YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD
M Sc CHEMISTRY EXAMINATION (Under CBS), MAY-2018
INORGANIC CHEMISTRY (GENERAL-II) - CH-201

Time: 3 hrs **M.Marks:60**

Note: Part-A is compulsory (word limit 30-40). Attempt any four questions from Part-B

PART-A

Q. 1 (a) Calculate number of microstates for d^2 configuration.

(b) Find the ground state term of d^7 configuration.

(c) What does Racah parameter signifies?

(d) Define nephelauxetic ratio.

(e) What do you mean by Laporte forbidden transitions?

(f) Obtain the different Mulliken symbols with degeneracy arising from spectroscopic term F of free metal atom/ion in octahedral field.

(g) What is 18 e^- rule? Illustrate with example.

(h) Predict the structure of $[B_{12}H_{12}]^{-2}$ as per wade's rule.

(i) Compare transition metal carbonyls and nitrosyls in terms of back bonding?

(j) Show the splitting of F term of d2 configuration under the influence of tetrahedral field, diagrammatically?

(10x2)

PART-B

Q. 2 (a) The electronic spectrum of $[CrF_6]^{-3}$ shows three bands at 14900 cm^{-1}, 22400 cm^{-1} and 34800 cm^{-1}. Calculate Δ_0 for this. (5)

(b) Sketch and explain Orgel diagram for d^4 and d^6 system in an octahedral field and show all possible transitions. (5)

Q3 (a) What do you understand by L-S coupling? Explain the phenomenon by taking an example of carbon. (5)

(b) With the help of vector diagrams, explain coupling of orbital angular momenta in d^2 configuration. (5)

Q 4 (a) Elucidate metalloboranes w.r.t. their structure, synthesis and properties. (5)

(b) Briefly account for different types of Boranes. (5)

Q 5 (a) Elaborate the scheme of bonding in metal carbonyls in detail. (5)

(b) Discuss different type of reactions shown by transition metal carbonyls. (5)

Q 6 (a) Explain dioxygen complexes of transition metal with emphasis on their preparation, structure and bonding. (5)

(b) What is wade's rule? Discuss its importance with example. (5)

Q 7 (a) What do you mean by Cotton effect? How this effect is useful in evaluating the configuration of optically active substances? (5)

(b) Discuss selection rules for d-d transitions and elaborate with the help of an example. (5)

----------End----------