Chem 4434 Exam 3 (Final)

This is a closed book exam (200 points, 50%)
Good luck!!!

1. In the boxed below, write the correct structural formula of $[Cr(bipy)_3]^{3+}$ (**a**) and $Pd(dppe)_2$ (**b**) (20 points):

(a) (10 points)

(b) (10 points)

2. Sketch all possible isomers of $[Cr(Cl)_2(Br)_2(F)_2]$ complex (10 points) and indicate all possible optical isomers (10 points). Total: 20 points

3. Explain why $[V(O)_2(H_2O)_4]^+$ ion has ***cis*** geometry while $[Os(O)_2(Cl)_4)]^{2-}$ ion has ***trans*** geometry. (20 points)

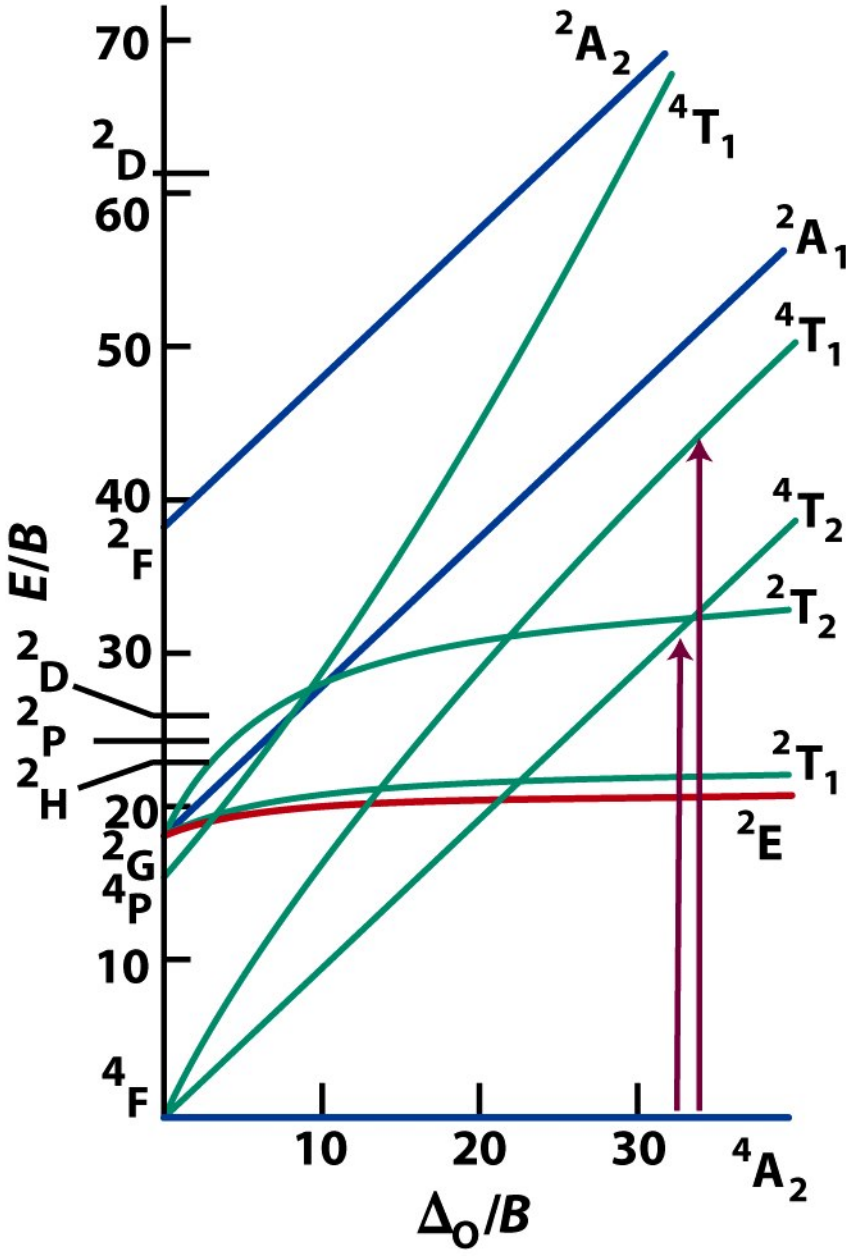
4. Sketch the energies of d-orbitals in tetrahedral crystal field (5 points). Label all individual orbitals (5 points). Total 10 points.

5. Calculate ligand-field stabilization energy for tetrahedral $[NiCl_4]^{2-}$ complex taking into consideration that Cl^- is a weak-field ligand (10 points)

6. Explain an influence of π-acceptor ligands on the magnitude of Δo using molecular orbital diagram (20 points)

7. What is the ground state term for d^4 electron configuration in atom? (20 points)

8. Using Tanabe-Sugano diagram below predict how many spin-allowed transition are possible for d^3 complex if Δo/B value is equal to 40 (10 points). Label all transitions using spectroscopic terms (10 points). Total: 20 points.



9. Complete the diagram of catalytic cycle for the Heck reaction (10 points each box, total 60 points).