FLINN SCIENTIFIC

Name_____

Pre-Laboratory Assignment

1. Define the terms *Lewis acid* and *Lewis base*.

2. Define the terms *ligand* and *coordination number*.

3. What are the oxidation numbers of the metal atoms in each of the following coordination compounds?

   a. $[Ni(NH_3)_6](NO_3)_2$

   b. $K_3[Co(CN)_6]$

   c. $[Pt(NH_3)_3Br]Cl$

4. For each of the following ligands, draw the Lewis structures and indicate the atom that donates an electron pair for complex ion formation.

   a. NH_3

   b. CN^-

   c. $C_2O_4^{2-}$

5. What is the coordination number of the metal in each of the following compounds?

   a. $[FeCO(CN)_5](NO_3)_3$

   b. $[Ag(CN)_2]Cl$

   c. $[Cr(H_2O)_2Cl_2]Br$

6. Suppose a student synthesizes potassium trioxalatoferrate(III) trihydrate, $K_3[FeC_2O_4)_3]\cdot 3H_2O$, by starting with 11.356 g of ferrous ammonium sulfate, $Fe(NH_4)_2SO_4\cdot 6H_2O$.

   a. What is the theoretical yield, in grams, for $K_3[FeC_2O_4)_3]\cdot 3H_2O$?

   b. If 9.376 g of $K_3[FeC_2O_4)_3]\cdot 3H_2O$ were actually synthesized, what is the percent yield?

Data Table

1. Mass of $Fe(NH_4)_2(SO_4)_2 \cdot 6H_2O$ (g) _____
2. Mass of $K_3[Fe(C_2O_4)_3] \cdot 3H_2O$ (g) _____

Wavelength, nm	Absorbance
360	
370	
380	

Post-Laboratory Review Questions

Results Table

Theoretical yield of $K_3[Fe(C_2O_4)_3]\cdot 3H_2O$ (g) _____

Percent yield of $K_3[Fe(C_2O_4)_3]\cdot 3H_2O$ (%) _____

Absorbance Ratios	Standard	Product
360/370 nm	1.43	
370/380 nm	1.64	
360/380 nm	2.35	

1. Calculate the theoretical yield of $K_3[Fe(C_2O_4)_3]\cdot 3H_2O$, based on the sample weight of $Fe(NH_4)_2(SO_4)_2\cdot 6H_2O$. Enter this value in the Results Table.

2. Calculate the percent yield for the $K_3[Fe(C_2O_4)_3]\cdot 3H_2O$ product. Enter this value in the Results Table.

3. Calculate the absorbance ratios of the product solution. Calculate the 360/370 nm, the 370/380 nm, and the 360/380 nm absorbance ratios and enter these values in the Results Table. Was the product $K_3[Fe(C_2O_4)_3]\cdot 3H_2O$?