COORDINATION COMPOUNDS

1) The ligand called π-acid is

1) NH_3 2) $C_2O_4^{2-}$ 3) CO 4) ethylene diamine

2) In which of the following complexes metal is in highest oxidation state?

1) $[Ni(CO)_4]$ 2) $[Ni(NH_3)_6](BF_4)_2$ 3) $K_2[NiF_6]$ 4) $K_4[Ni(CN)_6]$

3) Fac-Mer isomerism is associated with which of the following complexes? (M=Central metal)

1) $[M(AA)_3]$ 2) $[MA_3B_3]$ 3) $[M(AA)_2]$ 4) [MABCD]

4) The number of chloride ions produced by complex tetraaminechloroplatinum(IV) chloride in an aqueous solution is

1) four 2) one 3) three 4) two

5) Which of the following carbonyls will have the strongest C—O bond?

1) $V(CO)_6^-$ 2) $Cr(Co)_6$ 3) $Fr(CO)_5$ 4) $[Mn(CO)_6]^+$

6) An excess of $AgNO_3$ is added to 100 ml of 0.01 M solution of dichlorotetraaquachromium (III) chloride. The number of moles of AgCl precipitated would be

1) 0.001 2) 0.01 3) 0.003 4) 0.002

7) Which of the following complex has same oxidation state of the central metal atom in the cationic and anionic part?

1) $[Pt(NH_3)_4\ Cl_2]$ 2) $[Pt(Py)_4]\ [Pt\ Cl_4]$

3) $[Pt(NH_3)_4]\ [Pt\ Cl_6]$ 4) In all the above

8) Considering H_2O as a weak field ligand, the number of unpaired electrons in $[Mn(H_2O)_6]^{2+}$ will be (atomic number of Mn=25)

1) three 2) five 3) two 4) four

9) In $Fe(CO)_5$, the Fe → CO σ bond results by the overlap between filled sp-hybrid orbital of C-atom of CO molecule and vacant

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

3) sp^3 4) dsp^2 hybrid orbital of Fe

10) $[Co(CN)_6]^{3-}$, a complex ion of cobalt (III) absorbs radiation in violet region of the visible light. Its aqueous solution therefore appears.

1) orange 2) yellow 3) blue 4) pink

11) The pair in which both species have the same magnetic moment (spin only value) is

1) $[CoCl_4]^{2-}$, $[Fe(H_2O)_6]^{2+}$ 2) $[Cr(H_2O)_6)^{2+}$, $[Fe(H_2O)_6]^{2+}$

3) $[Mn(H_2O)_6]^{2+}$, $[Cr(H_2O)_6]^{2+}$, $[Cr(H_2O)_6]^{2+}$ 4) $[Cr(H_2O)_6]^{2+}$, $[CoCl_4]^{2-}$

12) The ion which is not tetrahedral in shape is

1) BF_4^- 2) $NiCl_4^{2-}$ 3) $[Cu(NH_3)_4]^{2+}$ 4) $\overset{+}{N}H_4$

13) Tetrahedral complexes are generally high spin. This is because

1) $\Delta_t > P$ 2) $\Delta_t < P$ 3) $\Delta_t = P$ 4) none of these

14) Which complex compound obeys 18 electrons rule?

1) $[Mn(H_2O)_6]^{2+}$ 2) $[V(CO)_5]$ 3) $[Ni(CN)_4]^{2-}$ 4) $[Fe(NH_3)_6]^{2+}$

15) In $[Co(NH_3)_6]Cl_3$, the number of covalent bond is

1) 3 2) 18 3) 9 4) 6

16) Ink contains Fe^{3+} ions. The spot of ink is removed by aqueous solution containing oxalate ions. It is due to formation of colourless complex entity, the formula of which is

1) $[Fe(C_2O_4)_3]^{3-}$ 2) $[Fe(C_2O_4)_3]^{4-}$ 3) $[Fe(C_2O_4)_3]^{2-}$ 4) $[Fe(C_2O_4)_6]^{3-}$

17) Dimethylglyoxime is used for estimation of

1) cobalt 2) zine 3) nickel 4) manganese

18) A reagent used for identifying nickel ion is

1) Potassium ferrocyanide 2) Neutral ferric chloride

3) Phenolpthalein 4) dimethyl glyoxime

19) Which of the following coordination entities should be expected to absorb light of lowest frequency?

1) $[Cr(en)_3]^{3+}$ 2) $[Cr(CN)_6]^{3-}$ 3) $[Cr(NH_3)_6]^{3+}$ 4) $[CrCl_6]^{3-}$

20) Which of the following is diamagnetic in nature?

1) Co^{3+} octahedral complex with strong field ligands

2) Co^{2+} in tetrahedral complex

3) CO^{3+} octahedral complex with weak field ligands

4) Co^{2+} in square planar complex

21) Both geometrical and optical isomerisms are exhibited by

1) pentaamminechlorocobalt (III) ion

2) tetraamminedichlorocobalt(III) ion

3) dichlorobis (ethylenediamine) cobalt (III) ion

4) triamminotrichlorocobalt (III) ion

22) Which of the following complex has σ and π bonds

1) $[Co(CO)_5NH_3]^{2+}$ 2) $[Cr(C_2O_4)_3]^{3-}$ 3) $[Co(en)_3]^{3+}$ 4) $[Sn(CH_3)_4]$

23) Among the following, the species having square planar geometry for central atom are

i) XeF_4 ii) SF_4 iii) $[NiCl_4]^{2-}$ iv) $[PdCl_4]^{2-}$

1) i and ii 2) i and iv 3) i and iii 4) iii and iv

24) Which among the following complex entities will have dipole moment=0?

I) $[Ni(CN)_4]^{2-}$ II) Cis-$[Pt(NH_3)_2Cl_2]$ III)trans-$[Pt(NH_3)_2Cl_2]$

1) I 2) I, III 3) III 4) II, III

25) The co-ordination number of cobalt in [$Co(en)_2Br_2]Cl_2$ is

1) 6 2) 2 3) 4 4) 8

26) The ligands in anticancer drug cis-platin are

1) NO, Cl^- 2) NH_3, Cl^- 3) Cl^-, H_2O 4) NH_3, H_2O

27) The total number of ions produced by Tollen's reagent on ionization are

1) 0 2) 1 3) 4 4) 2

28) The complexes , $[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4Cl_2$ are

1) Co-ordination isomers 2) Linkage isomers

3) Geometrical isomers 4) Ionisation isomers

29) Which of the following complexes as a pair of enantiomers ?

1) trans-$[Co(en)_2Cl]^+$ 2) $[Cp\{P(C_2H_5)_3\}ClBr]$

3) $[Cr(en)_3]^{3+}$ 4) $[Co(NH_3)_4Cl_2]^+$

30) The hexafluorocobaltate (III) ion is high spin complex. The hybrid state of cobalt is

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

31) Which of the following complex has same oxidation state of the central metal atom in the cationic and anionic part?

1) $[Pt(NH_3)_4Cl_2][PtCl_4]$ 2) $[Pt(Py)_4]$ $[PtCl_4]$

3) $[Pt(NH_3)_4][PtCl_6]$ 4) In all the above

32) All octahedral complexes of Ni^{2+} are

1) inner orbital 2) outer orbital

3) inner as well as outer orbital depending upon the strength of the ligand field

4) none of the above

33) Which of the following complex ions is expected to absorb visible light

1) $[Cr(NH_3)_6]^{3+}$ 2) $[Sc(H_2O)_3(NH_3)_3]^{3+}$

3) $[Ti(en)_2(NH_3)_2]^{4+}$ 4) $[Zn(NH_3)_6]^{2+}$

34) Out of the following metals, which forms polynuclear carbonyl?

1) Mg 2) Mn 3) Na 4) All

35) The oxidation number of cobalt in $K[Co(CN)_4]$ is

1) -1 2) +3 3) +1 4) -3

36) The complex which is maximum stable is

1) $[Fe(H_2O)_6]^{3+}$ 2) $[Fe(C_2O_4)_3]^{3-}$ 3) $[Fe(Cl_6]^{3-}$ 4) $[Fe(CN)_6]^{3-}$

37) Which of the following complex compounds will exhibit highest paramagnetic behaviour?

1) $[Co(NH_3)_6]^{3+}$ 2) $[Ti(NH_3)_6]^{3+}$ 3) $[Cr(NH_3)_6]^{3+}$ 4) $[Zn(NH_3)_6]^{2+}$

38) In which of the following pairs of species the number of unpaired electrons is same?

1) $[CoF_3]^{3-}$ and $[Fe(CN)_6]^{3-}$ 2) $[Fe(CN)_6]^{3-}$ & $[Fe(CN)_6]^{4-}$

3) $[CoF_6]^{3-}$ and $[FeF_6]^{3-}$ 4) $[Fe(CN)_6]^{4-}$ and $[Ni(CN)_4]^{2-}$

39) Number of unpaired electrons in d^4 low spin octahedral complex are

1) 1 2) 3 3) zero 4) 2

40) Which of the following complex will give white precipitate with barium chloride solution?

1) $[Cr(NH_3)_5SO_4]Cl$ 2) $[Cr(NH_3)_5Cl]SO_4$ 3) $[Co(NH_3)_6]Br_3$ 4) None of these

41) $[Fe(CN)_6]^{3-}$ ion has magnetic moment of 1.73 B.M. While $[Fe(H_2O)_6]^{3+}$ ha a magnetic moment of 5.92 B.M. Thus, hybridization of Fe in both the complexes are respectively

1) sp^3d^3, sp^3d^2 2) sp^3d^3, d^2sp^3 3) d^2sp^3, $sp^3\ d^2$ 4) d^2sp^3, d^2sp^3

42) In $[Ag(CN)_2]^-$, the number of π-bonds is

1) 2 2) 6 3) 4 4) 3

43) How many $EDTA^{4-}$ ligands can surround calcium ion in the complex

1) 3 2) 2 3) 1 4) 8

44) The hypothetical complex chlorodiaaquatriamminecobalt (III) chloride can be represented as

1) $[Co(NH_3)_3(H_2O)_2Cl]Cl_2$ 2) $[Co(NH_3)_3(H_2O)Cl_3]$

3) $[Co(NH_3)_3(H_2O)_3]Cl_3$ 4) $[Co(NH_3)_3(H_2O)_2Cl]$

45) EAN of Zn in $[Zn(OH)_4]^{2-}$ complex is

1) 36 2) 26 3) 16 4) 46

46) When 0.1 mol $CoCl_3(NH_3)_5$ is combined with excess $AgNO_3$, then 0.2 mol AgCl is obtained. The conductivity of the solution suits the

1) 1:2 electrolyte 2) 3:1 electrolyte 3) 1:1 electrolyte 4) 1:3 electrolyte

47) The most stable complex among the following is

1) $K_3\ [Al(C_2O_4)_3]$ 2) $[Ag(NH_3)_2]Cl$ 3) $K_2[Ni(EDTA)]$ 4) $[Pt(en)_2]Cl_2$

48) Which of the following coordination entities should be expected to absorb light of lowest frequency?

1) $[CrCl_6]^{3-}$ 2) $[Cr(CN)_6]^{3-}$ 3) $[Cr(NH_3)_6]^{3+}$ 4) $[Cr(en)_3]^{3+}$

49) The ion which is not tetrahedral in shape is?

1) $[Cu(NH_3)_4]^{2+}$ 2) BF_4^- 3) NH_4^+ 4) $NiCl_4^{2-}$

50) Which of the following complex will show geometrical as well as optical isomerism ?

1) $[Pt(NH_3)Cl_4]$ 2) $[Pt(NH_3)_2Cl_2]$ 3) $Pt(en)_3]^{4+}$ 4) $[Pt(en)_2Cl_2]$