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



**End Semester Examination – Nov/Dec - 2017**

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| **Code :** | **15CH3005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COORDINATION CHEMISTRY** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Draw the structures of i. ethylene diamine ii. 2,2’,2”-terpyridine | CO1 | 1 |
| b. | Calculate the effective atomic number for i. [Ni(CO)4] ii. [V(CO)6] | CO1 | 2 |
| c. | Explain Werner’s theory with examples. | CO1 | 5 |
| d. | Demonstrate the splitting of d orbitals in the following geometries with a neat diagram i. Octahedral ii. Tetrahedral iii Square planar | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Choose the cation that is colourless in aqueous solution in the following   1. Zn2+ (b) Cu2+ (c) Fe2+ (d) Cr2+ | CO1 | 1 |
| b. | Indicate the reasons for smaller t over o. | CO1 | 2 |
| c. | State the assumptions and defects of valence bond theory. | CO1 | 5 |
| d. | Explain in detail the factors affecting the magnitude of 10Dq values. | CO1 | 12 |
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| 3. | a. | List the various types of transitions in the electronic spectra of metal complexes. | CO1 | 1 |
|  | b. | Deduce the ground term for the following ions   1. Ti3+ (b) Cr3+ (c)Mn2+ (d) Ni2+ | CO1 | 2 |
|  | c. | Construct the MO diagram for a complex having only  donor ligand. | CO1 | 5 |
|  | d. | Draw the electronic spectra of [V(H2O)6]3+ and discuss the various transitions. | CO1 | 12 |
| (OR) | | | | |
| 4. | a. | Write two examples for  donor ligands. | CO1 | 1 |
|  | b. | Arrange the following transitions in the order of increasing spectral band intensities.   1. Laporte-allowed d-d (b) Spin-forbidden   (c) Symmetry allowed (d) Laporte-forbidden d-d | CO1 | 2 |
|  | c. | Explain Jahn Teller effect with examples. | CO1 | 5 |
|  | d. | Draw the Orgel diagrams for the following configurations in both octahedral and tetrahedral geometries   1. d1 (ii) d3 (iii) d4 (iv) d7 | CO1 | 12 |
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| 5. | a. | Write the formula for spin only magnetic moment. | CO1 | 1 |
|  | b. | With an example, explain the geometrical isomerism in square planar complexes. | CO1 | 2 |
|  | c. | Discuss the phenomenon of high-spin low-spin cross over in the metal complexes. | CO1 | 5 |
|  | d. | Explain the LMCT and MLCT spectra in metal complexes. | CO1 | 12 |
| (OR) | | | | |
| 6. | a. | [Co(NH3)5(ONO)]Cl2 and [Co(NH3)5(NO2)]Cl2 are   1. Linkage Isomers (b) Ionization Isomers   (c) Solvate Isomers (d) Coordination Isomers | CO1 | 1 |
|  | b. | Calculate the spin onlyvalue for the ions Ti3+ and Cr3+. | CO1 | 2 |
|  | c. | Write a note on orbital contribution to magnetic moment. | CO1 | 5 |
|  | d. | Discuss the various types of magnetic behaviors in metal complexes. | CO1 | 12 |
|  |  |  |  |  |
| 7. | a. | Discuss the magnetic properties of lanthanides. | CO2 | 3 |
|  | b. | Describe the importance of lanthanide contraction | CO2 | 5 |
|  | c. | Write a detailed account on inner sphere electron transfer reaction. | CO1 | 12 |
| (OR) | | | | |
| 8. | a. | Summarize the role of bridging ligand in the electron transfer reaction. | CO1 | 3 |
|  | b. | Explain Marcus Theory | CO1 | 5 |
|  | c. | Write a detailed account on transactinide elements and their applications | CO2 | 12 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss the factors affecting the stability of the Metal complex. | CO1 | 10 |
|  | b. | Describe the applications of the trans effect. | CO1 | 10 |

ALL THE BEST