

CO-ORDINATION COMPOUNDS

- [Co(NH₃)₅SO₄]Br and [Co(NH₃)₅Br]SO₄ are a pair of isomers (E 2008)**
1) ionisation 2) ligand 3) coordination 4) hydrate
- In the coordination compound, K₄[Ni(CN)₄] the oxidation state of nickel is (2003-E)**
1) +2 2) -1 3) 0 4) +1
- One mole of the complex compound Co(NH₃)₅Cl₃ gives 3 moles of ions on dissolution in water. One mole of the same complex reacts with two moles of AgNO₃ solution to yield two moles of AgCl(s). The structure of complex is (2003-E)**
1) [Co(NH₃)₄Cl]Cl₂.NH₃
2) [Co(NH₃)₅Cl]Cl₂
3) [Co(NH₃)₃Cl₃]2.NH₃
4) [Co(NH₃)₄Cl₂]Cl.NH₃
- Ammonia forms the complex ion with copper ions in alkaline solutions but not in acidic solutions. What is the reason for it? (2003-E)**
1) Copper hydroxide is an amphoteric substance
2) In acidic solutions hydration protects copper ions.
3) In acidic solutions protons coordinate with ammonia molecule forming ions and molecule are not available.
4) In alkaline solutions insoluble is precipitated which is soluble in excess of any alkali.
- The coordination number of a central metal atom in a complex is determined by (2004-E)**
1) the number of ligands around a metal ion bonded by sigma bonds
2) the number of ligands around a metal ion bonded by pi-bonds
3) the number of ligands around a metal ion bounded by sigma and pi bonds both.
4) the number of only anionic ligands bonded to the metal ion.
- Which one of the following complexes is an outer orbital complex? (2004-E)**
1) [Fe(CN)₆]⁴⁻ 2) [Mn(CN)₆]⁴⁻
3) [Co(NH₃)₆]³⁺ 4) [Ni(NH₃)₆]²⁺

7. Which one of the following has largest number of isomers? (2004-E)
- 1) $[Ru(NH_3)_4Cl_2]^+$
 - 2) $[Co(NH_3)_5Cl]^{2+}$
 - 3) $[Ir(Ph_3)_2H(CO)]^{2+}$
 - 4) $[Co(en)_2Cl_2]^+$
- (R=alkyl group, en=ethylenediamine)
8. The correct order of magnetic moments (spin only values in bohr magneton) among is (2004-E)
- 1) $[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$
 - 2) $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$
 - 3) $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$
 - 4) $[Fe(CN)_6]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$
- (Atomic numbers: Mn = 25, Fe = 26, Co = 27)
9. Which of the following compounds shows optical isomerism? (2005-E)
- 1) $[Cr(C_2O_4)_3]^{3-}$
 - 2) $[Co(CN)_6]^{3-}$
 - 3) $[Cu(NH_3)_4]^{2+}$
 - 4) $[ZnCl_4]^{2-}$
10. Which one of the following cyano complexes would exhibit the lowest value of paramagnetic behaviour? (2005-E)
- 1) $[Fe(CN)_6]^{3-}$
 - 2) $[Co(CN)_6]^{3-}$
 - 3) $[Cr(CN)_6]^{3-}$
 - 4) $[Mn(CN)_6]^{3-}$
11. Nickel (Z = 28) combines with a uninegative monodentate ligand to form a paramagnetic complex. The number of unpaired electron(s) in the nickel and geometry of this complex ion are, respectively (2006-E)
- 1) Two, square planar
 - 2) one, tetrahedral
 - 3) Two, tetrahedral
 - 4) one, square planar
12. In $Fe(CO)_5$, the Fe-C bond possesses (2006-E)
- 1) σ -Character only
 - 2) π -character only
 - 3) σ Both and π characters
 - 4) Ionic character

13. Which one of the following has a square planar geometry? (2007-E)
 1) $[CoCl_4]^{2-}$ 2) $[FeCl_4]^{2-}$
 3) $[NiCl_4]^{2-}$ 4) $[PtCl_4]^{2-}$
14. In which of the following octahedral complexes of cobalt (atomic number 27) will the magnitude of Δ_o be the highest? (2008-E)
 1) $[Co(NH_3)_6]^{3+}$ 2) $[Co(CN)_6]^{3-}$
 3) $[Co(C_2O_4)_3]^{3-}$ 4) $[Co(H_2O)_6]^{3+}$
15. The coordination number and the oxidation state of the element E in the complex, where en is ethylenediamine, are respectively (2008-A)
 1) 6 and 3 2) 6 and 2
 3) 4 and 2 4) 4 and 3
16. Which of the following has an optical isomer (A-2009)
 1) $[Co(en)(NH_3)_2]^{2+}$ 2) $[Co(en)(H_2O)_4]^{3+}$
 3) $[Co(en)_2(NH_3)_2]^{3+}$ 4) $[Co(Cl)(NH_3)_5]^+$
17. Which of the following pairs represents linkage isomers? (A-2009)
 1) $[Pd(PPh_3)_2(NCS)_2]$ and $[Pd(PPh_3)_2(SCN)_2]$
 2) $[Co(NH_3)_5NO_3]SO_4$ and $[Co(NH_3)_5SO_4]NO_3$
 3) $[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4]Cl_2$
 4) $[Cu(NH_3)_4][PtCl_4]$ and $[Pt(NH_3)_4][CuCl_4]$
18. The d-configuration of Cr^{2+} , Mn^{2+} , Fe^{2+} and Co^{2+} are d^4 , d^5 , d^6 and d^7 respectively. Which one of the following will exhibit minimum paramagnetic behavior? [CBSE AIPMT-2011]
 1) $[Cr(H_2O)_6]^{2+}$ 2) $[Mn(H_2O)_6]^{2+}$ 3) $[Fe(H_2O)_6]^{2+}$ 4) $[Co(H_2O)_6]^{2+}$
19. The complex, $[Pt(Py)(NH_3)BrCl]$ will have many geometrical isomers? [CBSE AIPMT-2011]
 1) 2 2) 3 3) 4 4) 0
20. Number of isomeric forms (Constitutional and stereoisomer's) for $[Rh(en)_2(NO_2)(SCN)]^+$ [DUMET 2011]
 1) 3 2) 6 3) 9 4) 12
21. Crystal field stabilization energy for high spin d^4 octahedral complex is? [CBSE AIPMT-2010]
 1) $-0.6\Delta_o$ 2) $-1.8\Delta_o$ 3) $-1.6\Delta_o + p$ 4) $-1.2\Delta_o$

KEY

1) 1 2) 3 3) 2 4) 3 5) 1

6) 4 7) 4 8) 1 9) 1 10) 2

11) 3 12) 3 13) 4 14) 2 15) 1

16) 3 17) 2 18) 4 19) 2 20) 4

21) 1

sakshieducation.com