B) Chemistry of Actinides: Position in periodic table, chemistry of actinides with respect to electron configuration, oxidation states, atomic and ionic radii

Content

4.8. Born- Haber Cycle

4.9. Solvation Energy

4.10. Factor Affecting Solvation and Solvation Energy

4.11. Polarization, Polarizing Power and Polarizability

4.12. Fajan's Rules

4.13. Consequences of Fajan's Rule (Application of Fajan's Rule)

5. Metallic Bonding

5.1. Factors favouring the formation of metallic bond

5.2. Metallic Properties

5.3. Valency Bond Theory

5.4. Band Theory: Molecular Orbital Approach

5.5 Band Structures of Conductors, Insulators and Semiconductors

6. Acids and Bases

6.1. Bronsted-Lowery concept

6.2. Lewis Acid and base

6.3. Lux-Flood acid-base definition

6.4. Solvent system concept and autoionization

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7.2. Electronic configuration

7.3. Atomic and Ionic Radii

7.4. Ionisation Potential

7.5. Oxidation State

7.6. Magnetic Property

7.7. Complex Formation Tendency

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8.2. Electronic Configuration of Third Transition Series

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8.6. Comparative Study of Fe, Ru and Os

8.7. Comparative Study of Co, Rh and Ir

8.8. Comparative Study of Ni, Pd and Pt

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9.3. Oxidation State

9.4. Atomic and Ionic Radii

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9.6. Consequences of Lanthanide Contraction

9.7. Basicity of oxides and hydroxides

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9.9. Occurrence and Isolation of Lanthanides

9.10. Separation of lanthanides

10. Chemistry of Actinides

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