Saitechinfo NEET JEE Academy

43, Haridoss Main Rd, CH-99. Ph:9444929163

COORDINATION COMPOUNDS

Class 12 - Chemistry

1. How many ions are produced from the complex $[Co(NH_3)_5Cl]\ Cl_2$ in solution? **[1]**

   a) 5 b) 2

   c) 3 d) 4

2. The correct IUPAC name of $[Pt(NH_3)_2\ Cl_2]$ is **[1]**

   a) Diamminedichloridoplatinum (II) b) Diamminedichlorideplatinum (0)

   c) Diamminedichlorideplatinum (IV) d) Dimminedichlorideplatinum (IV)

3. The coordination number of **Co** in the complex $[Co(en)_3]^{3+}$ is: **[1]**

   a) 6 b) 5

   c) 4 d) 3

4. Total number of unpaired electrons present in Co^{3+} (Atomic number = 27) is **[1]**

   a) 2 b) 4

   c) 5 d) 3

5. Which of the following species is **not** expected to be a ligand? **[1]**

   a) H_2O b) CO

   c) NH_4^+ d) NH_3

6. Using IUPAC norms write the formula of Hexaamminecobalt(III) sulphate. **[1]**

7. Arrange the following in increasing order of crystal field splitting energy: **[1]**

   $[Cr(CN)_6]^{3-}$, $[Cr(NH_3)_6]^{3+}$, $[CrCl_6]^{3-}$

8. What is the solution in which photographic film is washed? What reaction takes place? **[1]**

9. Arrange the following complex ions in increasing order of their crystal field splitting energy (Δ_o): **[1]**

   $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$, $[Co(CN)_6]^{3-}$

10. i. What is a chelate complex? Give one example. **[1]**

    ii. What are heteroleptic complexes? Give one example.

11. **Assertion (A):** $[Pt(NH_3)_2Cl_2]$ is tetrahedral. **[1]**

    Reason (R): The oxidation state of platinum is +2.

    a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false. d) A is false but R is true.

12. **Assertion (A):** $[Ti(H_2O)_6]^{3+}$ is coloured while $[Sc(H_2O)_6]^{3+}$ is colourless. **[1]**

Reason (R): d-d transition is not possible in $[Sc(H_2O)_6]^{3+}$.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

13. **Assertion (A):** $[FeF_6]^{3-}$ is a low spin complex. **[1]**

Reason (R): Low spin complexes have less number of unpaired electrons.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

14. **Assertion (A):** The crystal field model is successful in explaining the formation, structures, colour and magnetic properties of coordination compounds. **[1]**

Reason (R): The anionic ligands are found at the low end of the spectrochemical series.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

15. **Assertion (A):** Square planar complexes do not show optical isomerism. **[1]**

Reason (R): Optical isomerism is due to the absence of elements of symmetry.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

16. Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a) $[Pt(NH_3)_4]^{4+}$	(i) 1.73 B.M
(b) $[CuCl_4]^{2-}$	(ii) 0 B.M
(c) $[Co(CN)_4]^{2-}$	(iii) 2.83 B.M
(d) $[NiCl_4]^{2-}$	(iv) 3.87 B.M

a) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

b) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

c) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

d) (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)

17. Coordination compounds have great importance in biological systems. In this context, which of the following statement is incorrect? **[1]**

a) Carboxypeptidase- A is an enzyme and contains zinc

b) Chlorophylls are green pigments in plants and contain calcium

c) Haemoglobin is the end pigment of blood and contains iron

d) Cyanocobalamin is B_{12} and contains cobalt

18. In the complex $CoCl_3 .4NH_3$, which of the following can be correct? **[1]**

a) Counter ion is Cl^-

b) $CoCl_3 .4NH_3$ can be represented as $[Co(NH_3)_4Cl_2]Cl$. Cl^- is outside the square bracket and hence is the counter ion. Also the coordination entity is $[Co(NH_3)_4Cl_2]^+$ as this is within the square brackets and represents the coordination sphere. So, options B and C are correct.

c) Coordination entity is $[Co(NH_3)_4 Cl_2]^+$

d) Cl^- is not a ligand.

19. Identify the optically active compounds from the following: **[1]**

a) $[Cr(NH_3)_5Cl]$

b) $[Cr(NH_4)_3Cl_2]$

c) trans $[CO(en)_2Cl_2]^+$

d) $[CO(en)_3]^{3+}$

20. Match the complex ions given in Column I with the hybridisation and number of unpaired electrons given in Column II and assign the correct code : **[1]**

Column I (Complex ion)	Column II (Hybridisation, number of unpaired electrons)
(a) $[Cr(H_2O)_6]^{3+}$	(i) dsp^2, 1
(b) $[Co(CN)_4]^{2-}$	(ii) sp^3d^2, 5
(c) $[Ni(NH_3)_6]^{2+}$	(iii) d^2sp^3, 3
(d) $[MnF_6]^{4-}$	(iv) sp^3, 4
	(v) sp^3d^2, 2

a) (a)-(iii), (b)-(i), (c)-(v), (d)-(ii)

b) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

c) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

d) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

21. **State True or False:** **[5]**

(a) The formula of Mohr's salt is $Fe_2(SO_2)_3.(NH_4)_2SO_4.6H_2O$. **[1]**

(b) A bidentate ligand has 3 coordination sites. **[1]**

(c) Stability of coordination compounds increases with increase in charge density of the metal ions. **[1]**

(d) $Ni(CO)_4$ is paramagnetic. **[1]**

(e) The sp^2 hybridization form the tetrahedral complex. **[1]**

22. **Fill in the blanks:** **[5]**

(a) Trans form of $[M(AA)_2a_2]^{n+}$ complex does not show _____ isomerism. **[1]**

(b) Geometrical isomerism is not observed in complexes of coordination number 4 of _____ geometry. **[1]**

(c) $[Co(NH_3)_6]^{3+}$ is diamagnetic while $[COF_6]^{3-}$ is _____. **[1]**

(d) Ethylenediamine is an example of _____ ligand. **[1]**

(e) In the inner orbital (low spin) octahedral complexes involve _____ hybridization. **[1]**