

B. Sc. Ist Year (IInd Semester)

Paper-IV (CH-104) Inorganic Chemistry (Theory)

M.Marks: 32

Time: 3 Hrs.

Note: Nine questions will be set. **Q. No. 1**, based on whole syllabus, is compulsory. There will be four questions from section **A** and Four from section **B**. Candidates will be required to attempt five Questions in all, selecting at least two questions from each section. Question no. 1 carry 8 marks and all questions in Section A & B (not more than 2 - 3 parts) carry 6 marks each.

Section – A (23 periods)

Hydrogen Bonding and Van der Waals forces

Hydrogen Bonding – Definition, types, effects of hydrogen bonding on properties of substances, application

Brief discussion of various types of Van der Waals forces.

Metallic Bond and semiconductors

Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators).

Semiconductors – Introduction, types and applications.

S-Block elements

Comparative study of the elements including diagonal relationship, Anomalous behaviour of Lithium and Beryllium compared to other elements in the same group, salient features of hydrides, oxides, halides, hydroxides (methods of preparation excluded), behaviour of solution in liquid NH_3 .

Chemistry of Noble Gases

General physical properties, low chemical reactivity, chemistry of xenon, structure and bonding in fluorides, oxides and oxyfluorides of xenon.

Section – B (22 periods)

P-Block elements:

Electronic configuration, atomic and ionic size, metallic character, melting point, ionization energy, electron affinity, electronegativity, inert pair effect and diagonal relationship.

Boron family (13th group):

Diborane: Preparation, properties and structure (as an example of electron deficient compound and multicenter bonding), Borazine chemical properties and structure, relative strength of Trihalide of Boron as lewis acids, structure of aluminium (III) chloride.

Carbon family and Nitrogen family (14th and 15th group):

Catenation, Carbides, fluoro carbons, silicates (structural aspects).

Oxides: Structure of oxides of nitrogen and phosphorus, Oxyacids: Structure and relative acid strength of oxy acids of nitrogen and phosphorus, structure of white and Red phosphorus.

Oxygen family (16th group):

Oxy acids of sulphur – structure and acidic strength, Hydrogen Peroxide – properties and uses.

Halogen family (17th group):

Interhalogen compounds (their properties and structures), Hydra and oxy acids of chlorine – structure and comparison of acid strength, cationic nature of Iodine.

