TEST-B

SOLVED

Time: 1 hr. **Max. Marks: 30**

SECTION-A

Tick the correct option:

1. 0.1 M aqueous solution of which of the following coordination compound will have the highest boiling point? **[1]**

   (i) Hexaammine chromium (III) sulphate

   (ii) Hexaaqua iron (III) chloride

   (iii) Hexaammine platinum (II) chloride

   (iv) Potassium tetrachlorido nickelate (II)

2. The hybrid orbitals used by iron in the complex in $[FeCl_2(en)_2]^+$ is **[1]**

   (i) dsp^2 (ii) sp^3 (iii) d^2sp^3 (iv) sp^3d^2

3. The number of geometrical isomers for a square planar complex with a formula Mabcd is **[1]**

   (i) 1 (ii) 2 (iii) 3 (iv) zero

Assertion-Reason type Questions:

(i) If assertion and reason both are correct and reason is the correct explanation of assertion.

(ii) If assertion and reason both are correct and reason is not the correct explanation of assertion.

(iii) If assertion is correct and reason is wrong.

(iv) If assertion is wrong and reason is correct.

4. Assertion: EDTA is used in the estimation of hardness of water. **[1]**

   Reason: EDTA is a chelating ligand.

5. Assertion: Wilkinson's catalyst is a complex of platinum used as a homogeneous catalyst in the hydrogenation of alkene. **[1]**

   Reason: In homogeneous catalyst is reactants and the catalyst are in the same physical state.

One word /One Sentence type Questions.

6. An octahedral complex containing _____didentate ligands show optical isomerism. **[1]**

7. Write the IUPAC name of the linkage isomer of $[Co(NH_3)_5(ONO)]SO_4$. **[1]**

SECTION-B

8. Draw a well labelled diagram to show crystal field splitting for a complex with d^4 configuration in the presence of tetrahedral weak field ligand. **[2]**

9. (i) What is the coordination number and the oxidation state of chromium in the complex

$[Cr(NH_3)_2\ (en)_2]_2\ (SO_4)_3$?

(ii) Give one example of chelating ligand. **[2]**

10. Compound $CoCl_3.4NH_3$ on reaction with dil HNO_3 / $AgNO_3$ gives one mole of AgCl as a white precipitate. **[2]**

(i) write the formula of the coordination compound.

(ii) what is the name of the compound?

11. State with example, the applications of coordination compounds in (any two) **[2]**

(i) metallurgy

(ii) medicine

(iii) biological systems

12. Arrange the following complexes in order of increasing property indicated: **[2]**

(i) $[CrCl_6]^{3-}$, $[FeF_6]^{3-}$, $[Mn(CN)_6]^{4-}$ (magnetic moment)

(ii) $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$, $[Co(en)_3]^{3+}$ (increasing crystal field stabilisation energy, Δo).

13. Give reasons: **[2]**

(i) $K_4\ [Fe(CN)_6]$ is diamagnetic while $K_3\ [Fe(CN)_6]$ is weakly paramagnetic.

(ii) $[CrCl_6]^{3-}$ and $[Cr(CN)_6]^{3-}$ both are inner orbital complexes.

(iii) trans-$[Co(NH_3)_4Cl_2]^+$ does not show optical isomerism.

14. Predict the hybridisation, magnetic properties and the geometry for each of the following complexes **[2]**

(i) $[Fe(C_2O_4)_3]^{3-}$ (ii) $[MnBr_4]^{2-}$

(At. no. Mn = 25, Fe = 26)

15. (a) (i) What do you understand by stability constant.? **[2+2+1]**

(ii) Write the stability constant for the formation of $[Cu(NH_3)_4]^{2+}$

(iii) What are the factors on which the stability constant depends?

(b) Explain the concept of the back bonding in tetracarbonyl nickel (0).

