Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Chemistry) (2015 to 2017) (Sem.–3)

INORGANIC CHEMISTRY-II

Subject Code : MSCH-301

M.Code : 72619

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt FIVE questions in ALL including the COMPULSORY question No.1. and selecting ONE each from Unit-I to Unit-IV.**

1. Answer briefly : (2 × 10 = 20)

(a) Why do transition metals in zero or lower oxidation statesform complexes with ligands like CO and NO?

(b) How is $VOCl_2$ obtained from $VOCl_3$?

(c) Discuss the structure of $[TaF_8]^{3-}$.

(d) Can pyrazinium ion behave as ligand?

(e) Why Cerium (IV) sulphate is used in redox reactions?

(f) What are carbenes? Discuss its types.

(g) Discuss the chemistry of hexone method.

(h) How will you prepare Wilkinson catalyst?

(i) Define π-acidity and give an example.

(j) What is mercuration? Cite an example.

UNIT-I

2. (a) Discuss the various factors responsible for the kinetic instability of transition metal-carbon σ bonded compounds. (10)

(b) Discuss the oxidation-reduction reactions occurring through the transfer of atoms or groups, with examples. (10)

3. (a) Give detailed account of oxidation states and stereochemistry of Palladium and Platinum. (10)

(b) What is trans effect? How would you distinguish cis and trans isomer of $PtCl_2(NH_3)_2$ on the basis of this effect. (10)

UNIT-II

4. (a) The "Tunneling" electron transfer process involves a very low chemical activation energy. Justify the observation. (10)

   (b) Discuss in details about oxides, chalcogenides and halides formed by members of actinide series. (10)

5. (a) $[FeF6]^{3-}$ is colorless whereas $[CoF6]^{3-}$ is colored. How can this difference be accounted for? (10)

   (b) Discuss the molecular orbital diagram for $[Co(en)_3]^{3+}$. (10)

UNIT-III

6. (a) How do trialkylphosphines, arsines and stibines act as ligands? Even being weak σ-donors, why do these ligands form kinetically stable complexes with transition metal ions? (10)

   (b) Discuss the theoretical basis of the 18-electron rule. Does this rule apply for high spin organometallic octahedral complexes? If not, why? (10)

7. (a). Discuss some examples in details where cyclopentadienyl group acts as one-electron as well as five-electron ligand. (10)

   (b) What spectroscopic evidences are the appropriate to demonstrate Jt-back bonding in transition metal alkenyl and alkynyls? Give reasons. (10)

UNIT-IV

8. (a) Write a detailed note on the technetium complexes in synthesis and transformations. (10)

   (b) Discuss about metal embedded polymers as functional materials with examples. (l0)

9. (a) Discuss the structure, synthesis and applications of inorganic polymers having pthalocyanine and similar structural units. (l0)

   (b) How the transition metal complexes play a role in DNA cleavage? (10)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.