**Assignment-1**

**Class: B. Sc. (Chemistry), 5th Semester, (2023-2024)**

**Subject: (Organometallic Chemistry ) Code: CUTM 1481**

**Last Date of Submission:**

Section A:

1. (i) Which of the following complex does not obey 18-electron rule

(a) [Mn(CO)6]

(b) [Fe(CO)5]2-

(c) [Cr(CO)5]2-

(d) [Mn(CO)4Cl2]2+

(ii) Complex in which organic ligand is having only σ-bond with metal is

1. [W(CH3)6]
2. K[Pt(Cl)3 (C2H4)]
3. [Fe(η5-C5H5)2]
4. [Ru(η5-C6H6)2]

(iii) Number of metal-metal bond in [(C5H5)Fe(CO)2]2 is

1. 0
2. 1
3. 2
4. 3

(iv) The structure of Fe3(CO)12 shows

1. No bridging and two terminal CO groups
2. One bridging and 11 terminal
3. Two bridging and 10 terminal
4. 3 bridging and 9 terminal

(v) Which of the following forms bridged structure

(a) Fe3(CO)12

(b Ru3(CO)12

(c) Os3(CO)12

(d) Mn2(CO)10

(vi) Which one of the metal carbonyls is prepared by direct interaction of finely divided meatal with CO

1. Fe(CO)5
2. Cr(CO)6
3. V(CO)6
4. Mn2(CO)10

(vii) Which of the following carbonyls is prepared by photochemical decomposition?

1. Co2(CO)6
2. V(CO)6
3. Fe2(CO)9
4. Fe(CO)5

(viii) One of the following is known as Zeise’s salt?

1. Fe2(CO)9
2. K[Pt(Cl)3 (C2H4)]
3. K4[Fe(CN)4]
4. W(CH3)6

(ix) Ligands are classified in terms of hapticity into:

1. 3 types
2. 4 types
3. 8 types
4. None of these

(x) Number of bridging and terminal carbonyls present in Co3(CO)12 at low temperature are respectively

1. 3 and 9
2. 6 and 6
3. 4 and 8
4. 0 and 12

**Section B**

1. What do you mean by organometallic compounds? Give some example of different organometallic compounds like main group, transition metal group? Give two applications of organometallic compounds?
2. What is the concept Hapticity? Explains different organometallic compound stability with hapticity ligands.
3. What is EAN rule? Show that the following carbonyls Cr(CO)6, [Co(CO)4]-, [Fe(CO)4]2+ and [V(CO)6]- obey this rule.
4. Give the MO diagram of CO, write the structures of chromium mononuclear carbonyl and binuclear iron carbonyl.
5. Describe the bonding in carbonyl compound.
6. Write the short notes of the following
7. What is Organometallic Chemistry?
8. Give two examples of Organometallic Catalysts?
9. What is Hapticity?
10. Define Eighteen electron rule
11. Why metal carbonyl observes low oxidation state?

* (N.B. Students are required to submit the assignments on declared dates (within one week when the assignment is given). **Late submission will be penalized with low marks**. Assignments which are copied or are of poor quality may be asked for re-submission of assignments.)