Type 1 → 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 explaination for assertion

b) If both assertion and reason are correct but reason is not correct explaination for assertion.

c) If assertion is correct but reason is incorrect.

d) If both assertion & reason are incorrect.

Ques 1 - Assertion: Tetrahedral complexes donot show geometrical isomerism.

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

Q2: Assertion :- $[Co(NH_3)_3Cl_3]$ doesnot give a white ppt with $AgNO_3$ solution.

Reason: Chlorine is not present in the ionisation sphere.

Q3: Assertion: Cis $[CoCl_2(en)_2]^{2+}$ is optically active in nature.

Reason : It has no plane of symmetry.

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

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

Q5: Assertion: The complex $[Ni(en)_3]Cl_2$ has lower stability than $[Ni(NH_3)_6]Cl_2$

Reason: In $[Ni(en)_3]Cl_2$, 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 →
$[Cr(H_2O)_5Cl]Cl_2$
$[Co(NH_3)_5SCN]Cl_2$
$[Co(en)_2(NH_3)_2]Cl_3$
$[Co(NH_3)_5Cl]Cl_2$
$[Ag(NH_3)_2]NO_3$.

Q2. Write the ionisation isomer of $[Cr(H_2O)_5Br]SO_4$.

Q3. Write the co-ordination number of central metal ion in $[Fe(C_2O_4)_3]^{3-}$

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

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

Q2. Using valence bond approach, predict the shape and magnetic behaviour of $[CoCl_4]^{2-}$

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

Q4:- Explain -

i) $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic.

ii) $[Fe(H_2O)_6]^{3+}$ is more paramagnetic than $[Fe(CN)_6]^{3-}$

Q5:- Draw the structures of geometrical isomers of - $[Co(NH_3)_3Cl_3]$ and $[CoCl_2(en)_2]^+$

Q6. Explain with Eg -

a) Linkage isomerism

b) Co-ordination "

Q7. Determine the value of magnetic moment in foll-

1) $[Cr(H_2O)_6]^{3+}$

2) $[Fe(H_2O)_6]^{2+}$

3) $[Zn(H_2O)_6]^{2+}$

Q8. A solution of $[Ni(H_2O)_6]^{2+}$ is green but a solution of $[Ni(CN)_4]^{2-}$ is colourless. Explain

Q9. Using CFT, predict the configuration of

a) d^4 (High spin)

b) 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 -

a) Analytical chemistry.

b) Extraction of Metals.