Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (LT)/SEM-1/MLT-105/2010-11

2010-11

ADVANCED CO-ORDINATION CHEMISTRY

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

1. Answer any *five* of the following : 5 × 2 = 10

   i) What are soft & hard ions ? Give example.

   ii) Why is Cr harder than Na ?

   iii) Octahedral Nickel (II) complexes are expected to be paramagnetic. Explain.

   iv) Is $K_7Cu(IO)_6$, $7H_2O$ diamagnetic or paramagnetic ? Explain.

   v) Name the strongest & weakest ligands.

   vi) Give the full name of the term :

      a) LFER

      b) LFSE.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain why $Co(NH_3)_6^{3+}$ is unstable but inert, where as $Ni(CN)_4^{2-}$ are stable but labile.

3. Why is there exception in theoretical value of ionic radii of transition metal compounds with respect to its experimental value ?

4. Why are (II) amines hydrolyzed with great ease in aqueous solution ?

5. Give the electronic configuration of Cr (0) metal and mention its specificity with reason.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

6. Describe and explain the John Teller effect in octahedral complexes of Cr^{2+} and Cu^{2+}.

7. Calculate & compare the crystal field stabilization energy for d^1 to d^{10} ions in both octahedral & tetrahedral complexes.

8. a) Discuss the reason for colour formation in transitional metal complexes.

   b) How does it differ from organic coloured compounds ?

   c) What are the differences between a coloured compound & dyes ? 7 + 4 + 4

9. State and explain the thermodynamic & kinetic stability of complexes. Explain the factors which affect the stability of complexes.