Topic-III

Q-III.1. When high pressure is applied equally in all direction, what type of electronic configuration is favoured for an octahedral high-spin d^5 transition metal complex?

Q-III.2. Using the crystal field stabilisation energy as a criterion, indicate whether you expect the following spinels to be normal or inverse: Fe_3O_4; Co_3O_4.

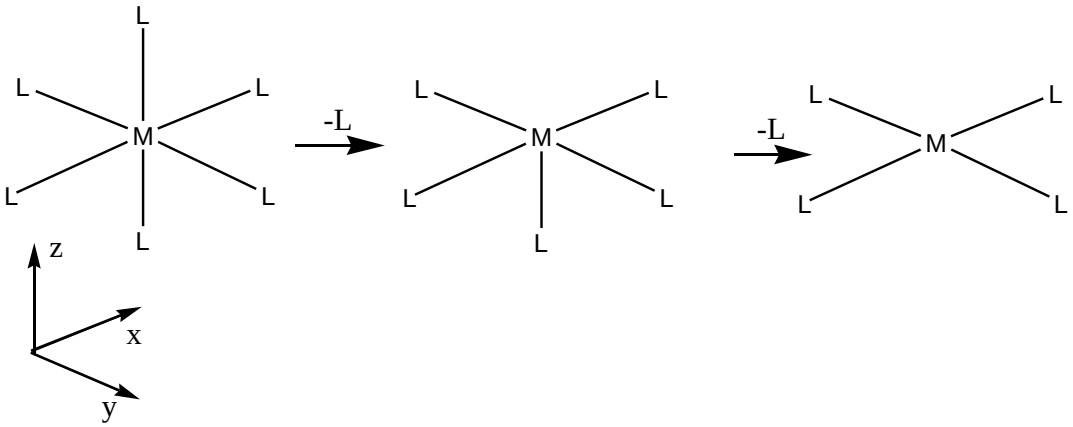
Q-III.3. By showing the details, determine the CFSE for the following complexes:

(a) $[FeCl_4]^{2-}$; (b) $[W(CO)_6]$

Q-III.4. For the following compounds $[M(NH_3)_6]^{3+}$ (M=Ti, Zr, Hf), draw the tentative absorption spectra.

Q-III.5 $[Cu(NH_3)_4(H_2O)_2]^{2+}$ complex reacts with two equivalent of KCN leading, to the formation of $[Cu(NH_3)_4(CN)_2]$. Based on crystal field theory, predict the orbital splitting and the expected geometry for both complexes.

Q-III.6 Draw the orbital splitting for the following geometries given. (Assume ligand L as weak field ligand and also label the orbitals.



Q-III.7. $[Cr(CO)_6]$ is a stable molecule while $[Ni(CO)_6]$ is very unstable. Rationalise this observation employing Molecular Orbital Theory and draw the corresponding molecular orbital diagrams.