B.Sc. 1st Semester (Hons) Examination,

November–2014

PHYSICS

Paper–Phy-105

Chemistry-I

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all, selecting **two** questions from each section.*

Section–I

1. (a) Give two differences between van der Waal bond and H-bond. 2,6

(b) Define : Intramolecular H-bond, Intermolecular H-bond, Semiconductors, Bent Rule, Lattice energy, Hybridization.

2. (a) Explain Born Haber cycle for formation of NaCl. 2,2,4

(b) Give two differences between square close packing and hexagonal close packing.

(c) Explain the bond order in CO using M.O. diagram.

3. (a) Explain a band theory to explain conductivity in Na. 4,2,2

(b) Why HF is liquid and HCl is gas ?

(c) Boiling point of p-nitrophenol is higher than o-nitrophenol.

4. (a) Write all the postulates of Valence bond theory.

(b) Explain the term Schotky and Frenkel defects.

(c) Define with an example : Radius ratio, p-semi-conductors. 2,4,2

Section–II

5. (a) Write all the postulates of Crystal field theory. 5,3

(b) Define : Pairing energy, Trans effect, Weak ligands.

6. (a) Explain the mechanism of substitution reaction in octahedral complexes using a suitable example. 4,4

(b) Explain the crystal field splitting in octahedral complexes using suitable diagram.

7. (a) To calculate Crystal field splitting (C.F.S.E.) of : d^6, d^7, d^8, d^9, d^{10} configuration for octahedral complexes in presence of strong ligands. 5,3

(b) Why Crystal field splitting (C.F.S.E.) is greater in octahedral complexes than tetrahedral complexes ?

8. (a) Explain the inner and outer sphere mechanism for electron transfer reactions. 4,4

(b) Why d-subshell orbitals splits in two sets in such a way that t_{2g} orbitals have higher energy than e_g orbitals in tetrahedral complexes ?