



HCG-1301

Seat No. _____

M. Sc. (Sem. II) Examination

April / May - 2015

Inorganic Chemistry : Paper-VII

Time : 3 Hours]

[Total Marks : 70

- 1 (a) Answer any **two**. 8
- (1) Derive the terms for all the states originated From P^2 case by 'Pigeon hole diagram.
 - (2) Explain the correlation diagram for d^2 electronic configuration.
 - (3) Which of the following term represents the ground state of the V^{3+} ion? Give reasons for your choice.
 $3F, 3P, 1G, 1D$ and $1S$.
- (b) Answer any **one**. 6
- (1) Drive the calculation $10Dq, B$ and β Parameters.
 - (2) Write note on: Charge transfer spectra.
- 2 (a) Answer any **two**. 8
- (1) Explain the behaviour of CO as π -acid Ligand in relation to M-C bond.
 - (2) What is mononuclear metal Carbonyls? Explain the structure of $Cr(CO)_6$.
 - (3) Explain the use of vibrational spectra to determine the molecular symmetry of polynuclear carbonyls.
- (b) Answer any **one**. 6
- (1) Write notes on: Importance of nitrosyl complexes.
 - (2) Give report on: Metal - Carbonyl cluster.

- 3 (a) Answer any two. 8
- (1) Give the preparation of higher boranes like B_5H_9 , B_6H_{10} , $B_{10}H_{14}$, B_8H_{12} .
 - (2) Give preparation and properties of Nido-Carborane.
 - (3) Write notes on: Metallo - carboranes.
- (b) Answer any one. 6
- (1) Explain the molecular description of metal-metal bonding.
 - (2) Explain the WED's rule for boron cages.
- 4 (a) Answer any two. 8
- (1) Write note on: "Isopoly tungstate".
 - (2) Give short account on: "Heteropoly blues".
 - (3) Explain the Molybdenum's poly acids and salts.
- (b) Answer any one. 6
- (1) Give the method of preparation for Aluminium's O.M.C and their physical and chemical properties.
 - (2) Explain the structure of $(Me_3Al)_2$
- 5 Answer any Seven. 14
- (1) What are microstates? Give the formula of microstates.
 - (2) Explain the term $\Delta S=0$ and $\Delta l = \pm 1$ in short.
 - (3) Draw the structure of bridge bonded B_2H_6 and give hybridization of Boron atom in it?
 - (4) Find out the values of L, S and J for $4F$ term.
 - (5) Derive the ground state term for Cr^{2+} ion.
 - (6) Give the two classes of metal clusters basis on the oxidation states of metal.
 - (7) What is Orgel diagram?
 - (8) Draw the structure of $Fe_2(CO)_9$
 - (9) Give the classification of CO group.
 - (10) Which is the ground state term from $1S, 2F, 3G$?