2021

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer any ***five*** *questions.*

1. What is Nucleophilic substitution reaction ? Exemplify. Discuss SN^1 and SN^2 mechanism associated with substitution in Octahedral complexes. 4+10 = 14

2. What is Trans effect ? Give its applications. Explain π-bond theory associated with Trans effect. 4+4+6 = 14

3. What do you mean by Electron Transfer Reactions ? Describe inner sphere mechanism associated with it. 6+8 = 14

4. What are Metal Carbonyls ? Give two methods of its preparation. Give some important reactions of metal carbonyls. 2+4+8 = 14

5. Write the structure of $Fe(CO)_5$ and $Cr(CO)_6$ with hybridisation. Discuss structure and bonding in $Ni(CO)_4$. 4+10 = 14

6. What are the Metal Nitrosyls ? Give two methods if its preparation. Discuss Tertiary Phosphine as a Ligand. 2+4+8 = 14

7. What are limitations of CFT ? Explain magnetic character of $[CoF_6]^{3-}$ and $Co(NH_3)_6]^{3+}$ on the basis of CFT. 6+8 =14

8. (a) How will you show that $[Ti(H_2O)_6]^{3+}$ is purple in colour ?

   (b) Explain Orgel Diagram. 8+6 = 14

9. (a) Discuss magnetic properties of complexes.

   (b) Explain Anomalous magnetic moments. 8+6 = 14

10. What are Carboranes ? How are carboranes prepared ? Give some reactions of carboranes. 3+5+6 = 14

11. Write notes on any **two** of the following : 14

(a) Acid Hydorlysis

(b) Anation Reaction

(c) Marcus-Hush Principle

(d) Charge Transfer Spectra

(e) Metal Clusters