



GBX-1571 Seat No. _____

M. Sc. (Sem. II) Examination

April/May - 2017

**CHN-501 : Chemistry : Paper - VII
(Inorganic Chemistry)**

Time : 3 Hours]

[Total Marks : 70

Instruction : All questions carry equal 14 marks.

1 (a) Answer any two : 8

- (1) What is term symbol ? Give the Hund's rule for the determination of ground state term.
- (2) Describe the term symbol for all the states arising from P^2 electronic configuration. Arrange them in increasing order of energy.
- (3) Explain the electronic spectra of $[V(H_2O)_6]^{3+}$ ion.

(b) Answer any one : 6

- (1) Explain the Orgel diagram of $d^2 - d^8$.
- (2) Explain "Charge transfer spectra" with appropriate example.

- 2 (a) Answer any two : 8
- (1) What is mono nuclear metal carbonyl ?
Explain the structure of $\text{Cr}(\text{CO})_6$ using IR spectra.
 - (2) Write a note on "Metal carbonyl clusters."
 - (3) Give short account on "Importance of nitrosyl compounds."
- (b) Answer any one : 6
- (1) Explain the use of vibrational spectra (IR spectra) for bonding and structure of carbonyl compounds.
 - (2) Calculate EAN
 $\text{Cr}(\text{CO})_6$, $\text{Mn}_2(\text{CO})_{10}$, $\text{Fe}_2(\text{CO})_9$.
- 3 (a) Answer any two : 8
- (1) What are boranes ? Give their classification and nomenclature.
 - (2) Discuss the Wed's rule for borane cages.
 - (3) Give the preparation of higher boranes like B_4H_{10} , B_5H_9 , B_8H_{12} , $\text{B}_{10}\text{H}_{14}$.
- (b) Answer any one : 6
- (1) Write note on "Metallo-Carboranes".
 - (2) Describe metal clusters and its types and various factors which favor metal-metal bonding.

4. (a) Answer any two : 8
- (1) Discuss the "Heteropoly Blues."
 - (2) Give note on "Isopoly tung states."
 - (3) Explain the structure of $(\text{Me}_3\text{Al})_2$.
- (b) Answer any one : 6
- (1) Explain the Keggin's Theory.
 - (2) Explain the Molybdenum's poly acid and salts.
- 5 Answer any seven : 14
- (1) Find L, S, J and no. of unpaired electrons for 4f term.
 - (2) Give the structure of Zeise salts.
 - (3) Draw the structure of $\text{Co}_2(\text{CO})_8$. Which IR frequencies shown by this complex ?
 - (4) Give the limitation of Orgel diagram.
 - (5) Draw the structure of two inter convertible form of "Ferrocene".
 - (6) Give the degeneracy of the E_g , T_{1g} , T_{2g} and A_{1g} term.
 - (7) How many microstates are arises from d^3 case ?
 - (8) Draw the structure bridged B_2H_6 . What is hybridization of B atom ?
 - (9) Give the mathematical description for "spin" and "Laporte" allowed transition with example.
 - (10) Derive the ground state term for Fe^{++} ion.
-