

M.Sc.Examination, 2018
Semester-III
Chemistry(Elective)
Course: CH-916
Optional (Inorganic Chemistry)

Time: Three Hours

Full Marks: 40

Questions are of value as indicated in the margin.
Answer *any four* questions.

1. a) What is Van Vleck equation? Give one application of this equation. Explain χ_M vs. T and χ_M vs. 1/T plots for antiferromagnetic, diamagnetic, paramagnetic and ferromagnetic compounds. 1+2+4
b) What is Single Molecule Magnet (SMM)? Give one example which behave as SMM. 2+1
 2. a) Propose a deliberate route towards synthesizing ferromagnetic compounds. 5
b) Explain the phenomenon of Accidental Orthogonality? 5
 3. a) Design a synthetic scheme to achieve a supramolecular architecture. 4
b) Define functional and structural components in Coronand or Cryptand explaining their role towards molecular recognition. 1.5+1.5
c) What are Catenanes and Rotaxanes? What are their importance's? 1+1+1
 4. a) How can you prepare the *cis* and *trans* isomers of $[\text{Pt}(\text{Cl})_2(\text{NH}_3)(\text{C}_2\text{H}_4)]$? 3.5
b) How can you detect the *cis* and *trans* isomers of $[\text{Pt}(\text{Cl})_2(\text{NH}_3)_2]$? 3.5
c) Comment on the rate law and mechanism of ligand substitution process in the reaction of $[\text{Ni}(\text{CO})_4]$ with PR_3 . 3
 5. a) What is the advantage of the Co(II) substituted carbonic anhydrase to study the structural features of the prosthetic group? 2
b) How does sulphonamide inhibit the activity of carbonic anhydrase? 3
c) Why did nature change Fe and Mn by Cu in the development of SOD in the evolution process? 2.5
d) Compare the structural features of the active site in catalase, peroxidase and heme group of myoglobin. 2.5
 6. a) Draw the skeletal structures of porphyrin, chlorin (in chlorophyll II), and corrin (in vit-B₁₂) rings. 3.5
b) How can you explain the cyanide induced toxicity through the inhibition of cyt-c oxidase? 3
c) Give the mechanism of racemisation for $\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3] \cdot 2\text{H}_2\text{O}$ when heated in a sealed tube. 3.5
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