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BM-2001 Seat No._____

M. Sc. (Sem. - II) Examination

March/April - 2014

CC - CHN - 501 : Inorganic Chemistry : Paper - VII

(New Course)

Time : 3 Hours] [Total Marks : 70

Instruction : All questions carry equal 14 marks.

1 (a) Answer any two of the following : 8

(i) Identify the ground state term for each set of the following terms with reasons.

(a) ^5D, ^3H, ^3P, ^3I, ^1G

(b) ^3F, ^3P, ^1G, ^1D, ^1S

(ii) What is term symbol ? Give the Hund's rule for the determination of ground state term.

(iii) Find the L, S, J and no. of unpaired electrons for the following terms :

^6S ^4G ^2D

(b) Answer any one of the following : 6

(i) Explain the Orgel diagram of d^2-d^8.

(ii) Explain "charge transfer spectra" with appropriate example.

2 (a) Answer any two of the followings: 8

(i) What is mono nuclear metal carbonyl ? Explain the structure of Fe $(CO)_5$ using IR spectra.

(ii) Define metal carbonyl. Give classification and properties of metal carbonyls.

(iii) Give report on "Metal-Carbonyl clusters".

(b) Answer any one of the following : 6

(i) Write report on : "Importance of nitrosyl complexes".

(ii) Explain the use of IR spectra in elucidating the structure of Fe_2 $(CO)_9$.

3 (a) Answer any two of the following : 8

(i) What are boranes ? Give their classification and nomenclature.

(ii) Discuss the Wed's rule for boron cages.

(iii) Give the preparation of higher boranes like B_4H_{10}, B_5H_9, B_6H_{10}, B_8H_{12}, $B_{10}H_{14}$.

(b) Answer any one of the following : 6

(i) Give report on "Metallo-carboranes".

(ii) What is 'carboranes' ? Give their classification, nomenclature and method of preparation.

4 (a) Answer any two of the following : 8

(i) Discuss the "Heteropoly Blues".

(ii) Explain the Molybdenum's poly acids and salts.

(iii) Give notes on : "Isopolytung states".

(b) Answer any one of the following : 6

(i) What is O.M.C ? Give their classification and example for each class.

(ii) Explain the structure of $(CH_3Li)_4$.

5 Give short answer of any seven of the following : **14**

(i) Derive the ground state term for He_2 and F^-.

(ii) Find the L,S, J and no. of unpaired electrons for 3F term.

(iii) Give the mathematical description for 'Spin' and 'Laporte' allowed transition with example.

(iv) Which three energy level diagram are used for explain the electronic spectra of complexes ?

(v) Give the splitting pattern of 2D and 3F term in octahedral ligand field.

(vi) Draw the structure of bridged B_2H_6. Show the σ and ∂ bond. What is the hybridization of B atom ?

(vii) What is polynuclear metal carbonyl ? Give their any four examples of different first transition metals.

(viii) Draw the structure of two interconvertible form of "Ferrocine".

(ix) Draw and give name of various types of bonds present in higher boranes.

(x) Draw the structure of CO_2 $(CO)_8$. Which IR frequencies shown by this complex ?
