JEE MAIN : CHAPTER WISE TEST-6

SUBJECT :- CHEMISTRY **DATE.....**

CLASS :- 12th **NAME.....**

CHAPTER :- COORDINATION COMPOUND **SECTION.....**

(SECTION A)

1. In the complex $[Co(NH_3)_6]^{3+}$ the species acting as lewis acid and lewis base are respectively –
(A) Co^{2+}, NH_3 (B) NH_3, Co
(C) Co^{3+}, NH_3 (D) NH_3, Co^{3+}

2. Addition compounds which do not retain their identity in solution are called
(A) Double salts
(B) Complex compounds
(C) Coordination compounds
(D) (B) and (C) both

3. To form a coordination bond, one needs a ligand. Which of the following species cannot be a ligand–
(i) NH_4^+ (ii) NO^+ (iii) $C_5H_5\ddot{N}$
(A) i only (B) i & ii only
(C) i & iii only (D) i, ii & iii only

4. The IUPAC name of $[CoCl(NO_2)(en)_2]$ Cl is–
(A) Chloronitro bis (ethylenediamine) cobalt (III) chloride
(B) Chloronitro bis (ethylenediamine) cobalt (II) chloride
(C) Chloro bis (ethylenediamine) nitrocobalt (III) chloride
(D) Bis (ethylenediamine) chloro nitro cobalt(III) chloride

5. The formula of the complex tris (ethylenediamine) cobalt(III) sulphate is –
(A) $[Co(en)_2SO_4]$
(B) $[Co(en)_3SO_4]$
(C) $[Co(en)_3]SO_4$
(D) $[Co(en)_3]_2(SO_4)_3$

6. A coordination complex of cobalt has molecular formula containing five ammonia molecules, one nitro group and two chlorine atoms for one cobalt atom. One mole of this compound produces three mole ions in an aqueous solution. In reacting this solution with excess of silver nitrate solution, two moles of AgCl get precipitated. The ionic formula of this complex would be –
(A) $[(Co(NH_3)_4.NO_2Cl].[(NH_3)Cl]$
(B) $[(Co(NH_3)_5Cl].[Cl(NO_2)]$
(C) $[(Co(NH_3)_5(NO_2)]Cl_2$
(D) $[(Co(NH_3)_5].[(NO_2)_2Cl_2]$

7. Which of the following metal carbonyl does not exist as monomer ?
(A) $Cr(CO)_6$ (B) $Mn(CO)_5$
(C) $Ni(CO)_4$ (D) $Fe(CO)_5$

8. The complex ion $[Cu(NH_3)_4]^{2+}$ is –
(A) Tetrahedral and paramagnetic
(B) Tetrahedral and diamagnetic
(C) Square planar and paramagnetic
(D) Square planar and diamagnetic

9. Complexes with CN^- ligands are usually –
(A) High spin complexes
(B) Low spin complexes
(C) Both (A) and (B)
(D) None of these

10. Which order is correct in spectrochemical series of ligands ?
(A) $Cl^- < F^- < C_2O_4^{2-} < NO_2^- < CN^-$
(B) $CN^- < C_2O_4^{2-} < Cl^- > NO_2^- < F^-$
(C) $C_2O_4^{2-} < F^- < Cl^{-va} > NO_2^- < CN^-$
(D) $F^- < Cl^- < NO_2^- < CN^- < C_2O_4\ 2^-$

11. In an octahedral crystal field, the t_{2g} orbitals are
(A) Raised in energy by 0.4 Δ_0
(B) Lowered in energy by 0.4 Δ_0
(C) Raised in energy by 0.6 Δ_0
(D) Lowered in energy by 0.6 Δ_0

12. From the stability constant (hypothetical values), given below, predict which is the strongest ligand:
(A) $Cu^{2+} + 4NH_3 \rightleftharpoons [Cu(NH_3)_4]^{2+}$, K = 4.5×10^{11}
(B) $Cu^{2+} + 4CN^- \rightleftharpoons [Cu(CN)_4]^{2-}$, K = 2.0×10^{27}
(C) $Cu^{2+} + 2en \rightleftharpoons [Cu(en)_2]^{2+}$, K = 3.0×10^{15}
(D) $Cu^{2+} + 4H_2O \rightleftharpoons [Cu(H_2O)_4]^{2+}$, K = 9.5×10^8

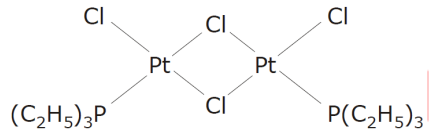
13. Which of the following is pair of ionization isomers ?
(A) $[Co(NH_3)_5Br]SO_4$ and $[Co(NH_3)_5SO_4]Br$
(B) $[Cr(H_2O)_5Cl]Cl_2.H_2O$ and $[Cr(H_2O)_4.Cl_2]Cl\ .2H_2O$
(C) $[Co(NH_3)_6]Cr(CN)_6$ and $[Cr(NH_3)_6][Co(CN)_6]$
(D) cis-$[Pt(NH_3)_2Cl_2]$ and tran-$[Pt(NH_3)_2Cl_2]$

14. Which of the following is not optically active ?
(A) $[Co(en)_3]^{3+}$
(B) $[Cr(ox)_3]^{3-}$
(C) cis-$[CoCl_2(en)_2]^+$
(D) trans-$[CoCl_2(en)_2]^+$

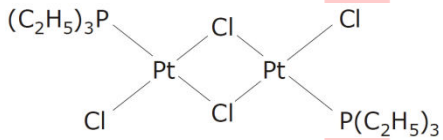
15. Which of the following is π complex ?
(A) Trimethyl aluminium
(B) Ferrocene
(C) Diethyl zinc
(D) Nickel tetracarbonyl

16. The geometry of $[Ni(CO)_4]$ and $[Ni(PPh_3)_2Cl_2]$ are :
(A) both square planar
(B) tetrahedral and square planar
(C) both tetrahedral
(D) square planar and tetrahedral

17. The complexes given below show:



and



(A) Optical isomerism
(B) Coordination isomerism
(C) Geometrical isomerism
(D) Coordination position isomerism

18. In the isoelectronic series of metal carbonyl, the CO bond strength is expected to increase in the order.
(A) $[Mn(CO)_6]^+ < [Cr(CO)_6] < [V(CO)_6]^-$
(B) $[V(CO)_6]^- < [Cr(CO)_6] < [Mn(CO)_6]^+$
(C) $[V(CO)_6]^- < [Mn(CO)_6]^+ < [Cr(CO)_6]$
(D) $[Cr(CO)_6] < [Mn(CO)_6]^+ < [V(CO)_6]^-$

19. If NO reacts with $[Cr(CO)_6]$ how many CO groups can be replaced by NO ?
(A)All the 6 CO groups are replaced by 6 NO groups
(B) All the 4 CO groups are replaced by 6 NO groups
(C) All the 2 CO groups are replaced by 3 NO groups
(D)All the 6 CO groups are replaced by 4 NO groups

20. $NiCl_2[P(C_2H_5)_2(C_6H_5)]_2$ exhibits temperature dependent magnetic behaviour (paramagnetic / diamagnetic). The coordination geometries of Ni^{2+} in the paramagnetic and diamagnetic states are respectively.
(A) Tetrahedral and tetrahedral
(B) Square planar and square planar
(C) Tetrahedral and square planar
(D) Square planar and tetrahedral

(SECTION B)

21. In the brown ring complex compond $[Fe(H_2O)_5NO]SO_4$, the oxidation state of Fe is –

22. The coordination number of cobalt in $[Co(en)_2Br_2]\ Cl_2$ is –

23. The values of 'x' in complexes $H_x[Co(CO)_4]$, $[Fe(CO)_x\ .\ (\pi\text{-}C_5H_5)]^+$ are respectively.

24. Among $[Ni(CO)_4]$, $[NiCl_4]^{2-}$, $[Co(NH_3)_4Cl_2]Cl$, $Na_2[COF_6]^{3+}$, Na_2O_2 and CsO_2, the total number of paramagnetic compounds is

25. Find the value of X ÷ Y for complex $[CoBr_2(CN)(NO_2)\ (H_2O)\ (NH_3)]$
where : X = Number of compound when both Br^- at cis position.
Y = Number of compound when both Br^- are at trans position.

26. If CFSE value of complex ion $[FeF_6]^{4-}$ in terms of Dq. is X, then find |X|.

27. The number of ions furnished per molecule of the complex $[Cr(NH_3)_6]Cl_3$ is / are ?

28. If Hund's rule violet then how many unpaired electrons are present in $[Cr(H_2O)_6]^{3+}$?

29. How many EDTA (ethylenediaminetetraacetate ion) molecules are required to make an octahedral complex with a Ca^{2+} ion ?

30. How many isomers are possible for the complex ion $[CrCl_3(OH)_2(NH_3)]^{2-}$?