

UNIT – 5 - COORDINATION CHEMISTRY

I. Answer in brief

1. What is double salt? Give example.
2. Define Coordination entity. Give example.
3. What is central metal atom / ion? Give example.
4. Define ligands. Give example.
5. What is coordination sphere? Give example.
6. Define coordination polyhedron. Give example.
7. What is coordination number? Give example.
8. Define oxidation state. Give example.
9. Calculate the oxidation number of iron in $[\text{Fe}(\text{CN})_6]^{4-}$
10. Calculate the oxidation number of cobalt in $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$
11. Write the limitations VBT.

II. Answer in a paragraph

1. Explain Werner's theory of coordination compounds.
2. In the complex, $[\text{Pt}(\text{NO}_2)(\text{H}_2\text{O})(\text{NH}_3)_2]\text{Br}$, identify the following.
 - a) Central metal atom / ion
 - b) Ligands and their types
 - c) Coordination entity
 - d) Oxidation number of the central metal ion
 - e) Coordination number
3. Write the IUPAC name for the following compounds.
 - a) $\text{K}_2[\text{Fe}(\text{CN})_3(\text{Cl})_2(\text{NH}_3)]$
 - b) $[\text{Cr}(\text{CN})_2(\text{H}_2\text{O})_4][\text{CO}(\text{OX})_2(\text{en})]$
 - c) $[\text{Cu}(\text{NH}_3)_2\text{Cl}_2]$
 - d) $[\text{Cr}(\text{NH}_3)_3(\text{NC})_2(\text{H}_2\text{O})]^+$
 - e) $[\text{Fe}(\text{CN})_6]^{4-}$
4. Explain the types of structural isomerism with example.
5. Explain the types of stereo isomerism with example.
6. Explain the main assumptions of Valence bond theory (VBT).
7. Explain the geometry, Hybridisation, and magnetic moment of $[\text{Ni}(\text{CO})_4]$ by using VB theory.
8. Explain the geometry, Hybridisation, and magnetic moment of $[\text{Ni}(\text{CN})_4]^{4-}$ by using VB theory.
9. Explain the geometry, Hybridisation, and magnetic moment of $[\text{Fe}(\text{CN})_6]^{3-}$ by using VB theory.
10. Explain the geometry, Hybridisation, and magnetic moment of $[\text{CoF}_6]^{3-}$ by using VB theory.
11. Explain the Crystal field splitting in octahedral complexes.
12. Explain the Crystal field splitting in tetrahedral complexes.
13. Write the classification of Metal carbonyls.
14. Explain the applications of coordination compounds.

