CH1102.

Assignment - 04

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EXPT. NO. - 04 : Cyanotype Blue Printing.

Q1. Ligands that produce a large splitting of d-orbitals and favour pairing of electrons are called Strong field Ligands.
Those which produce a small splitting of d orbitals are called Weak field Ligands.
In ascending order,

$$Br^{\ominus} < Cl^{\ominus} < H_2O < CN^{\ominus} < CO$$

Q2. In both the complexes, Fe is the +3 Oxidn State with configuration $3d^5$. $CN^{\ominus}$ is strong ligand and in its presence, 3d electrons pair up leaving only one electron unpaired. The hybridisation is d^2sp^3 forming inner orbital complex. In contrary to this, H_2O is a weak ligand and in its presence, 3d electrons do not pair up. The hybridisation is sp^3d^2 forming an outer orbital complex containing five unpaired electrons. Hence, $[Fe(CN)_6]^{3-}$ shows weak paramagnetic responses than its aqueous complex.

Qs. $[Fe(C_2O_4)_6]^{3-}$ is not stable among four ion complexes.

Reason: Metal Chelates are more stable. Oxalate is a bidentate ligand and forms metal chelates.