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 – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **15CH3008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Organometallic, Bioinorganic and Solid State 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. | Write down the number of electrons donated by the ligands in ionic and covalent models. (i) CO (ii) Allyl | CO1 | | 2 |
| b. | Match the C-O bond with their corresponding IR frequency.   1. Bridging carbonyl group (i) 2143 cm-1 2. Carbon Monoxide (ii) 1800 ± 75 cm-1 3. Teminal carbonyl group (iii) 1715 ± 10 cm-1 4. Saturated Ketone (iv) 2000 ± 100 cm-1 | CO1 | | 4 |
| c. | Define the isolobal concept. Write an example. | CO1 | | 4 |
| d. | Explain the preparation and reactions of ferrocene. | CO1 | | 10 |
| (OR) | | | | | |
| 2. | a. | Find out the number of M-M bonds for the following molecules.  (i) Co2(CO)8 (ii) Fe3(CO)12 | | CO1 | 4 |
| b. | Explain the preparation of metal carbonyl and metal carbonylate anions. | | CO1 | 6 |
| c. | What are the types of metal carbene complexes? How are they prepared? Discuss their structure and applications. | |  | 10 |
| 3. | a. | Write the preparation and reactions of metal-arene complexes. | | CO1 | 5 |
|  | b. | Explain the insertion reaction with one example. | | CO1 | 3 |
|  | c. | Write the hydroformylation reaction. Draw the catalytic cycle and explain the various steps involved. | | CO1 | 12 |
| (OR) | | | | | |
| 4. | a. | What is meant by coordinative unsaturation? Explain. | | CO1 | 5 |
|  | b. | Explain the migration reaction with one example. | | CO1 | 3 |
|  | c. | Write the reaction involved in Wacker Process. Draw the catalytic cycle and explain the various steps involved. | | CO1 | 12 |
| 5. | a. | Compare the thermal and photochemical excitation of a coordination complex with an example. | | CO1 | 4 |
|  | b. | State Adamson’s rule. | | CO1 | 4 |
|  | c. | Write a detailed account on Photoredox reactions. | | CO1 | 12 |
| (OR) | | | | | |
| 6. | a. | Explain the photodissociation process with an example. | | CO1 | 4 |
|  | b. | Write a short note on photochemical conversion and storage of solar energy’ | | CO1 | 6 |
|  | c. | Discuss the photosubstitution reactions carried out in coordination complexes. | |  | 10 |
| 7. | a. | Match the metal with their corresponding enzymes/systems.   1. Cobalt (i) Carboxy peptidase 2. Zinc (ii) Coenzyme B12 3. Iron (iii) Carbonic anhydrase 4. Manganese (iv) Methyl cobalamin   (v) Hydrogenase  (vi) Photosystem-II | | CO1 | 4 |
|  | b. | Write a short note on blue – copper proteins. | | CO1 | 4 |
|  | c. | Write a detailed account on fixation of molecular nitrogen. | | CO1 | 12 |
| (OR) | | | | | |
| 8. | a. | Draw the structures of Ferridoxin and Rubridoxin. | | CO1 | 2 |
|  | b. | Discuss the oxygen binding process in hemoglobin and myoglobin. | | CO1 | 8 |
|  | c. | With examples, explain the mechanism of platinum anticancer drug. | | CO1 | 10 |
|  | | **Compulsory:** | |  |  |
| 9. | a. | Describe the close packing in ionic solids. | | CO1 | 8 |
|  | b. | Write a detailed accont on band theory of solids. | | CO1 | 12 |

ALL THE BEST