

Objective Test
CO-ORDINATION CHEMISTRY

Time – 1 ½ Hrs.

M.M. - 150

- Q.1. Which of the following is not an ambident ligand –
 (a) CN^- (b) SCN^- (c) NO_2^- (d) Cl^-
- Q.2. Which of the following is not a bidentate ligand –
 (a) Oxalate ion (b) Ethane 1,2-diamine
 (c) EDTA (d) All
- Q.3. The IUPAC name of $\text{K}_4[\text{Fe}(\text{CN})_6]$ is –
 (a) Potassium hexacyanoferrate (II) (b) Potassium hexacyanoferrate (III)
 (c) Potassium hexacyanoiron (II) (d) Potassium hexacyanoiron (III)
- Q.4. The coordination number Ni^{2+} ion in $[\text{Ni}(\text{CN})_4]^{2-}$ is –
 (a) 2 (b) 4 (c) 3 (d) 6
- Q.5. The coordination number Co^{3+} ion in $[\text{Co}(\text{en})_3]^{3+}$ is –
 (a) 2 (b) 4 (c) 3 (d) 6
- Q.6. Which of the following is a chelating ligand –
 (a) CN^- (b) SCN^- (c) $\text{C}_2\text{O}_4^{2-}$ (d) Cl^-
- Q.7. The Effective Atomic Number (EAN) of CMI in $[\text{Fe}(\text{CN})_6]^{3-}$ ion is –
 (a) 20 (b) 35 (c) 36 (d) 18
- Q.8. The primary and secondary valencies in $[\text{Fe}(\text{CN})_6]^{3-}$ ion is –
 (a) 2, 6 (b) 3, 6 (c) 6, 3 (d) 6, 2
- Q.9. Which of the following is an inner orbital complex –
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (d) $[\text{FeF}_6]^{4-}$
- Q.10. Which of the following is an outer orbital complex –
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{NH}_3)_6]^{2+}$
 (c) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ (d) $[\text{FeF}_6]^{4-}$
- Q.11. Which of the following is the most paramagnetic –
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (d) $[\text{CoF}_6]^{3-}$
- Q.12. Which of the following is the most paramagnetic –
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (d) $[\text{CoF}_6]^{3-}$
- Q.13. Which of the following has the least magnetic moment –
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (d) $[\text{CoF}_6]^{3-}$
- Q.14. Which of the following hybridization is involved in central metal ion of $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ –
 (a) sp^3d^2 (b) d^2sp^3 (c) sp^3d (d) dsp^3

- Q.15. $[\text{Ni}(\text{CN})_4]^{2-}$ has following hybridization involved in central metal ion—
 (a) sp^3d^2 (b) d^2sp^3 (c) sp^3 (d) dsp^2
- Q.16. $[\text{Ni}(\text{NH}_3)_4]^{2+}$ has following hybridization involved in central metal ion—
 (a) sp^3d^2 (b) d^2sp^3 (c) sp^3 (d) dsp^2
- Q.17. Which of the following d-orbitals takes part in dsp^2 hybridization —
 (a) d_{xy} (b) $\text{d}_{x^2-y^2}$ (c) d_z^2 (d) d_{yz}
- Q.18. Which of the following d-orbital takes part in dsp^3 hybridization —
 (a) d_{xy} (b) $\text{d}_{x^2-y^2}$ (c) d_z^2 (d) d_{yz}
- Q.19. Which of the following has square planar geometry—
 (a) $[\text{Ni}(\text{NH}_3)_4]^{2+}$ (b) $[\text{Ni}(\text{CN})_4]^{2-}$ (c) $[\text{Ni}(\text{Cl})_4]^{2+}$ (d) $[\text{Pt}(\text{Cl})_4]^{2-}$
- Q.20. Which of the following has tetrahedral geometry—
 (a) $[\text{Ni}(\text{NH}_3)_4]^{2+}$ (b) $[\text{Pt}(\text{Cl})_4]^{2-}$ (c) $[\text{Ni}(\text{Cl})_4]^{2+}$ (d) All of these
- Q.21. Which of the following involves d^2sp^3 hybridization —
 (a) $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ (d) $[\text{FeF}_6]^{4-}$
- Q.22. Which of the following involves sp^3d^2 hybridization —
 (a) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{FeF}_6]^{4-}$ (d) All of these
- Q.23. Which of the following has octahedral geometry —
 (a) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (b) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 (c) $[\text{FeF}_6]^{4-}$ (d) All of these
- Q.24. In which of the following, the bond angle is 90° —
 (a) $[\text{Ni}(\text{NH}_3)_4]^{2+}$ (b) $[\text{Ni}(\text{CN})_4]^{2-}$
 (c) $[\text{Ni}(\text{Cl})_4]^{2+}$ (d) $[\text{Pt}(\text{Cl})_4]^{2-}$
- Q.25. $[\text{Fe}(\text{CN})_6]^{3-}$ ion is—
 (a) Inner orbital, spin paired, high spin complex
 (b) Inner orbital, spin paired, low spin complex
 (c) Outer orbital, spin paired, high spin complex
 (d) Inner orbital, spin free, high spin complex
- Q.26. $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ ion is—
 (a) Inner orbital, spin paired, high spin complex
 (b) Outer orbital, spin paired, low spin complex
 (c) Outer orbital, spin free, high spin complex
 (d) Inner orbital, spin free, high spin complex
- Q.27. $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ ion is—
 (a) Inner orbital, spin paired, high spin complex
 (b) Outer orbital, spin paired, low spin complex
 (c) Outer orbital, spin free, high spin complex
 (d) Inner orbital, spin free, high spin complex

- Q.28. Which of the following is a strong field ligand-
 (a) F^- (b) H_2O (c) NO_2^- (d) Cl^-
- Q.29. Which of the following is a weak field ligand-
 (a) CN^- (b) NH_3 (c) NO_2^- (d) Cl^-
- Q.30. Which of the following has the highest value of CFSE-
 (a) F^- (b) H_2O (c) NO_2^- (d) Cl^-
- Q.31. Which of the following has the least value of CFSE-
 (a) F^- (b) NH_3 (c) NO_2^- (d) CN^-
- Q.32. e_g set of orbitals involves following d-orbitals-
 (a) $d_{xy}, d_{yz}, \& d_{xz}$ (b) $d_{x^2-y^2} \& d_z^2$
 (c) $d_{xy} \& d_{x^2-y^2}$ (d) None
- Q.33. t_{2g} set of orbitals involves following d-orbitals-
 (a) $d_{xy}, d_{yz}, \& d_{xz}$ (b) $d_{x^2-y^2} \& d_z^2$
 (c) $d_{xy} \& d_{x^2-y^2}$ (d) None
- Q.34. The electronic configuration of central metal ion in $[Fe(H_2O)_6]^{3+}$ is-
 (a) $(t_{2g})^3, (e_g)^2$ (b) $(t_{2g})^5, (e_g)^0$ (c) $(t_{2g})^4, (e_g)^2$ (d) $(t_{2g})^3, (e_g)^3$
- Q.35. The electronic configuration of central metal ion in $[Co(H_2O)_6]^{2+}$ is-
 (a) $(t_{2g})^3, (e_g)^2$ (b) $(t_{2g})^5, (e_g)^2$ (c) $(t_{2g})^5, (e_g)^2$ (d) $(t_{2g})^4, (e_g)^3$
- Q.36. The electronic configuration of central metal ion in $[Co(NH_3)_6]^{3+}$ is-
 (a) $(t_{2g})^3, (e_g)^3$ (b) $(t_{2g})^5, (e_g)^1$ (c) $(t_{2g})^4, (e_g)^2$ (d) $(t_{2g})^6, (e_g)^0$
- Q.37. In octahedral complexes any electron entering in e_g set of orbitals -
 (a) increases energy of complex ion by $0.4 \Delta_o$
 (b) decreases energy of complex ion by $0.4 \Delta_o$
 (c) increases energy of complex ion by $0.6 \Delta_o$
 (d) decreases energy of complex ion by $0.6 \Delta_o$
- Q.38. In octahedral complexes any electron entering in t_{2g} set of orbitals -
 (a) increases energy of complex ion by $0.4 \Delta_o$
 (b) decreases energy of complex ion by $0.4 \Delta_o$
 (c) increases energy of complex ion by $0.6 \Delta_o$
 (d) decreases energy of complex ion by $0.6 \Delta_o$
- Q.39. If Δ_o and Δ_t are CFSE for octahedral and tetrahedral complexes having same ligands and same central metal ion and same metal ion – ligand distance. Then-
 (a) $\Delta_t = (4/9) \Delta_o$ (b) $\Delta_t = (2/5) \Delta_o$ (c) $\Delta_t = (3/5) \Delta_o$ (d) $\Delta_o = (4/9) \Delta_t$
- Q.40. $[Ti(H_2O)_6]^{3+}(aq)$ ion absorbs yellow-green colour and undergoes d-d transition. The colour of the solution will be-
 (a) Violet (b) Yellow (c) Green (d) Blue
- Q.41. $[Co(NH_3)_5(H_2O)]^{3+}$ ion absorbs blue-green colour and undergoes d-d transition. The colour of the solution will be-
 (a) Red (b) Green (c) Violet (d) Blue

- Q.42. $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ exhibits following isomerism-
- (a) Hydrate (b) Ionization
(c) Ligand (d) Linkage
- Q.43. $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{H}_2\text{O})_5\text{SO}_4]\text{Cl}$ are -
- (a) Hydrate isomers (b) Ionization isomers
(c) Ligand isomers (d) Linkage isomers
- Q.44. Which of the following will give white precipitate with aq. AgNO_3 solution-
- (a) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ (b) $[\text{Co}(\text{H}_2\text{O})_5\text{SO}_4]\text{Cl}$
(c) Both (d) None
- Q.45. Which of the following will give white precipitate with aq. BaCl_2 solution-
- (a) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ (b) $[\text{Co}(\text{H}_2\text{O})_5\text{SO}_4]\text{Cl}$
(c) Both (d) None
- Q.46. Which of the following will give the maximum precipitate of AgCl with aq. AgNO_3 solution-
- (a) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ (b) $[\text{Co}(\text{H}_2\text{O})_5\text{SO}_4]\text{Cl}$
(c) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ (d) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
- Q.47. Aqueous solution of which of the following has the highest electrical conductance-
- (a) $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ (b) $[\text{Co}(\text{H}_2\text{O})_5\text{SO}_4]\text{Cl}$
(c) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ (d) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
- Q.48. Which of the following is correct about $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{SO}_4$ -
- (a) It gives white precipitate of AgCl with aq. AgNO_3 but no precipitate with aq. BaCl_2
(b) It gives white precipitate of BaSO_4 with aq. BaCl_2 but no precipitate with aq. AgNO_3
(c) It gives white precipitate both with aq. AgNO_3 and aq. BaCl_2
(d) It does not give any precipitate both with aq. AgNO_3 and aq. BaCl_2
- Q.49. Which of the following does not show geometrical isomerism-
- (a) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ (b) $[\text{Co}(\text{en})_2\text{Cl}_2]^+$
(c) $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ (d) All of these
- Q.50. Which of the following shows optical isomerism-
- (a) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ (b) Trans $[\text{Co}(\text{en})_2\text{Cl}_2]^+$
(c) $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ (d) Cis $[\text{Co}(\text{en})_2\text{Cl}_2]^+$