

Roll No.

91030

**B. Sc. (Hons.) Physics 1st Semester
Examination – December, 2015**

CHEMISTRY - I

Paper : Phy 105

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting at least two questions from each Section. All questions carry equal marks.

SECTION - I

1. (a) Give all postulates of VB theory. What are the limitations of this theory. 4
- (b) Explain the formation of O_2 and NO molecule on the basis of MO theory. 4
2. (a) What is meant by hybridization ? Explain the formation of BeF_2 and CH_4 . 4

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SECTION - II

5. (a) Calculate CFSE for d^4 and d^6 ions in strong field and weak field in octahedral complexes. 4
- (b) Explain the factors which affect crystal field splitting. 4
6. (a) Explain crystal field splitting in tetragonal complexes. 3
- (b) What is Jahn Teller theorem. Explain. 2
- (c) Why CFS in tetrahedral complexes is smaller than in octahedral complexes. 3
7. (a) Define labile and inert complexes with example. 2
- (b) Explain substitution reaction of square planar complexes. 3
- (c) Define and explain trans effect with example. 3
8. (a) Explain thermodynamic and kinetic stability of complexes. 4
- (b) What are inner and outer sphere mechanism for electron transfer reactions? 4

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- (b) Explain : 4
- (i) Madelung constant 4
- (ii) Kapustinskii equation 4
- What are their applications.
3. (a) What is solvation energy? Explain the dissolution of NaCl in water. 4
- (b) What do you understand by lattice energy? Calculate lattice energy of MgF_2 from following data : 4
- (i) Heat of sublimation of Mg = 146.4 kJ/mole
- (ii) Dissociation energy of fluorine = 158.8 kJ/mole
- (iii) Ionization energy of Mg = -2186 kJ/mole
- (iv) E.A of Fluorine = 332.6 kJ/mole
- (v) Heat of formation of MgF_2 = -1096.5 kJ/mole
4. (a) Explain cubic close packing and hexagonal close packing in solids. Which is more efficient? 3
- (b) What are super conductors, insulators and semiconductors? Explain with example. 3
- (c) What are Vander Waal's forces of attractions? Explain their origin. 2

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