COORDINATION COMPOUND

EXERCISE

1. The correct IUPAC name of $[Pt(NH_3)_2Cl_2]$ is
(1) Diamminedichloridoplatinum (II)
(2) Diamminedichloridoplatinum (IV)
(3) Diamminedichloridoplatinum (0)
(4) Dichloridodiammineplatinum (IV)

2. When $CrCl_3.6H_2O$ is treated with excess of $AgNO_3$, 3 Mol of AgCl are obtained. The formula of the complex is:
(1) $[CrCl_3(H_2O)_3] \cdot 3H_2O$
(2) $[CrCl_2(H_2O)_4]Cl \cdot 2H_2O$
(3) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$
(4) $[Cr(H_2O)_6]Cl_3$

3. Indicate the complex ion which shows geometrical isomerism.
(1) $[Cr(H_2O)_4Cl_2]^+$ (2) $[Pt(NH_3)_3Cl]$
(3) $[Co(NH_3)_6]^{+3}$ (4) $[Co(CN)_5(NC)]^{-3}$

4. Which of the following option is correct for $K_4[Fe(CN)_6]$ complex?
(1) d^2sp^3 Hybridisation, diamagnetic
(2) sp^3d^2 Hybridisation
(3) Paramagnetic
(4) None of these

5. Which of the following complex formed by Cu^{+2} ions is most stable?
(1) $Cu^{+2} + 4NH_3 \longrightarrow [Cu(NH_3)_4]^{+2}$
(2) $Cu^{+2} + 4CN^- \longrightarrow [Cu(CN)_4]^{-2}$
(3) $Cu^{+2} + 2en \longrightarrow [Cu(en)_2]^{+2}$
(4) $Cu^{+2} + 4H_2O \longrightarrow [Cu(H_2O)_4]^{+2}$

6. The compounds $[Co(SO_4)(NH_3)_5]Br$ and $[Co(SO_4)(NH_3)_5]Cl$ represent :-
(1) Linkage isomerism
(2) Ionisation isomerism
(3) Coordination isomerism
(4) no isomerism

7. Which of the following species is not expected to be a ligand?
(1) NO
(2) NH_4^+
(3) $H_2N - CH_2 - CH_2 - NH_2$
(4) CO

8. Which complex is optically active?
(1) $[Co(en)_3]^{+3}$
(2) trans – $[Co(en)_2Cl_2]^+$
(3) Cis – $[Co(en)_2Cl_2]^+$
(4) (1) and (3) both

9. Geometrical shapes of the complexes formed by the reaction of Ni^{+2} with Cl^-, CN^- and H_2O respectively are.
(1) Octahedral, tetrahedral and sq. planar
(2) Tetrahedral. sq. planar and octahedral
(3) Square planar, tetrahedral and octahedral
(4) Octahedral, tetrahedral and square pyrimidal

10. How many EDTA molecules are requried to make an octahedral complex with a Ca^{+2} ion?
(1) 1 (2) 3 (3) 4 (4) 2

11. For the given complex $[Co(en)_2(NH_3)_2]^{+3}$, the number of geometrical isomers, optical isomers and total number of isomers of all type possible respectively are :
(1) 2, 2, 4 (2) 2, 2, 3 (3) 2, 0, 2 (4) 0, 2, 2

12. The value of effective atomic number of Cr in $[Cr(NH_3)_6]Cl_3$ is
(1) 35 (2) 27 (3) 33 (4) 36

13. A complex has a composition corresponding to the formula $CoBr_2Cl.4NH_3$. What is the structural formula if conductance measurements show two ions per formula unit ? Silver nitrate solution given an immediate precipitate of AgCl but no AgBr :-
(1) $[CoBrCl(NH_3)_4]Br$ (2) $[CoCl(NH_3)_4]Br_2$
(3) $[CoBr_2Cl(NH_3)_4]$ (4) $[CoBr_2(NH_3)_4]Cl$

14. How many ions are produced from the complex, $[Co(NH_3)_6]Cl_2$?
(1) 6 (2) 4 (3) 3 (4) 2

15. Ziegler - Naata catalyst is an organometalic compound of metal?
(1) Fe (2) Zr (3) Rh (4) Ti

16. Which of the following is π-acid ligand?
(1) NH_3 (2) CO (3) F^- (4) (en)

17. In Cu-ammonia complex the state of hybridization of Cu^{+2} is
(1) sp^3 (2) spd^2 (3) sp^3d^2 (4) dsp^2

18. The value of n in the carbonyl is
$(CO)_n - Co - Co - (CO)_n$
(1) 4 (2) 5 (3) 6 (4) 8

19. Which of the following doesn't follow effective atomic number rule?
(1) $[Cu(NH_3)_4]^{+2}$ (2) $[Zn(OH)_4]^{-2}$
(3) $[HgI_4]^{2-}$ (4) $Fe(CO)_5$

20. Which complex has highest paramagnetism?
(1) $[Cr(H_2O)_6]^{+3}$ (2) $[Fe(H_2O)_6]^{+2}$
(3) $[Cu(H_2O)_6]^{+2}$ (4) $[Zn(H_2O)_6]^{+2}$

21. Same number of unpaired electron is observed in which of the following complexes
(a) $[MnCl_6]^{3-}$ (b) $[Fe(CN)_6]^{3-}$
(c) $[CoF_6]^{3-}$ (d) $[Ni(NH_3)_6]^{2+}$
(1) a and b (2) a & c
(3) b & d (4) c & d

22. Which of the following statement is correct about ethane 1,2 diamine?
(1) It is a neutral ligand
(2) It is a bidentate ligand
(3) It is a chelating ligand
(4) All of the above

23. Which is correctly matched

Compound	Total stereoisomer
(1) $[Co(en)_3]Cl_3$	3
(2) $[Co(en)_2Cl_2]Cl$	2
(3) $[Co(NH_3)_3Cl_3]$	2
(4) $[Pt(NH_3)_2Cl_2]$	3

24. Which of the following complex species is not expected to exhibit optical isomerism
(1) $[Co(en)(NH_3)_2Cl_2]^+$
(2) $[Co(en)_3]^{+3}$
(3) $[Co(en)_2Cl_2]^+$
(4) $[Co(NH_3)_3Cl_3]$

25. When excess of ammonia is added to $CuSO_4$ solution. The deep blue colour complex is formed. The complex is
(1) Tetrahedral & paramagnetic
(2) Tetrahedral & diamagnetic
(3) Square planar & diamagnetic
(4) Square planar & paramagnetic

26. IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$ is
(1) Platinum diamminechloronitrite
(2) Chloronitrito-N-ammineplatinum(II)
(3) Diammine chloridonitrito-N-Platinum(II)
(4) Diamminechloronitrito-N-Platinum(II)

27. Which of the following have maximum number of isomers
(1) $[Co(NH_3)_4Cl_2]^+$ (2) $[Ni(en)(NH_3)_4]^{+2}$
(3) $[Ni(C_2O_4)(en)_2]^0$ (4) $[Cr(SCN)_2(NH_3)_4]^+$

28. Which among the following can exhibit cis-trans isomerism
(1) $CoCl_3.4NH_3$ (2) $CoCl_3.6NH_3$
(3) $CoCl_3.5NH_3$ (4) All of these

29. Out of the following coordination entities which is chiral (optically active)
(1) $[Cr(H_2O)_6]^{3+}$
(2) trans-$[CrCl_2(OX)_2]^{3-}$
(3) cis-$[CrCl_2(NH_3)_4]^+$
(4) cis-$[CrCl_2(OX)_2]^{3-}$

30. Amongst the following the most stable compound is
(1) $[Fe(H_2O)_6]^{3+}$ (2) $[Fe(C_2O_4)_3]^{3-}$
(3) $[Fe(NH_3)_6]^{3+}$ (4) $[FeCl_6]^{3-}$

31. Which of the following is an organometallic compound
(1) cis-platin (2) Zeise salt
(3) Tollen's reagent (4) Sodium nitroprusside

32. Which of the following system has maximum value of μ (only spin magnetic moment)?
(1) d^5 ($\Delta_0 > P$) (2) d^8 (tetrahedral)
(3) d^6 (high spin) (4) d^9 (octahedral)

33. The IUPAC name for $[Pt(NH_3)_3(Br)(NO_2)Cl]Cl$ is
(1) Triamminechlorobromonitroplatinum(IV) chloride
(2) Triamminebromochloronitroplatinum(IV) chloride
(3) Triamminechlorobromoplatinum(IV) chloride
(4) Triamminechloronitrobromoplatinum(IV) chloride

34. Which of the following cannot act as an electrolyte
(1) $CoCl_3.6NH_3$ (2) $CoCl_3.5NH_3$
(3) $CoCl_3.4NH_3$ (4) $CoCl_3.3NH_3$

35. In brown ring complex, the oxidation state of iron will be
(1) +2 (2) +3 (3) +1 (4) 0

36. Hexafluoroferrate(III) ion is an outer orbital complex the number of unpaired electrons present in it is
(1) 1 (2) 5
(3) 4 (4) unpredictable

37. Formula of Tris (ethylendiamine) cobalt (III)
(1) $[Co(en)_3]SO_4$ (2) $[Co(en)_3]_2(SO_4)_3$
(3) $[Co(en)_3SO_4]$ (4) $[Co(en)_2]SO_4$

38. Which of the following species can act as reducing agent ?
(1) $[Co(CO)_4]^-$ (2) $Mn(CO)_6$
(3) $Mn(CO)_5$ (4) $Cr(CO)_6$

39. The geometry of $[Ni(CO)_4]$ and $[Ni(PPh_3)_2Cl_2]$ are
(1) both are square planar
(2) tetrahedral and square planar
(3) both tetrahedral
(4) square planar and tetrahedral

40. Geometrical isomerism can be shown by
(1) $[Ag(CN)(NH_3)]$
(2) $Na_2[Cd(NO_2)_4]$
(3) $[PtCl_4I_2]^{-2}$
(4) $[PtCl(NH_3)_3][Au(CN)_4]$

41. Which of the following will give a pair of enantiomorphs
(1) $[Cr(NH_3)_6][Co(CN)_6]$
(2) $[Co(en)_2Cl_2]Cl$
(3) $[Pt(NH_3)_4][PtCl_6]$
(4) $[Co(NH_3)_4Cl_2]NO_2$

42. Which of the metals has most stable carbonate
(1) Na (2) Mg (3) Al (4) Si

43. Spin only magnetic moments of a d^8 ion in an octahedral, square planar and tetrahedral complex, respectively are
(1) 2.8 BM, 0.4 B.M., 2.8 BM
(2) 2.8 BM, 0 BM, 2.8 BM
(3) 0, 0 & 0 B.M.
(4) None of these

44. Among the following the colored compound is
(1) CuCl (2) $K_3[Cu(CN)_4]$
(3) CuF_2 (4) $[Cu(CH_3–CN)_4]BF_4$

45. $[NiCl_4]^{-2}$ and $[Ni(CN)_4]^{-2}$ resemble in
(1) geometry (2) magnetic nature
(3) hybridisation (4) oxidation state

46. CFSE of high spin d^4 complex is
(1) $-0.6\ \Delta_0$ (2) $-1.8\ \Delta_0$
(3) $-1.6\ \Delta_0 + P$ (4) $-1.2\ \Delta_0$

47. Total number of possible isomers of complex $[Pd(NH_3)_2(SCN)_2]$
(1) 2 (2) 4 (3) 3 (4) 6

48. Which of the following will have three stereoisomeric forms :-
(i) $[Cr(NO_3)_3(NH_3)_3]$ (ii) $K_3[Co(C_2O_4)_3]$
(iii) $K_3\ [CoCl_2(C_2O_4)_2]$ (iv) $[Co\ BrCl(en)_2]$
(1) iii, iv (2) i, ii and iv
(3) Only iv (4) All

49. The IUPAC name for ionisation isomers of $[Pt(NH_3)_3(Br)(NO_2)(I)]$ Cl is
(1) Triamminebromidochloridonitro platinum (IV) iodide
(2) Triamminebromidochloridoiodido platinum(IV) nitrite
(3) Triamminechloridoiodidonitro platinum (IV) bromide
(4) All are possible

50. Which ion would you expect to have the maximum splitting of d-orbitals
(1) $[Fe(CN)_6]^{-4}$ (2) $[Fe(CN)_6]^{-3}$
(3) $[Fe(H_2O)_6]^{+2}$ (4) $[Fe(H_2O)_6]^{+3}$

51. Indicate the complex ion which shows geometrical isomerism
(1) $[Cr(H_2O)_4Cl_2]^+$ (2) $[Pt(NH_3)_3Cl]^+$
(3) $[Co(NH_3)_6]^{3+}$ (4) $[Co(CN)_5(NC)]^{3-}$

52.

Compound	**Total stereoisomer**
(A) $[Co(en)_2\ Cl_2]^+$	(P) 2
(B) $[Co(en)_3]\ Cl_3$	(Q) 3
(C) $[Pt(NH_3)_2\ Cl_2]$	(R) 4
(D) $[Pt(NH_3)_3\ Cl_3]^+$	(S) 5

Correct code :-
(1) A = R, B = P, C =R, D = R
(2) A = Q, B = P, C = P, D = P
(3) A = P, B = R, C = P, D = P
(4) A = Q' B = Q, C = P, D = P

53. A brown ring is formed in the ring test of NO_3^- ion. It is due to the formation of
(1) $[Fe(H_2O)_5(NO)]^{2+}$ (2) $FeSO_4.NO_2$
(3) $[Fe(H_2O)_4(NO)_2]^{2+}$ (4) $FeSO_4.HNO_3$

54. The correct formula of diammine dichlorodicyano chromate(III) is :-
(1) $[CrCl_2(CN)_2(NH_3)_2]^{3+}$
(2) $[CrCl_2(CN)_2(NH_3)_2]^{3-}$
(3) $[CrCl_2(CN)_2(NH_3)_2]$
(4) $[CrCl_2(CN)_2(NH_3)_2]^-$

55. Select the correct order of E.A.N:

(1) $[Cr(CO)_6] > [Cr(CO)_6]^{\ominus} > [Cr(CO)_6]^{\oplus}$

(2) $[Cr(CO)_6]^{+} > [Cr(CO)_6]^{\ominus} > [Cr(CO)_6]$

(3) $[Cr(CO)_6]^{\ominus} > [Cr(CO)_6] > [Cr(CO)_6]^{\oplus}$

(4) $[Cr(CO)_6]^{\ominus} = [Cr(CO)_6] > [Cr(CO)_6]^{+}$

56. Select the correct I.U.P.A.C. name for $[Cr(C_6H_6)(CO)_3]$.

(1) (η^6-benzene) tricarbonylchromate (0)

(2) Tricarbonyl (η^6-benzene) chromate (0)

(3) Tricarbonyl (η^6-benzene) chrominum (0)

(4) (η^6-benzene) tricarbonylchromium (0)

57. Zeise's salt is:

(1) $Fe(\eta^5 - C_5H_5)_2$ (2) $Cr(\eta^6 - C_6H_6)_2$

(3) $K[Pt(\eta^2 - C_2H_4)Cl_3]$ (4) $K[Pt(\eta^2 - C_2H_4)_2Cl_2]$

58. Coordination number of calcium is six in :

(1) $[Ca(EDTA)]^{2-}$ (2) CaC_2O_4

(3) $[Ca(C_2O_4)_2]^{2-}$ (4) $CaSO_4.2H_2O$

59. Hybridization, shape, and magnetic moment of $K_3[Co(CO_3)_3]$ are:

(1) d^2sp^3, octahedral, 4.9 B.M.

(2) sp^3d^2, octahedral, 4.9 B.M.

(3) dsp^2, square planar, 4.9 B.M.

(4) sp^3, tetrahedral, 4.9 B.M.

60. Consider the following complexes :-

(a) K_2PtCl_6 (b) $PtCl_4.2NH_3$

(c) $PtCl_4.3NH_3$ (d) $PtCl_4.5NH_3$

Their electrical conductance in aqueous solutions are :-

(1) 404, 0, 97, 256 (2) 256, 97, 0, 404

(3) 404, 97, 256, 0 (4) 256, 0, 97, 404

61. The number of σ and π - bonds in $Fe_2(CO)_9$, respectively are:

(1) 22σ and 15π (2) 23σ and 15π

(3) 22σ and 16π (4) 15σ and 8π

62. Which of the following statement is correct?

(1) With d^2sp^3 hybridization $[FeCl(CN)_4(O_2)]^{4-}$ complex is diamagnetic

(2) $[NiCl_4]^{2-}$ complex is more stable than $[Ni(dmg)_2]$

(3) $[V(CO)_6]$ is not very stable and easily reduces to $[V(CO)_6]^{-}$

(4) Ligands such as CO, CN^{-}, NO^{+} are pie– donar due to the presence of filled p-molecular orbital

63. In the complex $[Pt(O_2)(en)_2(Br)]^{2+}$, coordination number and oxidation number of platinum are:

(1) 4, 3 (2) 4, 5 (3) 6, 2 (4) 6, 4

64. If $H_x[Pt\ y_6]$, y is a monodentate negatively charged ligand then find out the value of x:

(1) 5 (2) 3

(3) 6 (4) None of these

65. The bond length of C—O bond in CO is 1.128 Å. The C—O bond length in $[Fe(CO_5)]$ is :

(1) 1.115 Å (2) 1.128 Å

(3) 1.178 Å (4) 1.150 Å

66. The most stable ion is:

(1) $[Fe(C_2O_4)_3]^{3-}$ (2) $[Fe\ Cl_6]^{3-}$

(3) $[Fe(SCN)_6]^{3-}$ (4) $[Fe(H_2O)_6]^{3+}$

67. The increasing order of the crystal field splitting power of some common ligands is :

(1) $H_2O < NO_2^{-} < \overset{\ominus}{C}N < NH_3$

(2) $NH_3 < NO_2^{-} < \overset{\ominus}{C}N < H_2O$

(3) $H_2O < NH_3 < NO_2^{-} < \overset{\ominus}{C}N$

(4) $H_2O < NH_3 < \overset{\ominus}{C}N < NO_2$

68. Which of the following does not have optical isomers?

(1) $[Co(en)_3]Cl_3$

(2) $[Co(NH_3)_3Cl_3]$

(3) $[Co(en)(NH_3)_2Cl_2]Cl$

(4) None

69. Mg is an important component of which biomolecule occurring extensively in living world?

(1) Hemoglobin (2) Chlorophyll

(3) Vit B_{12} (4) ATP

70. The hybridization and geometry of $[Fe(CO)_4]^{2-}$ are:

(1) sp^3d,TBP (2) sp^3,tetrahedral

(3) dsp^2,square planar (4) sp^3,TBP

71. Which of the following organometallic compound is σ and π-bonded?

(1) $[Fe(\eta^5 - C_5H_5)_2]$ (2) $K[PtCl_3(\eta^2–C_2H_4)]$

(3) $[Co(CO)_5\ NH_3]^{2+}$ (4) $Fe(CH_3)_3$

72. Which of the following reagent is used for test of Ni ?
(1) Pot. ferrocynaide
(2) Dimethyl glyoxime
(3) EDTA
(4) Sod. nitroprusside

73. According to crystal field theory, octahedral splitting and tetrahedral splitting of d orbitals caused by the same ligands are related through the expression:
(1) $\Delta_o = \Delta_t$ (2) $4\Delta_o = 9\Delta_t$
(3) $9\Delta_o = 4\Delta_t$ (4) $\Delta_o = 2\Delta_t$

74. Which of the following will show optical isomerism?
(1) $[Cu(NH_3)_4]^{2+}$ (2) $[ZnCl_4]^{2-}$
(3) $[Cr(C_2O_4)_3]^{3-}$ (4) $[Co(CN)_6]^{3-}$

75. $[Cr(H_2O)_6]Cl_3$ (atomic number of Cr = 24) has a magnetic moment of 3.83 B.M. the correct distribution of 3d-electrons in the chromium present in the complex is:
(1) $3d^1_{xy}, 3d^1_{yz}, 3d^1_{zx}$ (2) $3d^1_{xy}, 3d^1_{yz}, 3d^1_{z^2}$
(3) $3d^1_{(x^2-y^2)}, 3d^1_{z^2}, 3d^1_{zx}$ (4) $3d^1_{xy}, 3d^1_{(x^2-y^2)}, 3d^1_{xz}$

76. The total number of coordination isomer for the given compound $[Pt(NH_3)_4Cl_2][PtCl_4]$ is:
(1) 2 (2) 4 (3) 5 (4) 3

77. Pick a poor electrolytic conductor complex in solution.
(1) $K_2[PtCl_6]$ (2) $[Co(NH_3)_3](NO_2)_3$
(3) $K_4[Fe(CN)_6]$ (4) $[Co(NH_3)_4]SO_4$

78. $CuSO_4$ solution reacts with excess of KCN solution to form:
(1) $Cu(CN)_2$ (2) $K_2[Cu(CN)_4]$
(3) $K_3[Cu(CN)_4]$ (4) $K[Cu(CN)_2]$

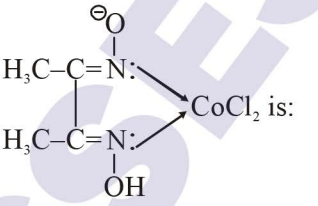
79. The number of ions formed on dissolving one molecule of $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$ in water is:
(1) 4 (2) 5 (3) 3 (4) 6

80. NH_2–NH_2 may serves as:
(1) monodenatate ligand
(2) chelating ligand
(3) Flexidentate ligand
(4) both (1) and (3)

81. EDTA is a.....ligand :
(1) monodenatate (2) hexadentate
(3) bidentate (4) tridentate

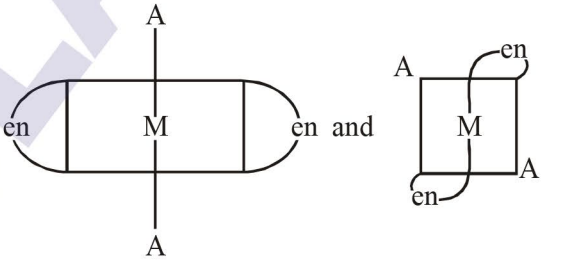
82. In solid $CuSO_4 \cdot 5H_2O$ copper is co-ordinated to :
(1) 4 water molecules
(2) 5 water molecules
(3) one sulphate molecule
(4) one water molecule

83. The correct IUPAC name of the complex:



(1) dichloridodimethylglyoximatocobalt (II)
(2) bis(dimethylglyoxime) dichlorido cobalt (II)
(3) dimethylglyoximecobalt (II) chloride
(4) dichloridodimethylglyoxime-N,N-cobalt (II)

84. The two complexes given below are:



(1) geometrical isomers (2) ionisation
(3) optical isomers (4) identical

85. Among $[Ni(CN)_4]^{2-}$, $[NiCl_4]^{2-}$ and $[Ni(CO)_4]$:
(1) $[NiCN)_4]^{2-}$ is square planar and $[NiCl_4]^{2-}$ and $[Ni(CO)_4]$ are tetrahedral
(2) $[NiCl_4]^{2-}$ is square planar and $[Ni(CN)_4]^{2-}$ and $[Ni(CO)_4]$ are tetrahedral
(3) $[Ni(CO)_4]$ is square planar and $[Ni(CN)_4]^{2-}$ and $[NiCl_4]^{2-}$ are tetrahedral
(4) None of these

86. Which one is the most likely structure of $CrCl_3 \cdot 6H_2O$ if 1/3 of total chlorine of the compound is percipitated by adding $AgNO_3$ to its aqueous solution?
(1) $CrCl_3 \cdot 6H_2O$
(2) $[Cr(H_2O)Cl_3] \cdot (H_2O)_3$
(3) $[CrCl_2(H_2O)_4]Cl \cdot 2H_2O$
(4) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$

87. The colour of $[Ti(H_2O)_6]^{3+}$ is due to :

(1) transfer of an electron from one Ti to another

(2) excitation of electrons from d → d

(3) intramolecular vibration

(4) None

88. Which statement is not correct in the case of $[Co(NH_3)_6]^{3+}$ complex?

(1) It is octahedral in shape

(2) It involves d^2sp^3-hybridisation

(3) It has diamagnetic nature

(4) All are correct

89. Which ion is paramagnetic?

(1) $[Ni(H_2O)_6]^{2+}$ (2) $[Fe(CN)_6]^{4-}$

(3) $[Ni(CO)_4]$ (4) $[Ni(CN)_4]^{2-}$

90. Considering H_2O as a weak field ligand, the number of unpaired electrons in $[Mn(H_2O)_6]^{2+}$ will be :

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

91. For which transition metal ions are low spin complexes possible?

(1) Rh^{3+} (2) Pt^{+2}

(3) Ru^{2+} (4) All are correct

92. Which ligand produces a high crystal field splitting (i.e. are strong ligand field):

(1) CO (2) NO_2^-

(3) CN^- (4) All of these

93. Which order is correct in spectrochemical series of ligands?

(1) $Cl^- < F^- < C_2O_4^{2-} < NO_2^- < CN^-$

(2) $CN^- < C_2O_4^{2-} < Cl^- > NO_2^- < F^-$

(3) $C_2O_4^{2-} < F^- < Cl^- > NO_2^- < CN^-$

(4) $F^- < Cl^- < NO_2^- < CN^- < C_2O_4^{2-}$

94. Which is high spin complex?

(1) $CoCl_6^{3-}$ (2) FeF_6^{3-}

(3) $[Cr(H_2O)_6]^{+3}$ (4) All are correct

95. $K_3[CoF_6]$ is high spin complex. What is the hybrid state of Co-atom in this complex?

(1) sp^3d (2) sp^3d^2 (3) d^2sp^3 (4) dsp^2

96. The structure of iron pentacarbonyl is:

(1) square planar (2) trigonal bipyramidal

(2) triangular (4) None of these

97. Ruthenium carbonyl is :

(1) $Ru(CO)_4$ (2) $Ru(CO)_5$

(3) $Ru(CO)_8$ (4) $Ru(CO)_6$

98. Which of the following is double salt?

(1) Carnallite (2) Mohr's salt

(3) Alum (4) All are correct

99. Carbon donor ligands are strong ligands and usually forms low spin complexes, Among the complexes given below, select the high spin complex:

(1) $Fe(CN)_6]^{3-}$ (2) $[Fe(CN)_6]^{4-}$

(3) $[Fe(C_2O_4)_3]^{3-}$ (4) None of these

100. Crystal field splitting energy (Δ) for transition metals belonging to different transition series lies in the order:

(1) 3d > 4d > 5d (2) 3d≈4d≈5d

(3) 3d < 4d < 5d (4) 3d > 4d < 5d

101. Select the correct order of CFSE (Δ) for the ions given below:

(1) $V^{2+} < Mn^{2+} < Fe^{2+} < Co^{2+} < Ni^{2+}$

(2) $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+} < V^{2+}$

(3) $Mn^{2+} < V^{2+} < Co^{2+} < Fe^{2+}\ Ni^{2+}$

(4) $V^{2+} \approx Mn^{2+} \approx Fe^{2+} \approx Co^{2+} \approx Ni^{2+}$

102. The compound $[CoCl_2(NH_3)_2(en)]$ can form :

(1) Linkage isomers

(2) Coordination isomers

(3) Optical isomers

(4) Linkage as well as optical isomers

103. Colour of Halogen is due to :

(1) Polarisation

(2) H.O.M.O. to L.U.M.O. transition

(3) Charge transfer

(4) d-d transition

104. For which of the following species d-d transition does not account for its colour ?

(1) $Cr_2O_7^{-2}$ (2) CrO_4^{-2}

(3) CrO_2Cl_2 (4) All of the above

105. Which of the following ion is not coloured?
(1) $[Ni(DMG)_2]$ (2) $[Co(SCN)_4]^{2-}$
(3) $[Al(OH)_4]^-$ (4) $[Fe(H_2O)_5(SCN)]^{+2}$

106. What will be the correct order of absorption of wavelength of light in the visible region, for the complex, $[Co(NH_3)_6]^{3+}$, $[Co(CN)_6]^{3-}$, $[Co(H_2O)_6]^{3+}$?
(1) $[Co(CN)_6]^{3-} > [Co(NH_3)_6]^{3+} > [Co(H_2O)_6]^{3+}$
(2) $[Co(NH_3)_6]^{3+} > [Co(H_2O)_6]^{3+} > [Co(CN)_6]^{3-}$
(3) $[Co(H_2O)_6]^{3+} > [Co(NH_3)_6]^{3+} > [Co(CN)_6]^{3-}$
(4) $[Co(CN)_6]^{3-} > [Co(NH_3)_6]^{3+} > [Co(H_2O)_6]^{3+}$

107. Which of the following compound is coloured and paramagnetic?
(1) $KMnO_4$ (2) AgI
(3) $CuSO_4 \cdot 5H_2O$ (4) $[Ni(CN)_4]^{2-}$

108. In which of the following complex, cis form is optically active?
(1) $[Co(en)(NH_3)_3Cl]Br$
(2) $[Pt(NH_3)_4ClBr]SO_4$
(3) $[Pt(NH_3)_2Cl_2Br_2]$
(4) $[Pt(NH_3)_2(NO_2)_2]$

109. AgBr and AgI are coloured because of :
(1) d — d transition
(2) Charge transfer
(3) Polarisation of halide by metal ion
(4) HOMO to LUMO transition

110. Spliting energy of $[Cr(X)_6]^{3+}$, $[Cr(Y)_6]^{3+}$, $[Cr(Z)_6]^{3+}$ are 315, 210 and 184 kJ/mole respectively, then their colour are :
(1) Yellow, Red and Green respectively
(2) Red, Yellow and Green respectively
(3) Green, Red and Yellow respectively
(4) Yellow, Green and Red respectively

111. Na_2S forms violet colour complex when reacts with :
(1) Brown ring complex
(2) Sodium nitroprusside
(3) $K_4[Fe(CN)_6]$
(4) Hypo Solution

112. Which of the following complex can represent both turn bull blue and prussian blue?
(1) $Fe_4[Fe(CN)_6]_3$ (2) $Fe_3[Fe(CN)_6]_2$
(3) $K_4[Fe(CN)_6]$ (4) $KFe[Fe(CN)_6]$

113. Which of the following reactions represent developing in photography?
(1) $AgNO_3 + NaBr \longrightarrow AgBr + NaNO_3$
(2) $AgBr + 2Na_2S_2O_3 \longrightarrow Na_3[Ag(S_2O_3)_2] + NaBr$
(3) $AgBr \xrightarrow{h\nu} Ag^+ + Br^-$
(4) $C_6H_4(OH)_2 + 2AgBr \longrightarrow C_6H_4O_2 + 2HBr + 2Ag$

114. Which is used in cancer-chemotherapy ?
(1) Cis-platin (2) Zeise's salt
(3) both 1 and 2 (4) None of these

COORDINATION COMPOUND ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**1**	**4**	**1**	**1**	**3**	**4**	**2**	**4**	**2**	**1**	**2**	**3**	**4**	**3**	**4**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**4**	**1**	**1**	**2**	**2**	**4**	**3**	**4**	**4**	**3**	**4**	**1**	**4**	**2**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**2**	**3**	**2**	**4**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	**1**	**2**	**3**	**4**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**1**	**4**	**1**	**4**	**2**	**1**	**2**	**1**	**4**	**3**	**4**	**3**	**1**	**2**	**4**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	**1**	**3**	**4**	**4**	**4**	**1**	**3**	**2**	**2**	**2**	**3**	**2**	**2**	**3**	**1**
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	**2**	**4**	**3**	**2**	**1**	**2**	**1**	**1**	**4**	**1**	**3**	**2**	**4**	**1**	**4**
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	**4**	**4**	**1**	**4**	**2**	**2**	**2**	**4**	**3**	**3**	**1**	**3**	**2**	**4**	**3**
Que.	106	107	108	109	110	111	112	113	114						
Ans.	**3**	**3**	**3**	**3**	**1**	**2**	**4**	**2**	**1**						