

Gurudas College

Internal Assessment Examination, 2021

Subject-CEMA, SEM-IV

Paper- CC-4-10

Full Marks-10

Time-30 mins

Answer any five questions

5 × 2 = 10

1. Calculate the CFSE (crystal field stabilization energy) for a high-spin d^6 octahedral complex.
2. Show the relationship between (a) pairing energy (P) and Δ_0 for weak field and strong field ligand (b) Δ_o and Δ_t .
3. Calculate the OSSE (octahedral site stabilization energy) for high spin d^2 configuration.
4. Explain the order of MLCT transition energy among the following: $[\text{V}(\text{CO})_6]^-$, $[\text{Cr}(\text{CO})_6]$, $[\text{Mn}(\text{CO})_6]^+$.
5. For d^8 transition metal ions the observed magnetic moment is in the order: $\mu_{\text{oct}} < \mu_{\text{td}}$ – justify.
6. Define labile and inert complexes and explain the lability sequence
 $\text{AlF}_6^{3-} > \text{SiF}_6^{2-} > \text{PF}_6^- > \text{SF}_6$.
7. MnSO_4 is pale pink but MnO_4^- is intense violet – justify the origin of their colour and the colour intensity with respect to selection rules of the electronic transition.
8. Give a brief note on oxidation states of d-block elements.