

SEM	SET	PAPER CODE	TITLE OF THE PAPER
II	2014	14PCH2106	INORGANIC CHEMISTRY – II

**SECTION – B****Answer all the questions:****5 x 5 = 25**

31. a. Employing Born – Haber cycle calculate the lattice energy of  $\text{AlF}_3(\text{S})$  from the following thermochemical data (in  $\text{KJ mol}^{-1}$ )
- Heat of sublimation of Al = 326
  - Ionisation energy (Al to  $\text{Al}^{3+}$ ) = 5138
  - Enthalpy of formation of  $\text{AlF}_3(\text{s})$  = -2620
  - Dissociation energy of fluorine = 160
  - Electron affinity of fluorine = -350

**OR**

- b. Discuss the effects of chemical forces on melting and boiling points of different substances.
32. a. Explain the concept of resonance and list the conditions under which a molecule can exhibit resonance.

**OR**

- b. It is found that the molecules  $\text{B}_2$  and  $\text{C}_2$  are respectively paramagnetic and diamagnetic. Explain on the basis of molecular orbital theory.
33. a. Given the standard electrode potentials of  $\text{Cr}^{+3} / \text{Cr}^{+2}$  and  $\text{Fe}^{+3} / \text{Fe}^{+2}$  couples are -0.414v and 0.771v respectively. Predict the possible cell reaction and calculate the free energy change for the reaction.

**OR**

- b. State Pearson's principle of HSAB concept and explain the theoretical basis for the concept.
34. a. Give a comparative account of the oxides of phosphine and amines.

**OR**

- b. Discuss the anomalous behaviour of fluorine.
35. a. How is polymeric sulphur nitride obtained? Discuss its properties and structure.

**OR**

- b. Illustrate the use of Wade's rules with examples in determining different types of structures in boranes.

### **SECTION – C**

**Answer any THREE questions:**

**3 x 15 = 45**

36. i. Derive Born-Landé equation for the lattice energy of ionic solid. (10+5)
- ii. Define electronegativity. Show how the electronegativity values may be used to estimate the ionic character of a bond.
37. i. What are the structures of methane, ammonia and water according to VSEPR theory? Account for the bond angles found in them. (9+6)
- ii. Describe the bonding in  $\text{BeH}_2$  molecule by giving MO energy diagram.
38. i. What is generalised acid – base concept? What are its advantages? Explain how steric and solvent effects affect acid – base strength. (10+5)

- ii. Describe the following reactions carried out in liquid ammonia solvent.  
(a) autoionisation    (b) neutralisation    (c) precipitation
39. i. Discuss the use of d-orbitals by non-metals in bonding. Illustrate with an example. (5+4+6)
- ii. Write any four reactions of the fluorides of xenon.
- iii. Describe the bonding and structure of the fluorides of xenon.
40. i. Represent by equations the formation of different varieties of silicones. (6+4+5)
- ii. Mention the uses of silicones.
- iii. Describe the structural features of three dimensional silicates with examples.

\*\*\*\*\*