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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17CH3008** | **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. | State the 18 electron rule and explain with examples. | CO1 | 4 |
| b. | Discuss the preparation, structure and reactivity of Fischer carbene complexes. | CO2 | 6 |
| c. | How are metal nitrosyl complexes synthesized? Compare the structures of linear and bent metal nitrosyl complexes. | CO2 | 10 |
| **(OR)** | | | | |
| 2. | a. | Draw the structures of the following molecules   1. Ir4(CO)12 (ii) Co4(CO)12 (iii) Fe2(CO)9 (iv) Os4(CO)15 | CO2 | 4 |
| b. | Define: isolobal fragments. Explain with examples. | CO2 | 6 |
| c. | Discuss the preparation, structure, bonding and characterization of metal carbonyl hydride complexes. | CO2 | 10 |
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| 3. | a. | State any two methods for the preparation of metal allyl complexes. | CO2 | 4 |
| b. | Write a note on ligand cone angle. What is its significance? | CO2 | 6 |
| c. | Draw the Molecular Orbital diagram of a metallocene. Predict the magnetic properties of Ferrocene, Cobaltocene and Nickelocene. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Write a note on cyclopentadienyl complexes containing tilted rings. | CO2 | 4 |
| b. | Write the preparation and reactivity of metal arene complexes. | CO2 | 6 |
| c. | Discuss the oxidative addition and migratory insertion reactions with examples. | CO3 | 10 |
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| 5. | a. | Which is the catalyst used for the conversion of methanol to acetic acid? Draw the catalytic cycle and explain each step. | CO3 | 10 |
| b. | Explain the following reactions with examples.   1. Photodissociation (ii) Photoredox reaction   (iii) Photoisomerization (iv) Photosubstitution | CO4 | 10 |
| **(OR)** | | | | |
| 6. | a. | Which is the catalyst used for the alkene hydrogenation reaction? Draw the catalytic cycle and explain each step. | CO3 | 10 |
| b. | With examples explain Ligand photoreactions. | CO4 | 10 |
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| 7. | a. | Explain Bohr effect. | CO5 | 4 |
| b. | What are the types of ferridoxins? Explain their importance. | CO5 | 6 |
| c. | Discuss therole of Manganese cluster in water splitting chemistry of Photosystem II. | CO5 | 10 |
| **(OR)** | | | | |
| 8. | a. | What are the various types of Blue copper proteins? | CO5 | 4 |
| b. | Discuss the importance of cytochromes. | CO5 | 6 |
| c. | Explain the physiology of Hemoglobin and Myoglobin. | CO5 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Write note on biomaterials. | CO5 | 4 |
| b. | Explain the structure of Caesium chloride. | CO6 | 6 |
| c. | State the reaction catalysed by carbonic anhydrase. Draw the active site and explain the catalytic cycle. | CO5 | 10 |