Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

G:\logo and QP Template\logo 3 Feb 2018 final.tif

**End Semester Examination – Nov/Dec – 2018**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **17CH3005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COORDINATION CHEMISTRY** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Write the formula for the following ligands.  (i) en (ii) dien (iii)acac (iv) tu | CO1 | 2 |
| b. | Explain Werner’s theory with examples. What are the disadvantages of Werner’s theory? | CO1 | 6 |
| c. | Discuss the factors affecting the magnitude of 10Dq values. What are the advantages of crystal field theory? | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Calculate the effective atomic number for the following compounds.   1. [Fe(CO)5] (ii) [Co(NH3)6]2+ | CO1 | 2 |
| b. | Discuss the valence bond theory for the octahedral complexes. | CO1 | 6 |
| c. | Using a clean diagram explain the crystal field splitting of d orbitals in octahedral, tetrahedral and square planar geometries. | CO1 | 12 |
|  |  |  |  |  |
| 3. | a. | Write a short note on terms generated in ligand fields. | CO2 | 4 |
| b. | Define: Nephaelauxetic effect. Write the nephelauxetic series. | CO2 | 6 |
| c. | Explain the molecular orbital diagram for an octahedral complex having only  interactions. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | State the selection rules for transitions in metal complexes. | CO2 | 4 |
| b. | Discuss Jahn teller effect with examples. | CO2 | 6 |
| c. | Draw the Orgel diagrams for the d1 and d3 configuration in octahedral and tetrahedral configurations. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | What are the types of the charge transfer spectra? Write examples for each type. | CO2 | 2 |
| b. | Derive the relationship between the stepwise stability constant and the overall stability constant. | CO4 | 6 |
| c. | Describe a method for the determination of magnetic susceptibility. | CO3 | 12 |
| (OR) | | | | |
| 6. | a. | Predict the spin-only magnetic moment value for  (i) Cr3+ and (ii) Ni2+. | CO3 | 2 |
| b. | Explain the various types of structural isomerism in complexes with examples | CO1 | 6 |
| c. | Write a detailed account on factors affecting the stability of coordination compounds. | CO4 | 12 |
|  |  |  |  |  |
| 7. | a. | Discuss chelate and macrocyclic effect with examples. | CO4 | 8 |
| b. | Write a detailed account on SN1CB mechanism in coordination complexes. | CO5 | 12 |
| (OR) | | | | |
| 8. | a. | Explain SN2 mechanism in coordination complexes with examples. | CO5 | 8 |
| b. | Define: Trans effect and discuss the applications of trans effect. | CO5 | 12 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Describe Marcus theory and outer sphere electron transfer reaction in metal complexes. | CO5 | 10 |
| b. | Discuss the following   1. Lanthanide contraction 2. Magnetic properties of Lanthanides | CO6 | 10 |