Navrachana University
School of Liberal Studies and Education, M.Sc. (Chemistry)
End-Semester Examination [May 2017]
FirstYear, Semester II,CH124, Chemical Bonding and Organometallic Compounds

Date: 8/05/2017
Time: 10.30 AM–12.30PM **Total Marks: 40**

Section I:

1. Answer the following questions **[8 Marks]**

a) State two different deciding factors to choose the better*trans* directing ligand.

b) Give one example from each of outer sphere and inner sphere electron transfer reactions.

c) What is the major difference of

(i) CFSE and LFSE?

(ii) Outer sphere and inner sphere mechanism?

d) Give one example of a mixed valence complex which undergoes electron transfer reaction and state under which condition its possible.

2. Write short notes on the following (Any one). **[3 Marks]**

a) Outer sphere electron transfer reaction with a suitable example.

b) How reaction rates influenced by acid and base.

3. Match A and B. **[4 marks]**

Column A	Column B
a. Thermodynamic term	i. Stable & unstable
b. Kinetic term	ii. Inert & labile
c. Mixed valence complex	iii. Bridging ligand
d. Outer sphere	iv. Redox reaction
e. Inner sphere	

Section II:

Q 4.A Answer the following questions **[10 Marks]**

(i) Which of the following can behaves as tri-hapto ligand [01]

(a) alkyl (b) carbyne (c) allyl (d) carbene

(ii) Complex $(\eta^3\text{-}C_5H_5)Cr(CH_3)(CO)_n$ is an electronically précised molecule. The value of n in this complex would be: [01]

(a) 3 (b) 4 (c) 5 (d) None of these

(iii) Which of the following method is best utilized to study fluxional behavior of molecules [01]

(a) FT-IR (b) ^{1}H NMR (c) EPR (d) none of these

(iv) A well known naturally organometallic compound is [01]

(a) myoglobin (b) cytochrome P-450
(c) chlorophyll (d) vitamin B_{12} coenzyme

(v) Lysine is: [01]
(a) Basic amino acid (b) Acidic amino acid
(c) Neutral amino acid (d) none of these

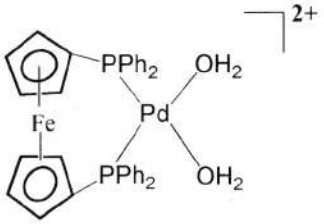
(vi) The existence of zwitter ionic form of amino acid can be proved by [01]
(a) existence of low solubility of amino acid
(b) existence of low solubility of amino acids
(c) existence of high solubility of amino acids
(d) all of these

(vii) Complete the following reductive eliminations reactions. [02]

$$LnMRH \longrightarrow LnM + ?$$

$$LnMH(COR) \longrightarrow LnM + ?$$

(viii) Give electron count and oxidation state for each atoms separately in the following complex. Comment on the expected stability. [02]



Q 4. B Attempt **any Five** of the following: **[15 Marks]**

(i) Explain the structural changes in olefin/ acetylene on binding with a metal ion. How they be explained in the basis of the DCD model. [03]

(ii) Briefly describe various modes of bonding of CO ligand. Give different methods of preparation of metal carbonyls. [03]

(iii) Show two specific examples of reactions that make a metal-alkyl complex. Name the reaction type that you have shown. [03]

(iv) What are essential amino acids? Give two methods of their preparation? [03]

(v) What do you understand by hydrometallationreactions. Describe hydroborations in brief. [03]

(vi) Briefly describe **any TWO** of the following: [03]

(i) Cytochromes

(ii) Flúxional behavior