

Single Correct Answer Type:

- IUPAC name of complex $K_3[Al(C_2O_4)_3]$ is :

(A) Potassium alumino-oxalate (B) Potassium trioxalatoaluminate (III)
 (C) Potassium aluminium (III) oxalate (D) Potassium trioxalatoaluminate (IV)
- For the complex ion dichlorobis(ethylene diamine) cobalt (III), select the correct statement.

(A) It has three isomers, two of them are optically active and one is optically inactive.
 (B) It has three isomers, all of them are optically active.
 (C) It has three isomers, all of them are optically inactive.
 (D) It has one optically active isomer and two geometrical isomers.
- Brown ring test for nitrates is due to the formation of

(A) $[Fe(H_2O)_5NO]^{2+}$ (B) $[Fe(H_2O)_6]^{2+}$
 (C) $[Fe(H_2O)(NO)_5]^{2-}$ (D) $[Fe(CN)_5NO]^{2+}$
- Which one is the most likely structure of $CrCl_3 \cdot 6H_2O$. If $1/3$ of total chlorine of the compound is precipitated by adding $AgNO_3$ to its aqueous solution :

(A) $[Cr(H_2O)_6]Cl_3$ (B) $[CrCl_3(H_2O)_3] \cdot 3H_2O$
 (C) $[CrCl_2(H_2O)_4] \cdot Cl \cdot 2H_2O$ (D) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$
- 0.001 mol, one litre of $Co(NH_3)_5(NO_3)(SO_4)$ 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) $[CoSO_4(NH_3)_5]NO_3$ (B) $[CoNO_3(NH_3)_5]SO_4$
 (C) $[Co(NH_3)_5]SO_4NO_3$ (D) None of these
- 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
- The molar ionic conductances of the octahedral complexes.

(I) $PtCl_4 \cdot 5NH_3$ (II) $PtCl_4 \cdot 4NH_3$ (III) $PtCl_4 \cdot 3NH_3$ (IV) $PtCl_4 \cdot 2NH_3$
 (A) I < II < III < IV (B) IV < III < II < I (C) III < IV < II < I (D) IV < III < I < II
- On treatment of 10ml of 1M solution of the complex $CrCl_3 \cdot 6H_2O$ with excess of $AgNO_3$, 4.305g of $AgCl$ was obtained. The complex is

(A) $[CrCl_3(H_2O)_3] \cdot 3H_2O$ (B) $[CrCl_2(H_2O)_4]Cl \cdot 2H_2O$
 (C) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$ (D) $[Cr(H_2O)_6]Cl_3$
- EAN of the central metal in the complexes $K_2[Ni(CN)_4]$, $[Cu(NH_3)_4]SO_4$ and $K_2[PtCl_6]$ are respectively.

(A) 36, 35, 86 (B) 34, 35, 84 (C) 34, 35, 86 (D) 34, 36, 86
- $Ni(CO)_4$ and $[Ni(NH_3)_4]^{2+}$ do not differ in :

(A) Magnetic moment (B) Oxidation number of Ni
 (C) Geometry (D) EAN

11. $[\text{Cu}(\text{NH}_3)_4]^{2+}$ 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.
12. Which of the following statements is incorrect?
 (A) Geometrical isomerism is not observed in complexes having tetrahedral geometry
 (B) Square planar complexes may show optical isomerism with ligands having chiral centre
 (C) Octahedral complexes having two chelating ligands in perpendicular plane always exhibit optical isomerism
 (D) Complex $[\text{Pt}(\text{Gly})_2]$ does not show geometrical isomerism
13. 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+}
14. Which one of the following statement is incorrect?
 (A) Greater the formation constant (K_f) of a complex ion, greater is its stability.
 (B) Greater the positive charge on the central metal ion, greater is the stability of the complex.
 (C) Greater is the basic character of the ligand, lesser is the stability of the complex.
 (D) Chelate complexes have high stability constants.
15. In the isoelectronic series of metal carbonyl, the CO bond strength is expected to increase in the order.
 (A) $[\text{Mn}(\text{CO})_6]^+ < [\text{Cr}(\text{CO})_6] < [\text{V}(\text{CO})_6]^-$ (B) $[\text{V}(\text{CO})_6]^- < [\text{Cr}(\text{CO})_6] < [\text{Mn}(\text{CO})_6]^+$
 (C) $[\text{V}(\text{CO})_6]^- < [\text{Mn}(\text{CO})_6]^+ < [\text{Cr}(\text{CO})_6]$ (D) $[\text{Cr}(\text{CO})_6] < [\text{Mn}(\text{CO})_6]^+ < [\text{V}(\text{CO})_6]^-$
16. The complex having highest CFSE value
 (A) $[\text{Ni}(\text{en})_3]^{2+}$ (B) $[\text{Ni}(\text{CN})_4]^{2-}$ (C) $[\text{NiCl}_4]^{2-}$ (D) $[\text{Ni}(\text{NH}_3)_6]^{2+}$
17. The correct statements among I to III are:
 I. Valence bond theory cannot explain the colour exhibited by transition metal complexes
 II. Valence bond theory can predict quantitatively the magnetic properties of transition metal complexes
 III. Valence bond theory cannot distinguish ligands as weak and strong field ones
 (A) I and II only (B) I, II and III (C) I and III only (D) II and III only
18. AgCl is soluble in NH_4OH solution. The solubility is due to formation of
 (A) AgOH (B) Ag_2O (C) $[\text{Ag}(\text{NH}_3)_2]^+$ (D) NH_4Cl
19. In the silver plating of copper, $\text{K}[\text{Ag}(\text{CN})_2]$ is used instead of AgNO_3 . The reason is
 (A) A thin layer of Ag is formed on Cu (B) More voltage is required
 (C) Ag^+ ions are completely removed from solution
 (D) Less availability of Ag^+ ions, as Cu cannot displace Ag from $[\text{Ag}(\text{CN})_2]^-$ ion
20. In an octahedral crystal field, the t_{2g} orbitals are
 (A) Realised in energy by $0.4 \Delta_0$ (B) Lowered in energy by $0.4 \Delta_0$
 (C) Raised in energy by $0.6 \Delta_0$ (D) Lowered in energy by $0.6 \Delta_0$

Numerical Based:

21. In nickel tetracarbonyl, the number of electrons in d-orbitals are.....
22. The spin only magnetic moment value (in Bohr magneton units) of $\text{Cr}(\text{CO})_6$ is
23. In case of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ ion, the net CFSE value will be
24. Oxidation number of Fe in violet coloured complex $\text{Na}_4[\text{Fe}(\text{CN})_5(\text{NOS})]$ is
25. The effective atomic number of central Cu (At. No. 29) metal in $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ is

KEY

1. B	2. A	3. A	4. C	5. B
6. D	7. B	8. D	9. C	10. A
11. D	12. D	13. C	14. C	15. B
16. B	17. C	18. C	19. D	20. B
21. 10	22. 0	23. 0.4	24. 2	25. 35

** Wish You all the Best **