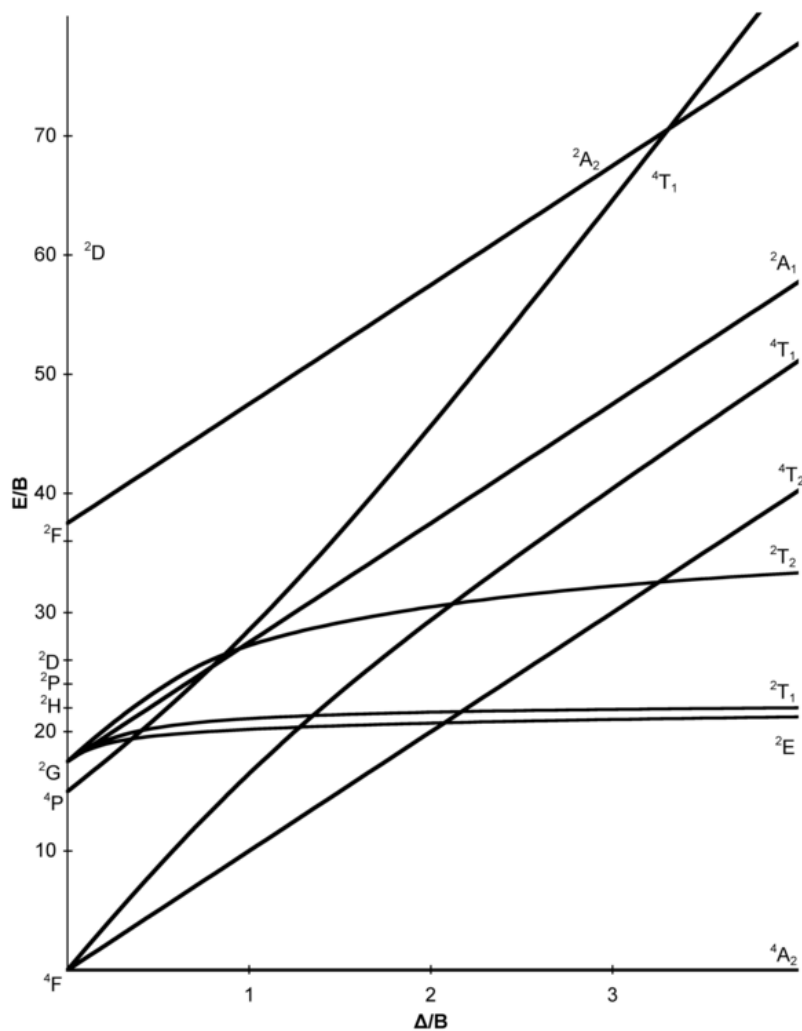
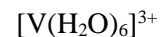
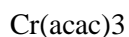


Consider  $\text{Mn}(\text{OAc})_2$ ,  $\text{KMnO}_4$ , and  $\text{TiCl}_3$ .

- For all three compounds, provide the oxidation state, d-electron count, and the term symbol of the free ion ground state.
- Identify the flask containing the respective compounds. Explain.
- For which transition metal complexes is the correlation diagram shown below appropriate for spectroscopic analysis? How many spin-allowed transitions would you expect? For the appropriate complexes, draw these transitions on the diagram.



4. Which of the correlation diagrams shown below or above is appropriate for the spectroscopic analysis of an  $O_h$  complex of  $Co^{III}$  that was found to have no unpaired electrons?

