

M.Sc. (Chemistry) (CBCS Pattern) Semester-II
PSCCHT05 - Major DSC Paper-VI : Inorganic Chemistry

P. Pages : 2

Time : Three Hours



GUG/W/24/11228

Max. Marks : 80

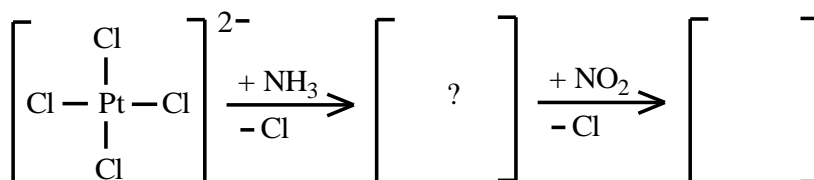
1. a) Describe Orgel diagram for octahedral metal complexes. 8
- b) Write magnetic moment, electronic spectra & structure of tetrahalocobalt(II) complex. 8

OR

- c) What do you mean by quenching of orbital angular momentum. 4
- d) Draw Tanabe-Sugano diagram of octahedral complex with d^2 configuration. 4
- e) Give the electronic spectra of octahedral Ni(II) complexes. 4
- f) Write short note on charge transfer spectra. 4
2. a) What is electron transfer reaction. Discuss the bridge activated complex mechanism for electron transfer reaction. 8
- b) Explain mechanism of substitution reaction in Pt(II) complexes. 8

OR

- c) Explain the effect of leaving group in substitution reaction in square planar complex. 4
- d) Write two electron transfer complementary reactions. 4
- e) Complete the reaction. 4



- f) Explain electron reaction with inner sphere mechanism. 4
3. a) What are metal carbonyl clusters, explain in details. 8
- b) What is EAN rule? Explain with any two suitable examples. 8

OR

- c) Give in details synthesis of metal pi – complex. 4
- d) Explain structure and bonding in $\text{Mn}_2(\text{CO})_{10}$. 4
- e) Calculate the EAN for metal in $[\text{Fe}_2(\text{CO})_9]$. 4
- f) Give the synthesis of $\text{Ni}(\text{CO})_4$. 4
- 4. a) Explain in detail x-ray diffraction studies of transition metal nitrosyls. 8
- b) Give various nitrosylating agents for synthesis of metal nitrosyls. 8

OR

- c) Write short note on Vaska's compound. 4
- d) Explain the role of Wilkinson's catalyst. 4
- e) Complete the following reaction 4
 - i) $\text{Na}_2\text{SO}_3 + \text{Na}_2[\text{Fe}(\text{CN})_5(\text{NO})] \longrightarrow ?$
 - ii) $\text{NO} + \text{FeSO}_4 + 5\text{H}_2\text{O} \longrightarrow ?$
- f) What are different method of binding NO in metal nitrosyl. 4
- 5. a) Calculate EAN of central metal atom in $[\text{Mn}(\text{NO})_3(\text{CO})]^0$. 2
- b) How will you differentiate terminal and bridging carbonyl group by I.R spectra. 2
- c) Draw structure of $\text{Fe}(\text{NO})_5$. 2
- d) Calculate magnetic moment of $[\text{Mn}(\text{CN})_6]^{4-}$. 2
- e) What is Laporte selection rule. 2
- f) Give one example of non-complimentary reactions. 2
- g) What is tunnelling effect. 2
- h) How are nitrosyl complexes useful in differentiating sulphide, sulphite and sulphate. 2
