

ETERNAL CAREER CLASSES

SUBJECT : CHEMISTRY

CLASS : XII

FULL MARKS : 20

NAME :

BOARD TEST : 12

DATE : 17.12.2024

SECTION - A

Single answer type question. Attempt any seven question :-

Marks : $1 \times 7 = 7$

1. The formula of the complex dichloridobis (ethane-1, 2-diamine) platinum (IV) nitrate is:
(a) $[\text{PtCl}_2(\text{en})_2(\text{NO}_3)_2]$
(b) $[\text{PtCl}_2(\text{en})_2](\text{NO}_3)_2$
(c) $[\text{PtCl}_2(\text{en})_2(\text{NO}_3)]\text{NO}_3$
(d) $[\text{Pt}(\text{en})_2(\text{NO}_3)_2]\text{Cl}_2$
2. One mole of $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ compound reacts with excess AgNO_3 solution to yield two moles of $\text{AgCl}(\text{s})$. The structural formula of the compound is:
(a) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$
(b) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}_3] \cdot 3\text{H}_2\text{O}$
(c) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
(d) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$
3. Ambidentate ligands like NO_2^- and SCN^- are:
(a) unidentate
(b) didentate
(c) polydentate
(d) has variable denticity
4. Assertion (A): Linkage isomerism arises in coordination compounds because of ambidentate ligand.
Reason (R): Ambidentate ligand like NO_2 has two different donor atoms i.e., N and O.
(a) Both (A) and (R) are true and R is the correct explanation of A.
(b) Both (A) and (R) are true and R is not the correct explanation of A.
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true
5. The crystal field splitting energy for octahedral (Δ_0) and tetrahedral (Δ_t) complexes are related as:
(a) $\Delta_t = 4/9\Delta_0$
(b) $\Delta_t = 1/2\Delta_0$
(c) $\Delta_0 = 2\Delta_t$
(d) $\Delta_0 = 4/9\Delta_t$
6. The CFSE for octahedral $[\text{CoCl}_6]^{4-}$ is $18,000 \text{ cm}^{-1}$. The CFSE for tetrahedral $[\text{CoCl}_4]^{2-}$ will be:
(a) $18,000 \text{ cm}^{-1}$
(b) $16,000 \text{ cm}^{-1}$
(c) $8,000 \text{ cm}^{-1}$
(d) $20,000 \text{ cm}^{-1}$
7. Predict the number of ions produced per formula unit in an aqueous solution of $[\text{Co}(\text{en})_3]\text{Cl}_3$:
(a) 4 (b) 3 (c) 6 (d) 2
8. What is the secondary valency of Cobalt in $[(\text{Co}(\text{en})_2\text{Cl}_2)]^+$?
(a) 6 (b) 4 (c) 2 (d) 8
9. Assertion (A): $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ complex is less stable than $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]^{2+}$ complex.
Reason (R): $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ complex shows chelate effect.
(a) Both (A) and (R) are true and R is the correct explanation of A.
(b) Both (A) and (R) are true and R is not the correct explanation of A.
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

10. The coordination number of Co in the complex $[\text{Co}(\text{en})_3]^{3+}$ is:
(a) 3 (b) 6 (c) 4 (d) 5

SECTION - B

Short answer type question. Attempt any one question :-

Marks : $1 \times 3 = 3$

11. A. Write the IUPAC names of the following:
 $[\text{Co}(\text{NH}_3)_5(\text{ONO})]^{2+}$
B. What is a chelate complex? Give one example.
C. Discuss bonding, geometry and magnetic property of $[\text{Ni}(\text{CN})_4]^{2-}$.
12. A. What type of isomerism is exhibited by the complex $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$?
B. Draw one of the geometrical isomers of the complex $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ which is optically active.

Long answer type question. Attempt any two question :-

Marks : $2 \times 5 = 10$

13. A. For the complex $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$, write the hybridization, magnetic character and spin of the complex.
[At. number of Fe = 26]
B. Write the state of hybridisation, shape and IUPAC name of the following complex:
 $[\text{Ni}(\text{CN})_4]^{2-}$
14. A. Why is $[\text{NiCl}_4]^{2-}$ paramagnetic but $[\text{Ni}(\text{CO})_4]$ diamagnetic?
B. Why a solution of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ is green while a solution of $[\text{Ni}(\text{CN})_4]^{2-}$ is colourless?
15. A. Why are low spin tetrahedral complex rarely observed?
B. Two complex is given as $[\text{CoF}_6]^{3-}$ and $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$, which one complex is:
(A) diamagnetic
(B) more stable
(C) outer orbital complex and
(D) low spin complex?
[Atomic no. of Co = 27]
