**Assignment-3**

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

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

**Last Date of Submission:**

Section A:

1. (i) The nucleophilicity of the halide ions decrease in the order

(a) I- > Br- > Cl- > F-

(b) I- > Cl- > Br-> F-

(c) F- > I- > Br- > Cl-

(d) I-> F- > Br- > Cl-

(ii) The Swain-Scott equation giving the relationship between the reactivity and nucleophilicity for substitution reaction given by

1. Log(k/k0) = sn
2. Log(k0/k) = sn
3. Log(kk0) = sn
4. None of these

(iii) Choose the correct statement:

1. The trans-Pt(NH3)2Cl2 is less stable than cis-isomer
2. The trans-Pt(NH3)2Cl2 is more stable than cis-isomer
3. The trans- and cis- isomers of Pt(NH3)2Cl2 are equal stable.
4. None of these

(iv) The affinity of halides ligands for Pt(II) decreases in order:

1. I- > Br- > Cl- > F-
2. F- > I- > Br- > Cl-
3. Br- > I- > Cl- > F-
4. I-> F- > Cl- > Br-

(v) Which is true for the hydrolysis and anation reaction:

(a) Hydrolysis and anation reactions follow the same reaction co-ordinate in opposite direction

(b) These two reactions follows different reaction co-ordinate in opposite direction

(c) These two reactions follows the same reaction co-ordinate in same direction

(d) None of these

(vi) The relative order of tran-labilizing effects, measured when T = Cl- as the standard case is given by

1. T = H- > CH3- > C6H5- > Cl-
2. T = Cl- > CH3- > H- > C6H5-
3. T = Cl- > C6H5- > H- > CH3-
4. T = H- > Cl- > C6H5- > CH3-

(vii) The kinetic order of trans effects of ligands Cl, C2H4, Me3P and H are in the order

1. C2H4 > Me3P ⁓ H > Cl
2. Me3P > C2H4 > Cl > H
3. H > Cl > C2H4 > Me3P
4. Cl > C2H4 > H > Me3P

(viii) The general order of trans-effects of typical ligands is

1. Py < Cl- < Br- < SCN- < CH3-
2. CH3- < Py < SCN- < Cl- < Br-
3. Py < SCN- < Br- < Cl- < CH3-
4. Cl- < CH3- < Py < Br- < SCN-

(ix) The substitution reactions were suggested by

1. Alfred Noble
2. Alfred Werner
3. Woodward
4. Wilkinson

(x) Ziegler-Natta catalyst is an organometallic compound of which metal

1. Iron
2. Zirconium
3. Rhodium
4. Titanium

(xi) Wilkinson's catalyst is used in

(a) Polymerization

(b) Condensation

(c) Halogenation

(d) Hydrogenation

(xii) What is the use of tetraethyl lead

(a) As a catalyst in addition reaction of alkenes

(b) As a catalyst in polymerization reaction of alkenes

(c) For reducing knocking

(d) For creating knocking

1. What is trans effect, Explain the theories of trans effect?
2. Explain the mechanism of nucleophilic substitution in square planar complexes?
3. Discuss the general mechanism of substitution in octahedral complexes.
4. Discuss the kinetics of octahedral substitution.
5. Explain the nature of two reaction pathways in square planar substitution reaction.
6. Write the reaction mechanism of Wilkinson’s catalyst of alkene hydrogenation.
7. Describe the catalytical cyclic of hydroformylation recation.
8. Short note of following questions
9. What is trans effect
10. What is labilizing effect?
11. Difference between Ia and Id mechanisms.
12. Gasoline synthesis by using catalyst
13. Tolman catalytic loops for hydrogenation of alkene

* (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.)