1. The correct order of hybridisation of the central atom in the following species. **[JEE 2001]**
NH_3, $[PtCl_4]^{2-}$, PCl_5 and BCl_3 is [At No. Pt = 78]
(1) dsp^2,sp^3d,sp^2 and sp^3
(2) sp^3,dsp^2, sp^3d, sp^2
(3) dsp^2,sp^2,sp^3 and sp^3d
(4) dsp^2, sp^3,sp^2 and sp^3d

2. In $[Cr(C_2O_4)_3]^{3-}$, the isomerism shown is - **[AIEEE-2002]**
(1) Ligand (2) Optical
(3) Geometrical (4) Ionization

3. One mole of the complex compound $Co(NH_3)_5Cl_3$, gives 3 moles of ions on dissolution in water. One mole of the same complex reacts with two moles of $AgNO_3$ solution to yield two moles of AgCl(s). The structure of the complex is - **[AIEEE-2003]**
(1) $[Co(NH_3)_3Cl_3].2NH_3$ (2) $[Co(NH_3)_4Cl_2]Cl.NH_3$
(3) $[Co(NH_3)_4Cl]Cl_2.NH_3$ (4) $[Co(NH_3)_5Cl]Cl_2$

4. In the coordination compound $K_4[Ni(CN)_4]$, the oxidation state of nickel is – **[AIEEE-2003]**
(1) 0 (2) +1 (3) +2 (4) –1

5. The number of 3d-electrons remained in Fe^{2+} (At.no. of Fe = 26) ion is – **[AIEEE-2003]**
(1) 4 (2) 5 (3) 6 (4) 3

6. The coordination number of a central metal atom in a complex is determined by :- **[AIEEE–2004]**
(1) The number of ligands around a metal ion bonded by sigma and pi-bonds both
(2) The number of ligands around a metal ion bonded by pi-bonds
(3) The number of ligands around a metal ion bonded by sigma bonds
(4) The number of only anionic ligands bonded to the metal ion

7. Which one of the following complexes is an outer orbital complex :- **[AIEEE–2004]**
(1) $[Co(NH_3)_6]^{3+}$ (2) $[Mn(CN)_6]^{4-}$
(3) $[Fe(CN)_6]^{4-}$ (4) $[Ni(NH_3)_6]^{2+}$
(Atomic nos.:Mn=25 ; Fe=26 ; Co=27 ; Ni = 28)

8. Coordination compounds have great importance in biological systems. In this contect which of the following statements is incorrect ? **[AIEEE–2004]**
(1) Cyanocobalamin is vitamin B_{12} and contains cobalt
(2) Haemoglobin is the red pigment of blood and contains iron
(3) Chlorophylls are green pigments in plants and contain calcium
(4) Carboxypeptidase - A is an enzyme and contains zinc

9. The correct order of magnetic moments (spin only values in B.M.) among is :- **[AIEEE–2004]**
(1) $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$
(2) $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$
(3) $[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$
(4) $[Fe(CN)_6]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$
(Atomic nos. : Mn = 25, Fe = 26, Co = 27)

10. The species having tetrahedral shape is : **[JEE 2004]**
(1) $[PdCl_4]^{2-}$ (2) $[Ni(CN)_4]^{2-}$
(3) $[Pd(CN)_4]^{2-}$ (4) $[NiCl_4]^{2-}$

11. The pair of compounds having metals in their highest oxidation state is **[JEE 2004]**
(1) MnO_2, $FeCl_3$
(2) $[MnO_4]^-$, CrO_2Cl_2
(3) $[Fe(CN)_6]^{3-}$, $[Co(CN)_3]$
(4)$[NiCl_4]^{2-}$, $[CoCl_4]^-$

12. For octahedral complex, the value of the 'spin only' magnetic moment for one of the following configurations is 2.84 BM. The correct one is **[AIEEE–2005]**
(1) d^4 (in strong ligand field)
(2) d^4 (in weak ligand field)
(3) d^3 (in weak as well as in strong field)
(4) d^5 (in strong ligand field)

13. The IUPAC name for the complex $[Co(NO_2)(NH_3)_5]Cl_2$ is - **[AIEEE–2006]**
(1) pentaammine nitrito-N- cobalt (II) chloride
(2) pentaammine nitrito-N- cobalt (III) chloride
(3) nitrito-N- pentaamminecobalt (III) chloride
(4) nitrito-N- pentaamminecobalt (II) chloride

14. Nickel (Z=28) combines with a uninegative monodentate ligand X^- to form a paramagnetic complex $[NiX_4]^{2-}$. The number of unpaired electron in the nickel and geometry of this complex ion are, respectively. **[AIEEE–2006]**
(1) one, square planar (2) two, square planar
(3) one, tetrahedral (4) two, tetrahedral

15. In $Fe(CO)_5$, the Fe–C bond possesses **[AIEEE–2006]**
(1) ionic character
(2) σ – character only
(3) π –character only
(4) both σ and π character

16. How many EDTA (ethylenediaminetetraacetate) molecules are required to make an octahedral complex with a Ca^{2+} ion ? **[AIEEE–2006]**
(1) One (2) Two (3) Six (4) Three

17. The "spin-only" magnetic moment [in units of Bohr magneton, (μ_B)] of Ni^{2+} in aqueous solution would be (At. No. Ni= 28)- **[AIEEE-2006]**
(1) 0 (2) 1.73 (3) 2.84 (4) 4.90

18. Which one of the following has a square planar geometry :-
(Co = 27, Ni = 28, Fe=26, Pt = 78) **[AIEEE-2007]**
(1) $[CoCl_4]^{2-}$ (2) $[FeCl_4]^{2-}$
(3) $[NiCl_4]^{2-}$ (4) $[PtCl_4]^{2-}$

19. The coordination number and the oxidation state of the element 'E' in the complex $[E(en)_2(C_2O_4^{-2})]\ NO_2^{\oplus}$ (where (en) is ethylene diamine) are, respectively - **[AIEEE-2008]**
(1) 6 and 2 (2) 4 and 2
(3) 4 and 3 (4) 6 and 3

20. In which of the following octahedral complexes of Co (at. no. 27), will the magnitude of Δ_0 be the highest ? **[AIEEE-2008]**
(1) $[Co(CN)_6]^{3-}$ (2) $[Co(C_2O_4)_3]^{3-}$
(3) $[Co(H_2O)_6]^{3+}$ (4) $[Co(NH_3)_6]^{3+}$

21. Which of the following pairs represents linkage isomers ? **[AIEEE-2009]**
(1) $[Co(NH_3)_5NO_3]SO_4$ and $[Co(NH_3)_5SO_4]NO_3$
(2) $[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4]Cl_2$
(3) $[Cu(NH_3)_4][PtCl_4]$ and $[Pt(NH_3)_4][CuCl_4]$
(4) $[Pd(PPh_3)_2(NCS)_2]$ and $[Pd(PPh_3)_2(SCN)_2]$

22. Which of the following has an optical isomer? **[AIEEE-2009]**
(1) $[Co(H_2O)_4(en)]^{3+}$ (2) $[Co(en)_2(NH_3)_2]^{3+}$
(3) $[Co(NH_3)_3Cl]^{+}$ (4) $[Co(en)(NH_3)_2]^{2+}$

23. Which one of the following has an optical isomer? **[AIEEE-2010]**
(1) $[Zn(en)_2]^{2+}$ (2) $[Zn(en)(NH_3)_2]^{2+}$
(3) $[Co(en)_3]^{3+}$ (4) $[Co(H_2O)_4(en)]^{3+}$
(en = ethylenediamine)

24. A solution containing 2.675 g of $CoCl_3.6NH_3$ (molar mass = 267.5 g mol^{-1}) is passed through a cation exchanger. The chloride ions obtained in solution were treated with excess of $AgNO_3$ to give 4.78 g of AgCl (molar mass = 143.5 g mol^{-1}). The formula of the complex is :- **[AIEEE-2010]**
(At. mass of Ag = 108 u)
(1) $[CoCl(NH_3)_5]Cl_2$ (2) $[Co(NH_3)_6]Cl_3$
(3) $[CoCl_2(NH_3)_4]Cl$ (4) $[CoCl_3(NH_3)_3]$

25. Which of the following facts about the complex $[Cr(NH_3)_6]Cl_3$ is wrong ? **[AIEEE-2011]**
(1) The complex is an outer orbital complex
(2) The complex gives white precipitate with silver nitrate solution
(3) The complex involves d^2sp^3 hybridisation and is octahedral in shape
(4) The complex is paramagnetic

26. The magnetic moment (spin only) of $[NiCl_4]^{2-}$ is :- **[AIEEE-2011]**
(1) 2.82 BM (2) 1.41 BM
(3) 1.82 BM (4) 5.46 BM

27. Among the ligands NH_3,en, CN^- and CO the correct order of their increasing field strength, is :- **[AIEEE-2011]**
(1) $CO < NH_3 < en < CN^-$
(2) $NH_3 < en < CN^- < CO$
(3) $CN^- < NH_3 < CO < en$
(4) $en < CN^- < NH_3 < CO$

28. Which one of the following complex ions has geometrical isomers ? **[AIEEE-2011]**
(1) $[Co\ (en)_3]^{3+}$ (2) $[Ni\ (NH_3)_5Br]^{+}$
(3) $[Co\ (NH_3)_2\ (en)_2]^{3+}$ (4) $[Cr\ (NH_3)_4(en)]^{3+}$

29. Which among the following will be named as dibromidobis (ethylene diamine) chromium (III) bromide ? **[AIEEE-2012]**
(1) $[Cr(en)Br_2]Br$ (2) $[Cr(en)_3]Br_3$
(3) $[Cr(en)_2Br_2]Br$ (4) $[Cr(en)Br_4]^-$

30. The complex ion
$[Pt(NO_2)\ (Py)\ (NH_3)\ (NH_2OH)]^+$ will give :- **[JEE-MAIN-2012, Online]**
(1) 4 isomers (Geometrical)
(2) 2 isomers (Geometrical)
(3) 3 isomers (Geometrical)
(4) 6 isomers (Geometrical)

PREVIOUS YEARS QUESTIONS				ANSWER KEY						Exercise-II
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**2**	**2**	**4**	**1**	**3**	**3**	**4**	**3**	**3**	**4**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**2**	**1**	**2**	**4**	**4**	**1**	**3**	**4**	**4**	**1**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**4**	**2**	**3**	**2**	**1**	**1**	**2**	**3**	**3**	**3**