Chapter-09

Coordination Compounds Marks- 5 with option 7

Multiple Choice Questions (1 Mark)

i) Amongst the following, the ambidentate ligand is……

a) Ethylene diamine
b) Oxalate ion
c) Chloride ion
d) Cyanide ion

ii) The charge on metal ion in $[Fe(CN)_6]^{4-}$ is ……..

a) **2+**
b) 3+
c) 4+
d)5+

iii) The effective atomic number of cobalt in $[Co(NH_3)_6]^{3+}$ is…….

a) 33
b) 34
c) 35
d) 36

iv) The IUPAC name of $Na_3[AlF_6]$ is……

a) Hexafluorosodiumaluminate
b) **Sodium hexafluoroaluminate(III)**
c) Sodium hexafluoroaluminate(II)
d)Sodium hexafluoroaluminium (III)

v) Hybridization of cobalt in $[Co(NH_3)_6]^{3+}$ the complex ion is…….

a) sp^3d^2
b) sp^2d^3
c) **d^2sp^3**
d) d^3sp^2

vi) The geometry of $[CoF_6]^{3-}$ the complex ion is…….

a) Trigonal bipyramidal
b) Tetrahedral
c) **Octahedral**
d) square planar

vii) The pair $[Co(NH_3)_5(SO_4)]Br$ and $[Co(NH_3)_5Br]SO_4$ exhibits…….. isomerism

a) Coordination
b) Ionization
c) Linkage
d) Optical

Very Short Answer Questions (1 Mark)

1.Draw structure of Ethylenediaminetetraacetate ion.

2.Write coordination number of Fe in $\left[Fe(CN)_6\right]^{3-}$

3.Write the chemical composition of carnallite.

4.Write oxidation number of iron in $[Fe\left(CO\right)_5)]$

5.Calculate effective atomic number of iron in $[Fe(CN)_6]^{4-}$ complex ion

6.Write the type of isomerism exhibited by $[Co(NH_3)_5(NO_2)]^{2+}$ and $[Co(NH_3)_5ONO]^{2+}$ pair of complex ion.

7.Write the IUPAC name of $[Fe(CN)_6]^{4-}$ ion.

Short Answer Questions (Type- I) (2 Marks)

1) Explain homoleptic and heteroleptic complexes.
2) Write four postulates of Werner's theory
3) Write one example each of bidentate and ambidentate ligands.
4) Distinguish between double salt and coordination complex.
5) Define the following terms: (i) Coordination isomer (ii) Hydrated isomers
6) Write two applications of coordination compound.

Short Answer Questions (Type-II) (3 Marks)

1) Write classification of ligands with one example of each type.
2) Define following terms (i) Coordination isomer (ii) Hydrated isomers.
   Draw structure of cis isomer of $[Co(NH_3)_4Cl_2]^+$
3) Write a formula to calculate EAN with significance of terms involved in it. Calculate EAN of $[Fe(CN)_6]^{3-}$.

4. Write the IUPAC name of$[Ni(CN)_4]^{2-}$.

Draw the geometrical isomers of following complexes $[Pt(NH_3)(H_2O)Cl_2]$ and $[Co(NH_3)_4Cl_2]^+$

5. Define ligand. Explain the magnetic properties of $[Ni(CN)_4]^{2-}$.

6. Define (i) Anionic complex (ii) coordination number. Draw optical isomers
   Of $[Co(en)_3]^{3+}$

Long Answer Questions (4 Marks)

1) Write oxidation state and coordination number of Co in $[Co(NH_3)_4Cl_2]^+$ ion. Calculate EAN of iron in $[Fe(CN)_6]^{4-}$.Write the IUPAC name of $[Zn(NH_3)_4]^{2+}$.

2) Explain, why $[Co(NH_3)_6]^{3+}$ ion is low spin? Calculate number of unpaired electrons and write the geometry of $[Co(NH_3)_6]^{3+}$.

3) Answer the following with respect to $[CoF_6]^{3-}$ion

   i) Type of hybridization ii) Number of unpaired electrons
   iii) Geometry of complex ion iv) Magnetic property.