



ACA-3851

Seat No. \_\_\_\_\_

**M. Sc. (Sem. II) Examination**

**March/April – 2019**

**CHN-501 : Chemistry : Paper - VII**

*(Inorganic Chemistry)*

Time : 3 Hours]

[Total Marks : 70

- 1 (a) Answer any two : 8
- (1) What is term symbol ? Give the Hund's rule for the determination of ground state term.
  - (2) Explain the electronic spectra of  $[V(H_2O)_6]^{3+}$  ion.
  - (3) Derive the calculation of  $10 D_q$ , B and  $\beta$  parameters by appropriate example.
- (b) Answer any one : 6
- (1) Explain the polymeric nature of M-C bond in metal carbonyls on the basis of V.B.T. and M.O.T.
  - (2) What is Orgel-diagram ? Explain the Orgel-diagram for  $d^4 - d^6$ .
- 2 (a) Answer any two : 8
- (1) Write a note on : "Metal carbonyl clusters".
  - (2) What is mono nuclear metal carbonyl ? Explain the structure of  $Cr(CO)_6$  using IR spectra.
  - (3) Give short account on importance of nitrosyl compounds.

(b) Answer any one : 6

(1) Discuss the structure of Iron penta carbonyl



(2) Calculate E.A.N. :



3 (a) Answer any two : 8

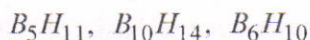
(1) Explain the Wed's rule for "Boron-cages".

(2) What are carboranes ? Give report on "Metallo-carboranes".

(3) Explain the structure of  $B_2H_6$  on the basis of  $sp^3$  hybridization.

(b) Answer any one : 6

(1) Explain the structure of higher boranes like :



(2) What are boranes ? Give their nomenclature classification and various types of bonds present in higher boranes.

4 (a) Answer any two : 8

(1) Explain the "Keggin's theory".

(2) Brief report on O.M.C. of Al and Mg.

(3) Classify the organo-metallic compounds.

(b) Answer any one : 6

- (1) Explain the structure of Tetramethyl lithim.
- (2) Write short note on : "Heteropoly blues".

5 Answer any seven : 14

- (1) What is O.M.C. ?
- (2) Give the limitations of orgel diagram.
- (3) Give the structure Zeise salt.
- (4) Draw the structure of two inter convertible forms of "Ferrocene".
- (5) Define the  $\Delta_s = 0$  term for electronic transition.
- (6) How many micro states arise from  $d^3$  case ?
- (7) Derive the ground state term for  $Fe^{++}$  ion.
- (8) What is E.A.N. ?
- (9) Which of the following terms represents the ground state term ? Why ?

$^1G \ ^1D \ ^1S \ ^3P \ ^3F.$

- (10) Find the value of L, S, J and No. of unpaired electrons for 5I term symbol.