Teaching Tanabe- Sugano Diagrams

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This in-class exercise will examine how the Tanabe-Sugano diagrams can be useful in predicting and analyzing the spectra of transition metal complexes.

For the metal complex $[Mn(H_2O)_6]^{3+}$, what is the d electron count?

Use, the appropriate Tanabe-Sugano Diagram Predict the spin-allowed electronic transitions for $[Mn(H_2O)_6]^{3+}$.

What changes would you expect if the water ligands were changed to bipyridine (bpy) ligands?

Explain why the free ion Ground state in this TS diagram labeled ^5D?

What would be the approximate wavelength (in nm) of the $^3T_1 \rightarrow {}^3T_2$ transition in a complex with Δ_o= 29,040cm^{-1} and B=968 cm^{-1}?