

Phosphorescence

3. Answer any 2

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- a (i) Calculate the CFSE of the following Octahedral systems:
 d^1 , $d^4(\text{low spin})$, $d^9(\text{low spin})$
- (ii) Explain Crystal field splitting in case of tetrahedral complex.
- b (i) Explain the magnetic properties of low spin and high spin complexes.
- (ii) What are d transitions? Name the different types of transitions involved in Octahedral complexes.
- c (i) Give the detailed account on Spin selection rule of electronic spectra.
- (ii) Draw the Orgel diagram and explain the energy level diagram for a d^3 configuration and explain the possible transitions.

4. Answer any 1

- a (i) Derive an expression for emf of the following cell at 25°C if the concentration of anodic and cathodic electrolyte is 'a' and 'c' respectively and $a > c$.
$$\text{Pt, H}_2 / \text{HCl} / \text{HCl} / \text{H}_2, \text{Pt}^+$$

a c
- (ii) Write a brief note on the factors affecting the magnitude of Crystal field splitting:
 - 1) Geometry of complex
 - 2) Nature of the Ligand.
- b (i) Derive an expression to determine the Liquid junction potential constructing an appropriate cell with uni-univalent electrolyte reversible to anions.
- (ii) $[\text{V}(\text{H}_2\text{O})_6]^{+3}$ has 2 absorption bands at 17800 cm^{-1} and 25700 cm^{-1} . Explain this with Orgel diagram and interpret the spectra of the same.

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