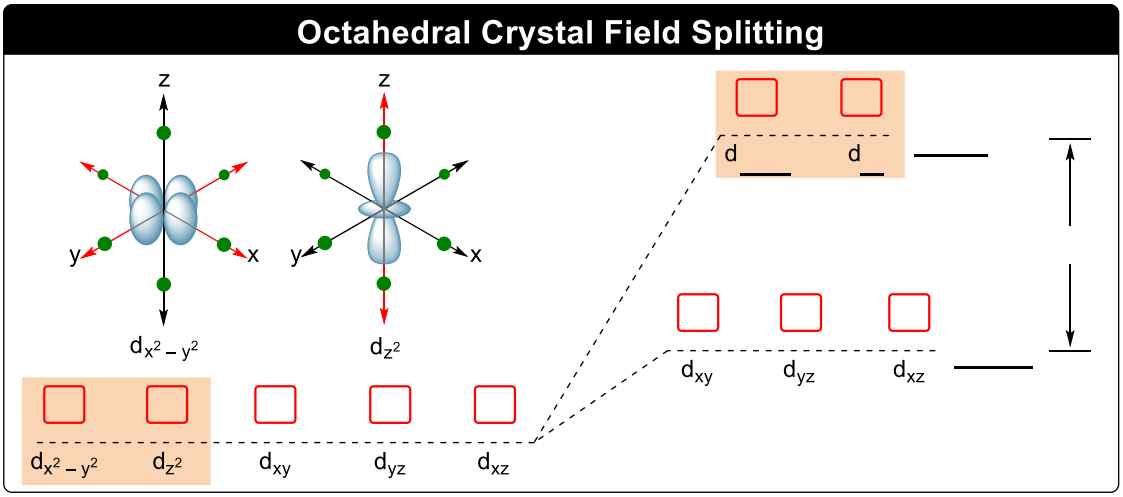
CONCEPT: CRYSTAL FIELD THEORY: OCTAHEDRAL COMPLEXES

- **Crystal Field Splitting:** The separation of degenerate d orbitals into non-degenerate sets.
  - □ The splitting pattern for a complex depends upon its _____.

Octahedral Crystal Field Splitting

- **Recall:** In octahedral complexes, ligand-orbital interactions on the axes are the strongest.
  - □ This _____ the energies of the orbitals that are oriented on the axes.



- **Crystal Field Splitting Energy (____):** The _____ difference between the two sets (e and t_2) of orbitals.
  - □ e = doublet (___ orbitals)
  - □ t = triplet (___ orbitals)

EXAMPLE: For which of the following complexes, the energy of the t_2 set is lower than the e set?

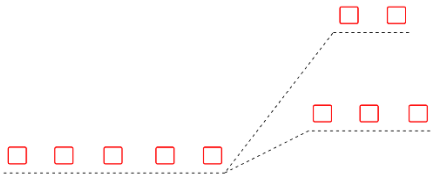
a) $[Zn(OH)_4]^{2-}$

b) $[Ag(NH_3)_2]^{+}$

c) $[CoCl_4]^{2-}$

d) $[Co(H_2O)_6]^{3+}$

PRACTICE: The following diagram shows crystal field splitting pattern for a complex. Which one of the complexes given below should best match the given diagram?



a) $[Ag(NH_3)_2]^{+}$

b) $[Cu(ox)_2]^{2-}$

c) $[Cr(en)_3]^{3+}$

d) $[Fe(CO)_5]$