**SEM-III (autonomous)**

CHE-III E-4 **Bioinorganic Chemistry**

**Faculty:** Dr. Lactina Gonsalves and Ms. Anagha Patil (22 + 23 lectures)

**Time:** Thursday: 11.00-12.00

Friday: 12.00-1.00 (alternate lecture)

**Location:** B-203

**Lecture Schedule:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lec. No.** | **Topic** | **Synopsis** | **Ref.** | **Remark** |
| 1. | Iron and Copper containing compounds in biology | Introduction | 1,3 | Refer to pdf and video on g-glassroom |
| 2. |  | Heme proteins: haemoglobin, oxygen transport and storge |  |  |
| 3. |  | Myoglobin, Bohr effect |  |  |
| 4. |  | Cytochrome c |  |  |
| 5. |  | Non heme proteins: hemerythrin, hemocyanin |  |  |
| 6. |  | Iron transport and storage: Siderophores |  |  |
| 7. |  | Transferrin and Ferritin |  |  |
| 8. |  | Electron transfer: Fe-S clusters |  |  |
| 9. |  | Fe-S cluster contd… |  |  |
| 10. |  | CA-1 (Test) |  |  |
| 11. |  | Copper proteins |  |  |
| 12 |  | Cytochromes |  |  |
| 13 |  | Copper electron transfer centres |  |  |
| 14 |  | Cu electron transfer contd… |  |  |
| 15 | Metalloenzymes | Introduction, role of enzymes in biology | 1,2,3 | Refer to pdf on g-classroom |
| 16 |  | Copper enzymes |  |  |
| 17 |  | Zinc enzymes |  |  |
| 18 |  | CA-3 (MCQ) |  |  |
| 19 |  | Cobalt enzymes |  |  |
| 20 |  | Molybdenum enzymes |  |  |
| 21 |  | Vit B12 and B12 coenzymes |  |  |
| 22 |  | Tutorial and Feedback |  |  |

**REFERENCE BOOKS:**

1. Shriver and Atkins, Inorganic Chemistry, 5th Edition, Oxford University Press.
2. I. Bertini, H. B. Gray, S. J. Lippard and J. S. Valentine, *Bioinorganic Chemistry*, University Science Books (1994).
3. J. J. R. Fausto da Siliva and R. J. P. Williams, The Biological Chemistry of the Elements, Oxford University Press (1991)
4. D. E. Fenton, Bio coordination Chemistry, Oxford Chemistry Printers, Oxford University Press (1995)

**SEM-V (autonomous)**

CHE-V E-11 **Organometallic Chemistry**

**Faculty:** Dr. Lactina Gonsalves and Mrs. Navita Naik (23 + 22 lectures)

**Time:** Tuesday: 10.30-11.30

Wednesday: 11.30-12.30

**Location:** B-303

**Lecture Schedule:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lec. No.** | **Topic** | **Synopsis** | **Ref.** | **Remark** |
| 1. | Introduction to organometallic chemistry | Introduction, 18 e- rule, EAN concept | 1,2 | Practice problems on g-classroom |
| 2. |  | Electron counting and oxidation states of in organometallic complexes |  |  |
| 3. |  | Problem solving |  |  |
| 4. |  | Problem solving |  |  |
| 5. |  | General method of Preparation, Properties and Reactions |  |  |
| 6. |  | CA-1 (MCQ) |  |  |
| 7. | Metallocenes | Sandwich compounds, Ferrocene: synthesis, structure, properties | 1,2 |  |
| 8. |  | Structure and aromaticity in metallocenes, |  |  |
| 9. |  | Synthesis and reactivity od cyclopentadienyl compounds |  |  |
| 10. |  | Fluxional behaviour in metallocenes |  |  |
| 11. |  | Metal-Metal bonding and metal clusters. Structure of clusters |  |  |
| 12 |  | Electron counting in metal clusters |  |  |
| 13 |  | Problem solving |  |  |
| 14 |  | Problem solving |  |  |
| 15 |  | CA-2 (TEST) |  |  |
| 16 | Reactivity of organometallic compounds | Reactions of organometallic compounds.  i) Ligand substitution | 1,2 | Practice problems on g-classroom |
| 17 |  | ii) Oxidative addition |  |  |
| 18 |  | iii) Reductive elimination iv) sigma-bond methathesis |  |  |
| 19 |  | iv)1,1 migratory insertions, 1-2 insertions v) beta- hydride elimination |  |  |
| 20 |  | Catalysis by organometallic compounds; alkene hydrogenation |  |  |
| 21 |  | Hydroformylation |  |  |
| 22 |  | Reaction with Ziegler-natta catalyst |  |  |
| 23 |  | Problem solving/tutorial and Feedback |  |  |
|  |  |  |  |  |

**REFERENCE BOOKS:**

TEXTBOOK:

1. Atkins P, Overton T, Rourke J et.al, Shriver and Atkins’ Inorganic Chemistry, 5th Edition, Oxford University Press.

ADDITIONAL READING:

1. Cotton F.A and Wilkinson G, Basic Inorganic Chemistry,Wiley Eastern Ltd.

2. Huheey J.E, Keiter E.A, Keiter R.L, Medhi O.K, Inorganic Chemistry: Principles of

Structure and Reactivity, Pearson Edu.

3. Lee J.D, Concise Inorganic Chemistry, Wiley-India