INORGANIC: CHEMISTRY OF p-BLOCK ELEMENTS

THEORY

Unit I: Chemistry of p-block elements

Electronic configuration, atomic and ionic size, metallic/non metallic character, melting point, ionization enthalpy, electron gain enthalpy, electronegativity. Allotropy, inert pair effect, diagonal relationship between Boron and Silicon and anomalous behaviour of first member of each group.

Unit II: Structure, bonding and properties: acidic/basic nature, stability, ionic/covalent nature, oxidation/reduction, hydrolysis, action of heat

Hydrides: Hydrides of group 13 (only Diborane), group 14, group 15 (EH_3 where E=N, P, As, Sb, Bi), group 16 and group 17.
- Oxides: Oxides of nitrogen, phosphorus, sulphur and chlorine.
- Oxoacids: Oxoacids of nitrogen, phosphorus, peroxoacids of sulphur, chlorine.
- Halides: Halides of carbon, silicon, nitrogen and phosphorus.

   Preparation, property, structure and uses of the following compounds
- Boric acid, borates, boron nitrides, borazine.
- Silicates, Ceramic materials, silicones, graphitic compounds, intercalation compounds of graphite.
- Phosphonitrilic halides $\{(PNCl_2)_n$ where n = 3 and 4$\}$
- Interhalogen and pseudohalogen compounds.
- Clatharate compounds of noble gases, Xenon fluorides (M.O. treatment of XeF_2).

Recommended Texts:
1. Lee, J.D. *Concise Inorganic Chemistry*, ELBS, 1991.
2. Douglas, B.E. & Mc Daniel, D.H. *Concepts & Models of Inorganic Chemistry*, Oxford, 1970
3. Greenwood, N.N. & Earnshaw, *Chemistry of the Elements*, Butterworth-Heinemann. 1997.
4. Cotton, F.A. & Wilkinson, G, *Advanced Inorganic Chemistry*, Wiley, VCH, 1999.
5. Gary L. Miessler, Donald A. Tarr, *Inorganic Chemistry, 4thEd.,* Pearson, 2010.

PRACTICAL

INORGANIC: COMPLEXOMETRIC TITRATIONS

i. Complexometric estimation of Mg^{2+} using EDTA.

ii. Complexometric estimation of Zn^{2+} using EDTA.

iii. Estimation of total, temporary and permanent hardnesss of water samples.

iv. Estimation of Ca^{2+} in solution by (substitution method) using Erio-chrome black-T as indicator.

v. Estimation of Ca^{2+} /Mg^{2+} in drugs/ milk/ biological samples by Back titration.

vi. Complexometric estimation of Zn^{2+} using Xylenol orange as indicator.

vii. Complexometric estimation of Al^{3+} using Erio-chrome black-T as indicator.

viii. Complexometric estimation of mixture of Zn^{2+} and Mg^{2+} in a sample solution using Xylenol orange and Eriochrome black-T as indicator

ix. Complexometric estimation of mixture of Al^{3+} and Mg^{2+} in a sample solution using masking agent.

x. Estimation of $BaSO_4$ by EDTA back titration using Eriochrome black-T as indicator.

Recommended text:

1. Vogel, A.I., Fundamentals of Quantitative Analysis, 5th Ed., Addison Wesley longman., 1989.