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 $\left[V(H_2O)_6\right]^{3+}$ ion.

(3) Derive the calculation of 10 D_q, B and β 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 shoprt account on importance of nitrosyl compounds.

(b) Answer any one : 6

(1) Discuss the structure of Iron penta carbonyl $\left[Fe(CO)_5\right]$.

(2) Calculate E.A.N. :

$Mn_2(CO)_{10}$, $Ni(CO)_4$, $Fe_3(CO)_{12}$.

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 :

B_5H_{11}, $B_{10}H_{14}$, B_6H_{10}

(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 froms 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 unpained electrons for 5I term symbol.