

Gurudas College
Internal Examination, 2020
Chemistry (Honours), SEM – IV
Paper: CC-4-10

F.M. – 50, Time – 2 hrs

(Answers should be brief and to the point. Each question carries five marks.)

Group – A (CC-4-10-TH)

(answer any five questions)

1. Discuss the d-orbital splitting in complex ions $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{NiCl}_4]^{2-}$.
2. What do you understand by 'dynamic Jahn-Teller distortion'? How does it differ from that of 'static' one?
3. Give the origin of colour in $[\text{CrO}_4]^{2-}$ and $[\text{Fe}(\text{o-phen})_3]$.
4. Predict the magnetic properties of $[\text{Fe}(\text{CN})_6]^{4-}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
5. For Co(II) complexes the observed magnetic moment : $O_h(\text{h.s.}) > T_d$ –justify.
6. What do you mean by lanthanide contraction? The third ionization energy for Eu and Yb are comparatively higher than other lanthanides.-Explain.
7. Compare the common oxidation states of Cu, Ag and Au metals.
8. How can you synthesize cis- and trans- isomers of $[\text{PtCl}_2(\text{NH}_3)_2]$ using Trans effect?

Group – B (CC-4-10-P)

(answer any three questions)

9. What kind of reaction(s) take place during the preparation of $\text{K}[\text{Cr}(\text{C}_2\text{O}_4)_2 \cdot (\text{H}_2\text{O})_2] \cdot 2\text{H}_2\text{O}$?
10. Write the structure of both the isomeric forms of $\text{K}[\text{Cr}(\text{C}_2\text{O}_4)_2 \cdot (\text{H}_2\text{O})_2] \cdot 2\text{H}_2\text{O}$.
11. What is the role of H_2O_2 in the preparation of $[\text{Co}(\text{NH}_3)_4\text{CO}_3]\text{NO}_3 \cdot 0.5\text{H}_2\text{O}$?
12. What kind of complex is $\text{Fe}(\text{acac})_3$?
13. Draw the structure of the complex $[\text{Ni}(\text{en})_3]\text{Cl}_2 \cdot \text{H}_2\text{O}$.
14. Write the procedure of preparation of $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3] \cdot 3\text{H}_2\text{O}$ schematically showing the change in colour in each step.

Group – C (Internal Assessment)

(answer any two questions)

15. For the complex $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ ion, the mean pairing energy (P) is found to be 28800 cm^{-1} . The magnitude of $10 Dq$ or Δ_0 is 21000 cm^{-1} . Calculate the crystal field stabilization energy (CFSE) to high spin and low spin state. Which state is more stable?
16. $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ is faint pink in colour but MnO_4^- is intense purple-justify.
17. Explain the LMCT transition energy : $\text{MnO}_4^- < \text{CrO}_4^{2-}$
18. Electronic absorption bands of lanthanide ions are sharper compared to those of transition metal ions - Explain.