IMPORTANT INSTRUCTIONS FOR PAPER ID 53407

1. Attempt any 4 part out of the given 8 from question No. 1.
2. SECTION D (Question No. 8 & 9) be treated as deleted or null & void.
3. Attempt any 04 questions from question No. 2 to 7.

5. (a) Write down the dissimilarities between lanthanides and actinides. **6**

(b) Explain why electronic configuration of actinides are less certain than lanthanides. **4**

(c) Magnetic properties of lanthanides are different from transition elements. Explain. **6**

Section C

6. (a) What are isomers ? Explain different types of structural isomers in coordination compounds by giving suitable examples. **6**

(b) Write the IUPAC name of : **2×3=6**

(i) $Li[A1H_4]$

(ii) $Na_3[Co(NO_2)_6]$

(iii) $[Co(NH_3)_3(NO_2)Cl_2]$

(c) Give the drawbacks of Valence Bond Theory. **4**

7. (a) What are inner and outer orbitals complexes ? Explain by giving suitable examples. **5**

Subject Code—53407

B. Sc. EXAMINATION

(Batch 2018 Onwards)

(Main & Re-appear)

(Fourth Semester)

CHEMISTRY

CCL-404

Inorganic Chemistry–II

(Transition Metals and Coordination Chemistry)

(Core Course–VII)

Time : 3 *Hours* *Maximum Marks :* 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. Q. No. **1** is compulsory.

1. (a) Why is Eu^{2+} more stable than Ce^{2+} ? **2**

(b) Why are *d*-block elements called transition elements ? **2**

(c) Why do tetrahedral complexes not show geometrical isomerism ? **2**

(d) Compare the toxicity of KCN and $K_4[Fe(CN)_6]$ **2**

(e) Hydrated cupric sulphate ($CuSO_4.5H_2O$) is blue but anhydrous cupric sulphate ($CuSO_4$) colorless. Why ? **2**

(f) Define spectrochemical series. **2**

(g) Why is Cu^{2+} more stable than Cu^{+} ? **2**

(h) Why lanthanides resemble each other much more closely than do a horizontal row of transition elements ? **2**

Section A

2. (a) Why do transition elements in lower or zero oxidation state form complexes with ligands like CO, NO or trialkyl phosphines (PR_3) ? **5**

(b) Why transition metals forms large number of complexes ? Explain by giving examples. **5**

(c) Explain the stability of various oxidation states of iron using Latimer diagram. **6**

3. (a) How do you explain the anomalous electronic configuration of Cr and Cu ? **4**

(b) Why do transition metals : **6**

(i) Show variable oxidation states

(ii) Form a large number of complexes

(iii) Give colored ions

(c) Calculate the magnetic moment (spin only) of Mn^{3+}, V^{2+} and Cr^{3+}. **3×2=6**

Section B

4. (a) Discuss the ion exchange method for the separation of lanthanide ions. **6**

(b) What is lanthanide contraction ? Explain its cause. **4**

(c) Explain different types of electronic transitions responsible for color of Actinide ions. **6**

(b) Why the magnitude of crystal field splitting in octahedral complexes Δ_0 is larger than in tetrahedral complexes Δ_t. **4**

(c) Explain by drawing suitable diagram the tetragonal elongation and tetragonal compression in octahedral compounds. **6**

(b) What are chelates ? Discuss the factors that affect the stability of chelates. **5**

(c) Write the chemical formula of the following complexes : **3×2=6**

(i) Potassium pentacyanonitrosylferrate (III)

(ii) Potassium trioxalatoferrate(III)

(iii) Hexaamminechromium(III) ion.

Section D

8. (a) How do the *d*-orbitals split when a transition metal ion is placed in octahedral crystal field of ligands ? **6**

(b) Give the limitations of crystal field theory. **4**

(c) State and explain Jahn Teller Effect giving suitable examples. **6**

9. (a) How do the *d*-orbitals split when a transition metal ion is placed in tetrahedral crystal field of ligands ? **6**