

Type A $\rightarrow$ Reason-Assertion type Questions of Co-ordination compounds.

The questions given below consist of Assertion (A) and Reason (R). Use the following key to select the correct answer -

- a) If both assertion and reason are correct and reason is correct explanation for assertion
- b) If both assertion and reason are correct but reason is not correct explanation for assertion.
- c) If assertion is correct but reason is incorrect.
- d) If both assertion & reason are incorrect.

Ques 1 - Assertion: Tetrahedral complexes don't show geometrical isomerism.

Reason: - The relative positions of the ligands in tetrahedral complexes are the same with respect to each other.

Q2: Assertion: - $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ does not give a white ppt with AgNO_3 solution.

Reason: Chlorine is not present in the ionisation sphere.

Q3: Assertion: $\text{cis}[\text{CoCl}_2(\text{en})_2]^{2+}$ is optically active in nature.

Reason: It has no plane of symmetry.

Q4: Assertion: The complex $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic in nature.

Reason: Ni^{2+} ion in the complex is d^8 hybridised.

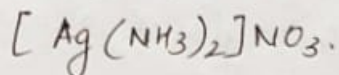
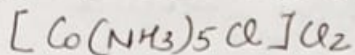
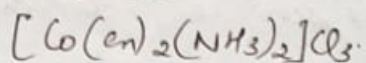
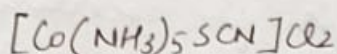
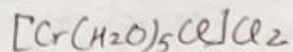
Q5: Assertion: The complex $[\text{Ni}(\text{en})_3]\text{Cl}_2$ has lower stability than $[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2$.

Reason: In $[\text{Ni}(\text{en})_3]\text{Cl}_2$, the geometry of Ni is trigonal bipyramidal.

Q6:- Assertion:- The ligands nitrito-N and nitrito-O are ambident in nature.
Reason:- The ligands give linkage isomers.

Type-B: Very short answer type Questions (1 Mark)

Q1. Write the IUPAC name of the complexes $\rightarrow$



Q2. Write the ionisation isomer of $[\text{Cr}(\text{H}_2\text{O})_5\text{Br}]\text{SO}_4$.

Q3. Write the co-ordination number of central metal ion in $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$

Type C:- Short answer type Questions (2 Marks)

Q1. Using valence bond approach, predict the shape and magnetic character of $[\text{Fe}(\text{CN})_6]^{3-}$ ion.

Q2. Using valence bond approach, predict the shape and magnetic behaviour of $[\text{CoCl}_4]^{2-}$

Q3. How is the magnitude of Δ_o affected by -
a) the Nature of ligands
b) Oxidation state of metal ion

Q4:- Explain -

- $[\text{Co}(\text{NH}_3)_6]^{3+}$ is diamagnetic whereas $[\text{CoF}_6]^{3-}$ is paramagnetic.
- $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ is more paramagnetic than $[\text{Fe}(\text{CN})_6]^{3-}$.

Q5:- Draw the structures of geometrical isomers of -
 $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ and $[\text{CoCl}_2(\text{en})_2]^+$

Q6. Explain with Eg -

- Linkage isomerism
- Co-ordination "

Q7. Determine the value of magnetic moment in foll -

- $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
- $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
- $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$

Q8. A solution of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ is green but a solution of $[\text{Ni}(\text{CN})_4]^{2-}$ is colourless. Explain

Q9. Using CFT, predict the configuration of

- d^4 (High spin)
- d^4 (Low spin)

Q10. Describe the nature of bonding in metal carbonyls.

Q11:- Mention application of coordination compounds in the following areas giving an eg of each -

- Analytical chemistry.
- Extraction of Metals.