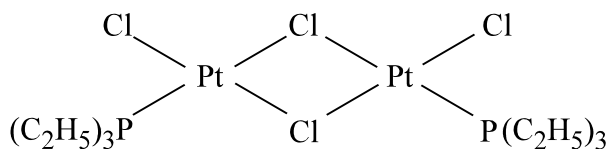


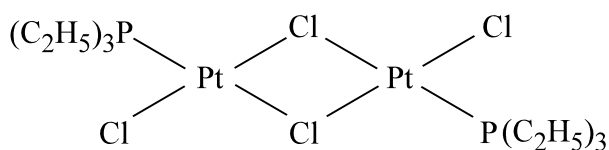
QUESTION BANK ON
COORDINATION COMPOUNDS

StudySteps.in

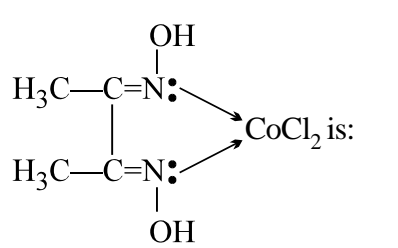
- Q.1 Among TiF_6^{2-} , CoF_6^{3-} , Cu_2Cl_2 and NiCl_4^{2-} the colourless species are:
- (A) CoF_6^{3-} and NiCl_4^{2-} (B) TiF_6^{2-} and CoF_6^{3-}
 (C) NiCl_4^{2-} and Cu_2Cl_2 (D) TiF_6^{2-} and Cu_2Cl_2
- Q.2 IUPAC name of complex $\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3]$ is :
- (A) Potassium alumino-oxalate (B) Potassium trioxalatoaluminate (III)
 (C) Potassium aluminium (III) oxalate (D) Potassium trioxalatoaluminate (IV)
- Q.3 Which ion has tetrahedral geometry:
- (A) $[\text{Fe}(\text{CO})_5]$ (B) $[\text{Co}(\text{NH}_3)_6]^{2+}$ (C) $[\text{NiCl}_4]^{2-}$ (D) $[\text{Ni}(\text{CN})_4]^{2-}$
- Q.4 Trioxalato aluminate (III) and tetrafluoro-borate (III) ions are:
- (A) $[\text{Al}(\text{C}_2\text{O}_4)_3]^{3-}$, $[\text{BF}_4]^{3-}$ (B) $[\text{Al}(\text{C}_2\text{O}_4)_3]^{3+}$, $[\text{BF}_4]^{3+}$
 (C) $[\text{Al}(\text{C}_2\text{O}_4)_3]^{3-}$, $[\text{BF}_4]^{-}$ (D) $[\text{Al}(\text{C}_2\text{O}_4)_3]^{2-}$, $[\text{BF}_4]^{2-}$
- Q.5 Which of the ligands can show linkage isomerism:
- (A) CNS (B) NO_2 (C) CN (D) All of these
- Q.6 Consider the following statements:
 According to Werner's theory.
- (1) Ligands are connected to the metal ions by covalent bonds.
 - (2) Secondary valencies have directional properties
 - (3) Secondary valencies are non-ionisable
- Of these statements:
- (A) 1, 2 and 3 are correct (B) 2 and 3 are correct
 (C) 1 and 3 are correct (D) 1 and 2 are correct
- Q.7 From the stability constant (hypothetical values), given below, predict which is the strongest ligand:
- (A) $\text{Cu}^{2+} + 4\text{NH}_3 \rightleftharpoons [\text{Cu}(\text{NH}_3)_4]^{2+}$, $K = 4.5 \times 10^{11}$
 (B) $\text{Cu}^{2+} + 4\text{CN}^- \rightleftharpoons [\text{Cu}(\text{CN})_4]^{2-}$, $K = 2.0 \times 10^{27}$
 (C) $\text{Cu}^{2+} + 2\text{en} \rightleftharpoons [\text{Cu}(\text{en})_2]^{2+}$, $K = 3.0 \times 10^{15}$
 (D) $\text{Cu}^{2+} + 4\text{H}_2\text{O} \rightleftharpoons [\text{Cu}(\text{H}_2\text{O})_4]^{2+}$, $K = 9.5 \times 10^8$
- Q.8 The complexes given below show:



and



- (A) Optical isomerism (B) Co-ordination isomerism
 (C) Geometrical isomerism (D) Bridged isomerism

- Q.9 In which of the following complexes the nickel metal is in highest oxidation state:
 (A) $\text{Ni}(\text{CO})_4$ (B) K_2NiF_6 (C) $[\text{Ni}(\text{NH}_3)_6](\text{BF}_4)_2$ (D) $\text{K}_4[\text{Ni}(\text{CN})_6]$
- Q.10 An ion M^{2+} , forms the complexes $[\text{M}(\text{H}_2\text{O})_6]^{2+}$, $[\text{M}(\text{en})_3]^{2+}$ and $[\text{MBr}_6]^{4-}$, match the complex with the appropriate colour.
 (A) Green, blue and red (B) Blue, red and green
 (C) Green, red and blue (D) Red, blue and green
- Q.11 Name the metal M which is extracted on the basis of following reactions:
 $4\text{M} + 8\text{CN}^- + 2\text{H}_2\text{O} + \text{O}_2 \longrightarrow 4[\text{M}(\text{CN})_2]^- + 4\text{OH}^-$
 $2[\text{M}(\text{CN})_2]^- + \text{Zn} \longrightarrow [\text{Zn}(\text{CN})_4]^{2-} + 2\text{M}$
 (A) Nickel (B) Silver (C) Copper (D) Mercury
- Q.12 The correct IUPAC name of the complex:
- 

CoCl₂ is:
- (A) Dichlorodimethylglyoximate cobalt (II) (B) Bis (dimethylglyoxime) dichloro cobalt (II)
 (C) Dimethylglyoxime cobalt (II) chloride (D) Dichlorodimethylglyoxime cobalt (II)
- Q.13 $[(\text{C}_6\text{H}_5)_2\text{Pd}(\text{SCN})_2]$ and $[(\text{C}_6\text{H}_5)_2\text{Pd}(\text{NCS})_2]$ are:
 (A) Linkage isomers (B) Co-ordination isomers
 (C) Ionisation isomers (D) Geometrical isomers
- Q.14 Which one of the following will be able to show cis-trans isomerism:
 (A) MA_3B (B) $\text{M}(\text{AA})_2$ (C) MABCD (D) MA_4
- Q.15 A complex of platinum, ammonia and chloride produces four ions per molecule in the solution. The structure consistent with the observation is:
 (A) $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_4$ (B) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_4]$ (C) $[\text{Pt}(\text{NH}_3)_5\text{Cl}]\text{Cl}_3$ (D) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}_2$
- Q.16 The total number of possible isomers of the compound $[\text{Cu}^\text{II}(\text{NH}_3)_4][\text{Pt}^\text{II}\text{Cl}_4]$ are:
 (A) 3 (B) 5 (C) 4 (D) 6
- Q.17 In the complex $\text{Fe}(\text{CO})_x$, the value of x is:
 (A) 3 (B) 4 (C) 5 (D) 6
- Q.18 Cis-trans-isomerism is found in square planar complexes of the molecular formula : (A and B are monodenate ligands):
 (A) MA_4 (B) MA_3B (C) MA_2B_2 (D) MAB_3
- Q.19 The oxidation state of Mo in its oxo-complex species $[\text{Mo}_2\text{O}_4(\text{H}_2\text{O})_2(\text{C}_2\text{H}_4)_2]^{2-}$ is:
 (A) +2 (B) +3 (C) +4 (D) +5
- Q.20 The hybridisation and unpaired electrons in $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ ion are :
 (A) sp^3d^2 ; 4 (B) d^2sp^3 ; 3 (C) sp^3d ; 4 (D) sp^3d^2 ; 2

- Q.21 In which complex is the transition metal in zero oxidation state:
 (A) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2$ (B) $[\text{Fe}(\text{H}_2\text{O})_6]\text{SO}_4$ (C) $[\text{Ni}(\text{CO})_4]$ (D) $[\text{Fe}(\text{H}_2\text{O})_3](\text{OH})_2$
- Q.22 Formula of ferrocene is:
 (A) $[\text{Fe}(\text{CN})_6]^{4-}$ (B) $[\text{Fe}(\text{CN})_6]^{3+}$ (C) $[\text{Fe}(\text{CO})_5]$ (D) $[(\text{C}_5\text{H}_5)_2\text{Fe}]$
- Q.23 The hybridisation involved in $[\text{CoF}_6]^{3-}$ is:
 (A) d^2sp^3 (B) d^3sp^2 (C) dsp^3 (D) sp^3d^2
- Q.24 Which of the following is π complex:
 (A) Trimethyl aluminium (B) Ferrocene
 (C) Diethyl zinc (D) Nickel carbonyl
- Q.25 Which complex is likely to show optical activity:
 (A) $\text{Trans}-[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ (B) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
 (C) $\text{Cis}-[\text{Co}(\text{NH}_3)_2(\text{en})_2]^{3+}$ (D) $\text{Trans}-[\text{Co}(\text{NH}_3)_2(\text{en})_2]^{3+}$
- Q.26 Which one is the most likely structure of $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ if $1/3$ of total chlorine of the compound is precipitate by adding AgNO_3 to its aqueous solution:
 (A) $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ (B) $[\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot (\text{H}_2\text{O})_3$
 (C) $[\text{CrCl}_2(\text{H}_2\text{O})_4] \cdot \text{Cl} \cdot 2\text{H}_2\text{O}$ (D) $[\text{CrCl}(\text{H}_2\text{O})_5]\text{Cl}_2 \cdot \text{H}_2\text{O}$
- Q.27 The complex $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ will give white ppt. with:
 (A) PbCl_2 (B) AgNO_3 (C) KI (D) None of these
- Q.28 The two compounds $[\text{Co}(\text{SO}_4)(\text{NH}_3)_5]\text{Br}$ and $[\text{Co}(\text{SO}_4)(\text{NH}_3)_5]\text{Cl}$ represent:
 (A) Linkage isomerism (B) Ionisation isomerism
 (C) Co-ordination isomerism (D) No isomerism
- Q.29 The structure of iron pentacarbonyl is:
 (A) Square planar (B) Trigonal bipyramid (C) Triangular (D) None of these
- Q.30 The EAN of platinum in potassium hexachloroplatinate (IV) is:
 (A) 46 (B) 86 (C) 36 (D) 84
- Q.31 Diethylene triamine is:
 (A) Chelating agent (B) Polydentate ligand (C) Tridentate ligand (D) All of these
- Q.32 How many moles of AgCl would be obtained, when 100 ml of 0.1 M $\text{Co}(\text{NH}_3)_5\text{Cl}_3$ is treated with excess of AgNO_3 ?
 (A) 0.01 (B) 0.02 (C) 0.03 (D) none of these
- Q.33 0.001 mol of $\text{Co}(\text{NH}_3)_5(\text{NO}_3)(\text{SO}_4)$ was passed through a cation exchanger and the acid coming out of it required 20 ml of 0.1 M NaOH for neutralisation. Hence, the complex is
 (A) $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{NO}_3$ (B) $[\text{Co}(\text{NH}_3)_5\text{NO}_3]\text{SO}_4$
 (C) $[\text{Co}(\text{NH}_3)_5](\text{SO}_3)(\text{NO}_3)$ (D) none of these
- Q.34 Cu^{2+} shows a coordination number of
 (A) 2 only (B) 2 or 4 (C) 4 only (D) 4 or 6

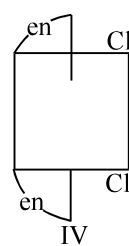
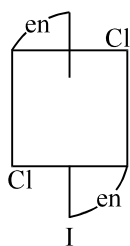
- Q.35 Which of the following is not chelating agent?
 (A) thiosulphato (B) oxalato (C) glycinate (D) ethylene diamine
- Q.36 Which of the following has five donor (coordinating) sites?
 (A) Triethylene tetramine (B) Ethylenediamine tetracetate ion
 (C) Ethylenediamine triacetate ion (D) Diethylene triamine
- Q.37 A compound contains 1.08 mol of Na, 0.539 mol of Cu and 2.16 mol of F. Its aqueous solution shows osmotic pressure which is three times that of urea having same molar concentration. The formula of the compound is
 (A) $\text{Na}_4[\text{CuF}_6]$ (B) $\text{Na}[\text{CuF}_4]$ (C) $\text{Na}_2[\text{CuF}_4]$ (D) $\text{Na}_2[\text{CuF}_3]$
- Q.38 The IUPAC name of the red coloured complex $[\text{Fe}(\text{C}_4\text{H}_7\text{O}_2\text{N}_2)_2]$ obtained from the reaction of Fe^{2+} and dimethyl glyoxime
 (A) bis (dimethyl glyoxime) ferrate (II) (B) bis (dimethyl glyoximate) iron (II)
 (C) bis (2, 3-butanediol dioximate) iron (II) (D) bis (2, 3-butanedione dioximate) iron (II)
- Q.39 The molar ionic conductances of the octahedral complexes.
 (1) $\text{PtCl}_4 \cdot 5\text{NH}_3$ (2) $\text{PtCl}_4 \cdot 4\text{NH}_3$ (3) $\text{PtCl}_4 \cdot 3\text{NH}_3$ (4) $\text{PtCl}_4 \cdot 2\text{NH}_3$
 (A) $\text{I} < \text{II} < \text{III} < \text{IV}$ (B) $\text{IV} < \text{III} < \text{II} < \text{I}$ (C) $\text{III} < \text{IV} < \text{II} < \text{I}$ (D) $\text{IV} < \text{III} < \text{I} < \text{II}$
- Q.40 On treatment of 10 ml of 1M solution of the complex $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ with excess of AgNO_3 , 4.305 g of AgCl was obtained. The complex is
 (A) $[\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$ (B) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
 (C) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ (D) $[\text{Cr}(\text{H}_2\text{O})_6\text{Cl}_3]$
- Q.41 Which of the following species is not expected to be a ligand
 (A) NO^+ (B) NH_4^+ (C) $\text{NH}_2-\text{NH}_3^+$ (D) CO
- Q.42 The number of donor sites in dimethyl glyoxime, glycinate, diethylene triamine and EDTA are respectively:
 (A) 2, 2, 3 and 4 (B) 2, 2, 3 and 6 (C) 2, 2, 2 and 6 (D) 2, 3, 3 and 6
- Q.43 EAN of the central metal in the complexes – $\text{K}_2[\text{Ni}(\text{CN})_4]$, $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ and $\text{K}_2[\text{PtCl}_6]$ are respectively.
 (A) 36, 35, 86 (B) 34, 35, 84 (C) 34, 35, 86 (D) 34, 36, 86
- Q.44 Which of the following pair of complexes have the same EAN of the central metal atoms/ions?
 (A) $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ and $\text{K}_3[\text{Fe}(\text{CN})_6]$ (B) $\text{K}_4[\text{Fe}(\text{CN})_6]$ and $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
 (C) $\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3]$ and $[\text{Cr}(\text{NH}_3)_6]\text{Cl}(\text{NO}_2)_2$ (D) all
- Q.45 The complex that violates the Sidgwick's rule of EAN is
 (A) Potassium ferrocyanide (B) Hexamine cobalt (III) Chloride
 (C) Tetramine copper (II) sulphate (D) Potassium dichlorodioxalato cobaltate (III)
- Q.46 The IUPAC name for the coordination compound $\text{Ba}[\text{BrF}_4]_2$ is
 (A) Barium tetrafluorobromate (V) (B) Barium tetrafluorobromate (III)
 (C) Barium bis (tetrafluorobromate) (III) (D) none of these

- Q.47 The formula of the complex hydridotrimethoxyborate (III) ion is:
 (A) $[\text{BH}(\text{OCH}_3)_3]^{2-}$ (B) $[\text{BH}_2(\text{OCH}_3)_3]^{2-}$ (C) $[\text{BH}(\text{OCH}_3)_3]^-$ (D) $[\text{BH}(\text{OCH}_3)_3]^+$
- Q.48 The complex ion which has no 'd' electrons in the central metal atom is:
 (A) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (B) $[\text{Fe}(\text{CN})_6]^{3-}$ (C) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ (D) $[\text{MnO}_4]^-$
- Q.49 Oxidation number of Fe in violet coloured complex $\text{Na}_4[\text{Fe}(\text{CN})_5(\text{NOS})]$ is:
 (A) 0 (B) 2 (C) 3 (D) 4
- Q.50 Complexes $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ and $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ can be distinguished by
 (A) conductance measurement (B) using BaCl_2
 (C) using AgNO_3 (D) all
- Q.51 Amongst the following ions, which one has the highest paramagnetism?
 (A) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ (B) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ (C) $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ (D) $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$
- Q.52 $\text{Ni}(\text{CO})_4$ and $[\text{Ni}(\text{NH}_3)_4]^{2+}$ do not differ in
 (A) magnetic moment (B) oxidation number of Ni
 (C) geometry (D) EAN
- Q.53 Which of the following statements is not correct?
 (A) $\text{Ti}(\text{NO}_3)_4$ is a colourless compound (B) $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$ is a coloured compound
 (C) $\text{K}_3[\text{VF}_6]$ is a colourless compound (D) $[\text{Cu}(\text{NCCH}_3)_4]\text{BF}_4$ is a colourless compound
- Q.54 The geometry of $\text{Ni}(\text{CO})_4$ and $[\text{Ni}(\text{PPh}_3)_2\text{Cl}_2]$ are
 (A) both square planar (B) tetrahedral and square planar
 (C) both tetrahedral (D) square planar and tetrahedral
- Q.55 Of the following which is diamagnetic in nature?
 (A) $[\text{CoF}_6]^{3+}$ (B) $[\text{NiCl}_4]^{2-}$ (C) $[\text{CuCl}_4]^{2-}$ (D) $[\text{Ni}(\text{CN})_4]^{2-}$
- Q.56 The $[\text{Fe}(\text{CN})_6]^{3-}$ complex ion
 (A) exhibits planar geometry (B) is diamagnetic
 (C) should be very stable (D) has 2 unpaired electrons
- Q.57 50 ml of 0.2 M solution of a compound with empirical formula $\text{CoCl}_3 \cdot 4\text{NH}_3$ on treatment with excess of $\text{AgNO}_3(\text{aq})$ yields 1.435 g of AgCl . Ammonia is not removed by treatment with concentrated H_2SO_4 . The formula of the compound is:
 (A) $\text{Co}(\text{NH}_3)_4\text{Cl}_3$ (B) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ (C) $[\text{Co}(\text{NH}_3)_4\text{Cl}_3]$ (D) $[\text{CoCl}_3(\text{NH}_3)]\text{NH}_3$
- Q.58 In the process of extraction of gold,
 $\text{Roasted gold ore} + \text{CN}^- + \text{H}_2\text{O} \xrightarrow{\text{O}_2} [\text{x}] + \text{OH}^-$; $[\text{x}] + \text{Zn} \longrightarrow [\text{y}] + \text{Au}$
 $[\text{x}]$ and $[\text{y}]$ are:
 (A) $[\text{x}] = [\text{Au}(\text{CN})_2]^-$, $[\text{y}] = [\text{Zn}(\text{CN})_4]^{2-}$ (B) $[\text{x}] = [\text{Au}(\text{CN})_4]^{3-}$, $[\text{y}] = [\text{Zn}(\text{CN})_4]^{2-}$
 (C) $[\text{x}] = [\text{Au}(\text{CN})_2]^-$, $[\text{y}] = [\text{Zn}(\text{CN})_6]^{4-}$ (D) $[\text{x}] = [\text{Au}(\text{CN})_4]^-$, $[\text{y}] = [\text{Zn}(\text{CN})_4]^{2-}$
- Q.59 Which of the following is non-conducting?
 (A) $\text{CoCl}_3 \cdot 6\text{NH}_3$ (B) $\text{CoCl}_3 \cdot 5\text{NH}_3$ (C) $\text{CoCl}_3 \cdot 4\text{NH}_3$ (D) $\text{CoCl}_3 \cdot 3\text{NH}_3$

- Q.60 Aqueous solution of FeSO_4 gives tests for both Fe^{2+} and SO_4^{2-} but after addition of excess of KCN, solution ceases to give test for Fe^{2+} . This is due to the formation of
 (A) the double salt $\text{FeSO}_4 \cdot 2\text{KCN} \cdot 6\text{H}_2\text{O}$ (B) $\text{Fe}(\text{CN})_3$
 (C) the complex ion $[\text{Fe}(\text{CN})_6]^{4-}$ (D) the complex ion $[\text{Fe}(\text{CN})_6]^{3-}$
- Q.61 Which of the following statement(s) is/are correct with reference to Fe^{2+} and Fe^{3+} ions?
 (1) Fe^{3+} gives brown colour with potassium ferricyanide
 (2) Fe^{2+} gives blue colour with potassium ferricyanide
 (3) Fe^{3+} gives red colour with potassium thiocyanate
 (4) Fe^{2+} gives brown colour with ammonium thiocyanate
 (A) 1, 2 (B) 1, 4 (C) 1, 2, 3 (D) all of these
- Q.62 The number of sigma bonds in Ziese's salt is:
 (A) 4 (B) 6 (C) 8 (D) none of these
- Q.63 The disodium salt of ethylene diamine tetracetic acid can be used to estimate the following ion(s) in the aqueous solution
 (A) Mg^{2+} ion (B) Ca^{2+} ion (C) Na^+ ion (D) both Mg^{2+} and Ca^{2+}
- Q.64 The oxidation number of Co in the complex ion $[(\text{en})_2\text{Co} \begin{smallmatrix} \text{NH} \\ \text{OH} \end{smallmatrix} \text{Co}(\text{en})_2]^{3+}$
 (A) +2 (B) +3 (C) +4 (D) +6
- Q.65 $[\text{Cu}(\text{NH}_3)_4]^{2+}$ has hybridisation and magnetic moment
 (A) sp^3 , 1.73 B.M. (B) sp^3d , 1.73 B.M. (C) dsp^2 , 2.83 B.M. (D) dsp^2 , 1.73 B.M.
- Q.66 $[\text{FeF}_6]^{3-}$ has Fe atom ---hybridised with unpaired ---electrons
 (A) d^2sp^3 , 4 (B) d^2sp^3 , 5 (C) sp^3d^2 , 5 (D) sp^3d^2 , 3
- Q.67 Which of the following statements about $\text{Fe}(\text{CO})_5$ is correct?
 (A) It is paramagnetic and high spin complex (B) It is diamagnetic and high spin complex
 (C) It is diamagnetic and low spin complex (D) It is paramagnetic and low spin complex
- Q.68 Which of the following statements is not true?
 (A) MnCl_4^- ion has tetrahedral geometry and is paramagnetic
 (B) $[\text{Mn}(\text{CN})_6]^{2-}$ ion has octahedral geometry and is paramagnetic
 (C) $[\text{CuCl}_4]^{2-}$ has square planar geometry and is paramagnetic
 (D) $[\text{Ni}(\text{Ph}_3\text{P})_2\text{Br}_3]$ has trigonal bipyramidal geometry and one unpaired electron
- Q.69 The increasing order of magnetism of
 (I) $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$ (II) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (III) $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$ (IV) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
 (A) I < II < III < IV (B) IV < III < II < I (C) III < IV < II < I (D) III < IV < I < II
- Q.70 Which of the following statements is correct?
 (A) Geometrical isomerism is not observed in complexes of C.N.4 having tetrahedral geometry
 (B) Square planar complexes generally do not show geometrical isomerism
 (C) The square planar complex of general formulae Ma_3b or Mab_3 exhibits cis-trans isomerism
 (D) The platinum glycinate complex, $[\text{Pt}(\text{Gly})_2]$ does not show geometrical isomerism

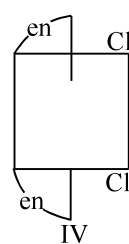
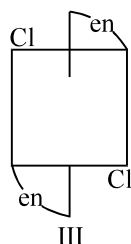
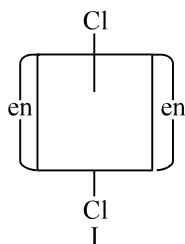
- Q.71 Geometrical isomerism can be shown by
 (A) $[\text{Ag}(\text{NH}_3)(\text{CN})]$ (B) $\text{Na}_2[\text{Cd}(\text{NO}_2)_4]$ (C) $[\text{PtCl}_4\text{I}_2]$ (D) $[\text{Pt}(\text{NH}_3)_3\text{Cl}][\text{Au}(\text{CN})_4]$
- Q.72 $[\text{Co}(\text{en})_3]^{3+}$ ion is expected to show
 (A) two optically active isomers: d and l forms
 (B) three optically active isomers: d, l and meso forms
 (C) four optically active isomers: cis, d and l isomers and trans d and l isomers
 (D) none of these
- Q.73 The number of geometrical isomers for octahedral $[\text{Co}(\text{NH}_3)_2\text{Cl}_4]^-$, square planar $[\text{AuCl}_2\text{Br}_2]^-$ and $[\text{Pt}(\text{en})\text{Cl}_2]$ are
 (A) 2, 2, 2 (B) 2, 2, no isomerism (C) 3, 2, 2 (D) 2, 3, no isomerism
- Q.74 Which of the following statements is not true about the complex ion $[\text{Cr}(\text{en})_2\text{Cl}_2]^+$
 (A) It has two geometrical isomers – cis and trans
 (B) Both the cis and trans isomers display optical activity
 (C) Only the cis isomer displays optical activity
 (D) Only the cis isomer has non-superimposable mirror image

- Q.75 Of the following configurations, the optical isomers are



- (A) I and II (B) I and III (C) II and IV (D) II and III

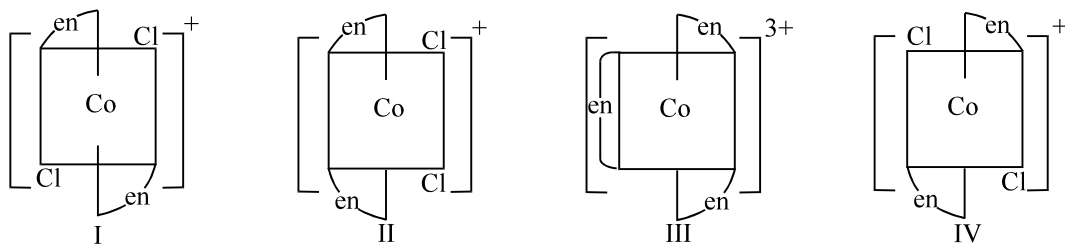
- Q.76 Identify the geometrical isomers of the following:



- (A) I with III (B) II with IV (C) I with II and IV (D) none of these

- Q.77 Other than the X-ray diffractions, how could be the following pairs of isomers be distinguished from one another by
 $[\text{Cr}(\text{NH}_3)_6]$ $[\text{Cr}(\text{NO}_2)_6]$ and $[\text{Cr}(\text{NH}_3)_4(\text{NO}_2)_2]$ $[\text{Cr}(\text{NH}_3)_2(\text{NO}_2)_4]$
 (A) electrolysis of an aqueous solution (B) measurement of molar conductance
 (C) measuring magnetic moments (D) observing their colours
- Q.78 How the isomeric complexes $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{NO}_2)_6]$ and $[\text{Cr}(\text{NH}_3)_6][\text{Co}(\text{NO}_2)_6]$ can be distinguished from one another by
 (A) conductivity measurement (B) measuring magnetic moments
 (C) electrolysis of their aqueous solutions (D) optical measurement

Q.79 Which of the following ions are optically active?



- (A) I only (B) II only (C) II and III (D) IV only

Q.80 Which of the following polymerisation isomers of the compound having empirical formula $\text{Cr}(\text{NH}_3)_3(\text{NO}_2)_3$ has the lowest molecular mass?

- (A) $[\text{Cr}(\text{NH}_3)_4(\text{NO}_2)_2]^+ [\text{Cr}(\text{NH}_3)_2(\text{NO}_2)_4]^-$ (B) $[\text{Cr}(\text{NH}_3)_6]^{3+} [\text{Cr}(\text{NO}_2)_6]^{3-}$
 (C) $[\text{Cr}(\text{NH}_3)_5(\text{NO}_2)]^{2+} [\text{Cr}(\text{NH}_3)(\text{NO}_2)_5]^{2-}$ (D) all

Q.81 Octahedral complex of Ni(II) must be

- (A) inner orbital
 (B) outer orbital
 (C) inner or outer orbital depending upon the strong or weak field ligand
 (D) none of these

Q.82 For the correct assignment of electronic configuration of a complex, the valence bond theory often requires the measurement of

- (A) molar conductance (B) optical activity (C) magnetic moment (D) dipole moment

Q.83 Mn^{2+} forms a complex with Br^- ion. The magnetic moment of the complex is 5.92 B.M. What could not be the probable formula and geometry of the complex?

- (A) $[\text{MnBr}_6]^{4-}$, octahedral (B) $[\text{MnBr}_4]^{2-}$, square planar
 (C) $[\text{MnBr}_4]^{2-}$, tetrahedral (D) $[\text{MnBr}_5]^{3-}$, trigonal bipyramidal

Q.84 How many isomers are possible for the complex ion $[\text{Cr}(\text{NH}_3)(\text{OH})_2\text{Cl}_3]^{2-}$

- (A) 2 (B) 3 (C) 4 (D) 5

Q.85 A complex of certain metal has the magnetic moment of 4.91 BM whereas another complex of the same metal with same oxidation state has zero magnetic moment. The metal ion could be

- (A) Co^{2+} (B) Mn^{2+} (C) Fe^{2+} (D) Fe^{3+}

Q.86 The tetrahedral $[\text{CoI}_4]^{2-}$ and square planar $[\text{PdBr}_4]^{2-}$ complex ions are respectively

- (A) low spin, high spin (B) high spin, low spin (C) both low spin (D) both high spin

Q.87 Ethylenediaminetetraacetic acid (EDTA) is the antidote for lead poisoning. It is administered in the form of

- (A) free acid (B) sodium dihydrogen salt
 (C) Calcium dihydrogen salt (D) none of these

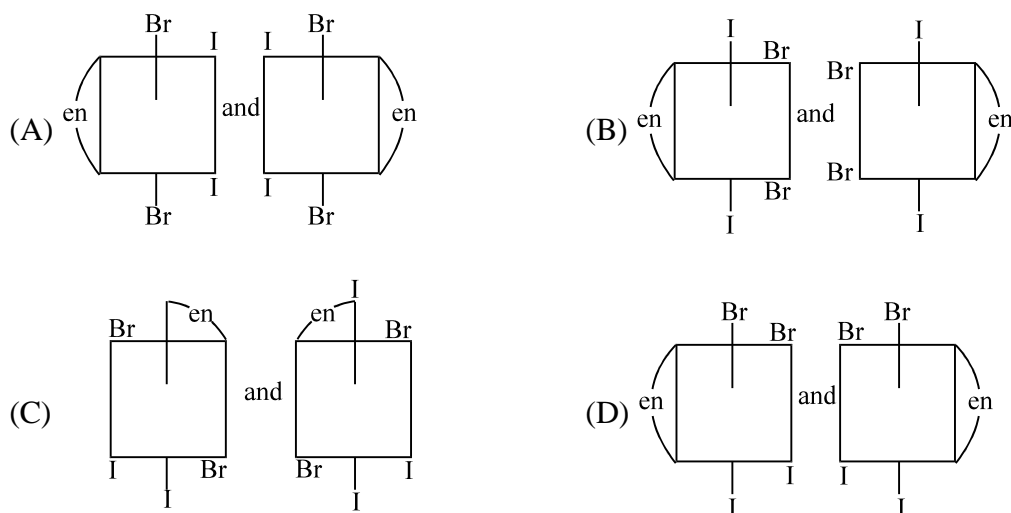
Q.88 The species having tetrahedral shape is

- (A) $[\text{PdCl}_4]^{2-}$ (B) $[\text{Ni}(\text{CN})_4]^{2-}$ (C) $[\text{Pd}(\text{CN})_4]^{2-}$ (D) $[\text{NiCl}_4]^{2-}$

Q.89 Which one of the following species does not represent cationic species of vanadium formed in aqueous solution

- (A) VO_2^+ (B) VO^{2+} (C) $[\text{V}(\text{H}_2\text{O})_6]^{3+}$ (D) VO_2^{2+}

Q.90 The complex ion has two optical isomers. Their correct configurations are:



Q.91 The EAN of metal atoms in $\text{Fe}(\text{NO})_2(\text{CO})_2$ and $\text{Co}_2(\text{CO})_8$ respectively are
(A) 34, 35 (B) 34, 36 (C) 36, 36 (D) 36, 35

Q.92 Following Sidgwick's rule of EAN, $\text{Co}(\text{CO})_x$ will be
(A) $\text{Co}_2(\text{CO})_4$ (B) $\text{Co}_2(\text{CO})_3$ (C) $\text{Co}_2(\text{CO})_8$ (D) $\text{Co}_2(\text{CO})_{10}$

Q.93 On treatment of $[\text{Ni}(\text{NH}_3)_4]^{2+}$ with concentrated HCl, two compounds I and II having the same formula, $\text{Ni}(\text{NH}_3)_2\text{Cl}_2$ are obtained, I can be converted into II by boiling with dilute HCl. A solution of I reacts with oxalic acid to form $[\text{Ni}(\text{NH}_3)_2(\text{C}_2\text{O}_4)]$ whereas II does not react. Point out the correct statement of the following
(A) I cis, II trans; both tetrahedral (B) I cis, II trans; both square planar
(C) I trans, II cis; both tetrahedral (D) I trans, II cis; both square planar

Q.94 Coordination isomerism could be shown by
(A) $[\text{Ag}(\text{NH}_3)_2][\text{CuCl}_2]$ (B) $[\text{Al}(\text{H}_2\text{O})_6][\text{Co}(\text{CN})_6]$
(C) $[\text{Fe}(\text{NH}_3)_6]_2[\text{Pt}(\text{CN})_6]_3$ (D) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$

Q.95 Point out the correct statements amongst the following
(A) $[\text{Cu}(\text{CN})_4]^{3-}$ has tetrahedral geometry and dsp^2 hybridization
(B) $[\text{Ni}(\text{CN})_6]^{4-}$ is octahedral and Ni has d^2sp^3 hybridization
(C) $[\text{ZnBr}_4]^{2-}$ is tetrahedral and diamagnetic
(D) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ has octahedral geometry and sp^3d^2 hybridization

Q.96 Among the following ions which one has the highest paramagnetism
(A) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ (B) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ (C) $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ (D) $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$

Q.97 Among the following, the compound that is both paramagnetic and coloured is
(A) $\text{K}_2\text{Cr}_2\text{O}_7$ (B) $(\text{NH}_4)_2[\text{TiCl}_6]$ (C) VOSO_4 (D) $\text{K}_3[\text{Cu}(\text{CN})_4]$

Q.98 Which of the following compounds is expected to be coloured
(A) Ag_2SO_4 (B) CuF_2 (C) MgF_2 (D) CuCl

Q.99 Which compound is formed when excess of KCN is added to aqueous solution of copper sulphate?
(A) $\text{Cu}(\text{CN})_2$ (B) $\text{K}_2[\text{Cu}(\text{CN})_4]$ (C) $\text{K}[\text{Cu}(\text{CN})_2]$ (D) $\text{K}_3[\text{Cu}(\text{CN})_4]$

Q.100 Which of the following complex shows ionization isomerism
(A) $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$ (B) $[\text{Cr}(\text{en})_2]\text{Cl}_2$ (C) $[\text{Cr}(\text{en})_3]\text{Cl}_3$ (D) $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$

ANSWER KEY

Q.1 D	Q.2 B	Q.3 C	Q.4 C
Q.5 D	Q.6 B	Q.7 B	Q.8 C
Q.9 B	Q.10 B	Q.11 B	Q.12 D
Q.13 A	Q.14 C	Q.15 C	Q.16 C
Q.17 C	Q.18 C	Q.19 B	Q.20 A
Q.21 C	Q.22 D	Q.23 D	Q.24 B
Q.25 C	Q.26 C	Q.27 A	Q.28 D
Q.29 B	Q.30 B	Q.31 D	Q.32 B
Q.33 B	Q.34 D	Q.35 A	Q.36 C
Q.37 C	Q.38 B	Q.39 B	Q.40 D
Q.41 B	Q.42 B	Q.43 C	Q.44 D
Q.45 C	Q.46 B	Q.47 C	Q.48 D
Q.49 B	Q.50 D	Q.51 B	Q.52 A
Q.53 C	Q.54 C	Q.55 D	Q.56 C
Q.57 B	Q.58 A	Q.59 D	Q.60 C
Q.61 C	Q.62 C	Q.63 D	Q.64 B
Q.65 D	Q.66 C	Q.67 C	Q.68 C
Q.69 B	Q.70 A	Q.71 C	Q.72 A
Q.73 B	Q.74 B	Q.75 C	Q.76 C
Q.77 B	Q.78 C	Q.79 C	Q.80 D
Q.81 B	Q.82 C	Q.83 B	Q.84 B
Q.85 C	Q.86 B	Q.87 C	Q.88 D
Q.89 D	Q.90 D	Q.91 C	Q.92 C
Q.93 B	Q.94 A, B	Q.95 C	Q.96 B
Q.97 C	Q.98 B	Q.99 D	Q.100 D