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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **15CH3005** | **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. | Draw the structures of (i) EDTA (ii) dipyridyl | CO1 | 1 |
| b. | Outline the defects of Werner’s theory. | CO1 | 3 |
| c. | Explain Sidgwick’s effective atomic number rule with examples. | CO1 | 6 |
| d. | Demonstrate the Valence Bond theory for Octahedral and Tetrahedral Complexes. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | [Ni(Cl)4]2- is paramagenetic. Hence its geometry is   1. Tetrahedral (b) Tetragonal (c) Square planar (d) Octahedral | CO1 | 1 |
| b. | State the assumptions of crystal field theory. | CO1 | 3 |
| c. | Desecribe the process of calculating Crystal Field Stabilization Energy for the octahedral complexes. | CO1 | 6 |
| d. | Discuss any three consequences of the Crystal Field Splitting. | CO1 | 10 |
|  |  |  |  |
| 3. | a. | Among the following cations, choose the ion having ground term 6S.   1. Ti3+ (b) Cr3+ (c) Mn2+ (d) Cu2+ | CO1 | 1 |
|  | b. | Draw the MO diagram for a complex with a  acceptor ligand. | CO1 | 3 |
|  | c. | Describe the various types of absorption spectra. | CO1 | 6 |
|  | d. | Write a detailed account on width of the electronic spectra of metal complexes and the factors affecting it. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Write the states generated from the following terms.   1. D (ii) F | CO1 | 1 |
|  | b. | Explain Nephelauxetic effect. | CO1 | 3 |
|  | c. | State the selection rules that govern the electronic transition in metal complexes. | CO1 | 6 |
|  | d. | Write a detailed account on Orgel diagrams. State its importance. | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | [Co(NH3)4NO2Cl]Cl and [Co(NH3)4Cl2]NO2 are   1. Linkage Isomers (b) Ionization Isomers   (c) Solvate Isomers (d) Coordination Isomers | CO1 | 1 |
|  | b. | Write a note on Irwing Willainm series. | CO1 | 3 |
|  | c. | Explain the geometrical isomerism in metal complexes. | CO1 | 6 |
|  | d. | Explain a method for the determination of magnetic susceptibility. | CO1 | 10 |
| (OR) | | | | |
| 6. | a. | Write the formula for S+L and explain the terms. | CO1 | 1 |
|  | b. | Write a note on intervalence charge transfer. | CO1 | 3 |
|  | c. | Derive the relationship between the stepwise and overall stability constants. | CO1 | 6 |
|  | d. | Write a detailed account on optical isomerism in octahedral metal complexes. | CO1 | 10 |
| 7. | a. | Define trans effect. | CO1 | 1 |
|  | b. | Classify the following complexes as labile and inert complexes based on Taube’s classification.  [V(H2O)6]3+, [Cr(H2O)6]3+, [Mn(H2O)6]3+, [Fe(H2O)6]3+, [Fe(CN)6]3-, [Ni(en)3]2+ | CO1 | 3 |
|  | c. | Explain briefly a method for the determination of stability constant of a metal complex. | CO1 | 6 |
|  | d. | Describe the SN1CB mechanism in octahedral metal complexes with an example. | CO1 | 10 |
| (OR) | | | | |
| 8. | a. | Write an example for anation reaction. | CO1 | 1 |
|  | b. | Define: Macrocyclic effect. | CO1 | 3 |
|  | c. | How does the chelateing ability of the ligand affect the stability of the metal complex? Explain. | CO1 | 6 |
|  | d. | Explain the theories of trans effect. | CO1 | 10 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss the Mechanism of outer sphere electron transfer reaction. | CO1 | 10 |
|  | b. | Describe the method of separation of lanthanides and actinides. | CO2 | 10 |

ALL THE BEST