B.Sc. Part II
Inorganic Chemistry

Multiple Choice

1. Coordination number of Fe in potassium ferrocyanide:-

   (a) 4 (b) 3 (c) 6 (d) 5

2. Electronic configuration of Cr(24) is:-

   (a) $3d^4 4s^2$ (b) $3d^5 4s^1$ (c) $3d^5 4s^2$ (d) $3d^6 4s^2$

3. Which oxidation state is more stable for f-block elements?

   (a) +2 (b) +4 (c) +1 (d) +3

4. Lanthanides are also known as:-

   (a) Actinides (b) Rare earth elements

   (c) Non Metal (d) Metal

5. Oxidation state of Ni in complex $Ni(CO)_4$ is:-

   (a) 2 (b) 3 (c) 1 (d) 0

6. Number of donor atoms in bidentate ligand is:-

   (a) 4 (b) 5 (c) 2 (d) 1

7. NO_2^- ligand act as:-

   (a) Monodentate ligand (b) Tridentate ligand

   (c) Ambidentate ligand (d) Bidentate ligand

8. Give example of nonprotonic solvent:-

   (a) CH_3COOH (b) H_2SO_4 (c) liq.SO_2 (d) H_2O

9. Hybridisation in complex $[Ni(CN)_4]^{2-}$ is:-

   (a) sp^3 (b) dsp^2 (c) sp^2 (d) sp

10. Which geometrical isomer can show optical isomerism:-

    (a) cis (b) trans

    (c) cis & trans (d) None of the above

Short Questions:-

1. Why melting point of chromium is the highest among the 3d metals?
2. Explain ambidentate ligand with example.
3. Write the postulates of Werner's theory
4. Write the limitation of VBT.
5. Explain the oxidation states of lanthanides with example.
6. Explain ionisation isomerism with example.
7. Discuss the complex formation tendency of actinides.
8. Explain Arrhenius theory of acids and bases.
9. Explain protonic solvents.
10. Metal ammonia solutions are good conductors of electricity, explain.
11. Compare liquid NH_3 and H_2O as solvents.
12. Write uses of redox potential data.
13. Write short note on magnetic properties of lanthanides.
14. Explain colour of transition metal complexes.
15. Define the term coordination number and coordination sphere.

Long Questions:-

1. Write the IUPAC name of the following compounds:-

   (i) $Na_2[CuCl_4]$ (ii) $[Cr(NH_3)_5ONO]Cl_2$

   (iii) $[Co(en)_2Cl_2]Cl$ (iv) $Na_3[Fe(NH_3)_5NO]$

2. Write short note on ligands.
3. On the basis of VBT explain why $[Co(NH_3)_6]^{3+}$ is diamagnetic but $[CoF_6]^{3-}$ is paramagnetic.
4. Explain optical isomerism in octahedral complexes.
5. Explain lanthanide contraction and its consequences.
6. Explain super heavy elements.
7. Discuss Lux-flood theory of acid and base, on the basis of acidity scale explain the behaviour of acidic, basic and amphoteric oxides.
8. Discuss various types of reactions occuring in liquid SO_2.
9. How many types of solvents are there on the basis of their behaviour towards protons.
10. What are Latimer diagrams? Explain.