K25P 2870

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (C.B.C.S.S. – O.B.E. – Reg./Supple./Imp.) Examination, October 2025
(2023 Admission Onwards)
CHEMISTRY/CHEMISTRY WITH DRUG CHEMISTRY SPECIALIZATION
MSCHD03C12/MSCHE03C12 : Inorganic Chemistry – III

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **any 5** questions. **Short** answer questions. **Each** question carries **3** marks. **(5×3=15)**

1. Draw the structural forms of $Co_2(CO)_8$ and indicate the type of metal-metal bond present.
2. What is Ellingham diagram ? State the significance of Ellingham diagrams in metallurgical processes.
3. Briefly discuss metal carbonyl hybrides with suitable examples.
4. What are spectator ligands ? Give examples and mention their role.
5. Define lanthanide contraction and mention any two consequences of lanthanide contraction.
6. Briefly discuss ferritin and its bilogical role.

SECTION – B

Answer **any 3** questions. **Paragraph** questions. **Each** question carries **6** marks. **(3×6=18)**

7. Explain the function of cytochromes on biological systems.
8. Describe the extraction of uranium from its ore pitchblende. Mention some of the uses of uranium.
9. Explain the structure and bonding of $Re_2(CO)_{10}$.

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10. Explain the 18-electron rule on the basis of MO theory. Describe the different methods of electron counting with suitable examples.

11. Write short notes on the therapeutic uses of metal complexes in :

    i) Cancer therapy ii) Chelation therapy

SECTION – C

Answer **any 3** questions. **Essay** type questions. **Each** question carries **9** marks. **(3×9=27)**

12. Compare haemoglobin and myoglobin in terms of structure, oxygen binding and cooperativity.

13. Discuss the coordination number and stereochemistry of lanthanide complexes. Explain their applications in NMR shift reagents and MRI contrasting agent.

14. Explain the preparation, properties and structure of transition metal carbonyls, with special reference to $Ni(CO)_4$.

15. Discuss the synthesis, structure and bonding of ferrocene.

16. Explain the role of organometallic compounds in the Wilkinson's synthesis and Wacker process with reaction mechanisms.

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