

HW 6
CHEM 362

Due: October 29, 2019

1. Define the terms *lability*, *labile*, and *inert*. Are these thermodynamic issues or kinetic issues?
2.
 - a. Draw all the ways a regular octahedron can be distorted, and explain in words how each distortion is achieved.
 - b. Draw a regular octahedron
 - c. What is the rarest distorted geometry? Why?
3. What are the differences between the **trans influence** and the **trans effect**? How can the presence of the trans influence be determined? *Hint: which one is a thermodynamic effect? Which one is a kinetic effect? And why does that matter?*
4. Draw the reactions and give the products (and include the proper IUPAC name) for the following reactions. Explain how you arrived at the product.
 - a. $[\text{Rh}(\text{Cl})_3(\text{CO})]^{2-}$ with one equivalent of PPh_3
 - b. $[\text{AuI}_4]$ - with first one equivalent of PPh_3 followed by one equivalent of py.
5. Consider the compound $\text{Pt}(\text{py})\text{NH}_3\text{NO}_2\text{Cl}$.
 - i. Draw the three isomers of this compound
 - ii. Using the trans effect sequence given in the text, devise rational procedures for selectively synthesizing each of the three isomers
6. What are the 6 types of reactions that octahedral complexes can undergo? Describe each and be sure to write the chemical reactions for any relevant or important steps in the reaction mechanism.
7. Square planar complexes can undergo substitution reactions
 - a. Write the general formula for this type of reaction
 - b. What is the overall rate law?
 - c. What does this rate law tell you about the available reaction path(s)? Describe these path(s) in detail.
8. Square pyramidal complexes can be considered fluxional
 - a. Show with drawings how axial-equatorial exchange in a square pyramidal complex AB_5 could occur through a trigonal bipyramidal intermediate.
 - b. For the compound PCl_2F_3 , how many ^{19}F -NMR signals would you expect to see at room temperature? How signals many would you expect to see if the experiment was performed at a temperature that prevented a fluxional process? Explain