

Your name: _____

Your instructor: _____

CHY116 Report Form

Measuring an Equilibrium Constant I: Using Color to Analyze an Equilibrium Mixture

Print this form and bring it with you to lab.

Keep complete records of your lab work, including observations and data, in your **Laboratory Notebook**. A student with your background should be able to repeat your work and compare their results against yours, using only your lab notebook.

I. Calculations and Results

Working in your lab notebook, complete all tasks requested in the **Procedure**.

After carrying out all calculations and obtaining final results in your lab notebook, transfer the specified calculations and results, NEATLY and with proper units, in the spaces provided below. Show proper units and significant figures. Give the page number where this information can be found in your lab notebook.

Part 1. Calibration Data and Results

1. From the completed work in your lab notebook, transfer data and results to this table (before lab, set up this table in your lab notebook):

Table 1. Calibration Data and Results (from page ____ in your lab notebook)

Solution #	[FeSCN ²⁺] (calculated)	Absorbance (measured)
C1 (blank)		
C2		
C3		
C4		
C5		

2. *After this page*, insert your Beer's-law plot. Be sure that it meets all syllabus guidelines for a graph.

3. Enter the value you obtained for **E**, with proper units and significant digits:

E = _____ .

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Part 2. Equilibrium Data and Results

1. Transfer data and results from your lab notebook to this table (before lab, set up this table in your lab notebook):

Table 2. Equilibrium Data and Results (from page _____ in your lab notebook)

Solution # -->	E2	E3	E4	E5
Initial [Fe ³⁺], M				
Initial [SCN ⁻], M				
Absorbance				
[FeSCN ²⁺], from calibration equation				
Eq'n [Fe ³⁺], M				
Eq'n [SCN ⁻], M				
K_C				

2. Find the mean (average) value of **K_C** from your four equilibrium solutions.

Answer: _____

3. Find the standard deviation for your four values of **K_C**.

Answer: _____

4. Divide the standard deviation by the mean value, and express the result as a percentage.

Answer: _____ %.

5. The answer to question 4 measures the amount of variation among your four determinations of **K_C**. Consult your syllabus, **Guidelines for Reports, Abstracts, and Graphs**, and read the last section, on **Experimental Variation**. Then compute the expected experimental variation of your data for solution E3.

Answer: _____.

6. If your answer to 4 is larger than your answer to 5, it means that there is excessive variation among your four values of **K_C**. Suggest possible reasons for this excessive variation.

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Part 2. Questions

1. What are the units of **A**? Show that the product **EbC** has the same units as does **A**.
2. When you plot a graph of the absorbance (**A**) versus the concentration of a substance, how do you know if the data obey Beer's law?
- 3) How would your *calculated* value of **K_C** be affected (increased, decreased, or not changed) if you used water instead of aqueous HNO₃ in part II of this experiment? Circle the correct answer.
I D NC **Explain**
- 4) a. How would the *observed absorbance* of calibration solutions be affected if you did not read labels carefully and used 0.00200 M Fe³⁺ instead of 0.200 M Fe³⁺ to make up the solutions?
I D NC **Explain**

b. Would you still expect the calibration graph to be a straight line? **Explain.**
5. In the experiment, Fe³⁺ is always in excess so that FeSCN²⁺ does not react further with SCN⁻ to form Fe(SCN)₂⁺ (*compare these two formulas carefully -- they are not the same!*). Fe(SCN)₂⁺ absorbs even more strongly at 460 nm than does FeSCN²⁺. How would your *calculated* value of **K_C** be affected by formation of Fe(SCN)₂⁺?

I D NC **Explain**

Report

Turn in 1) all pages of this **Report**, and 2) all copy pages from your laboratory notebook. Staple them into a single package.

Ask your instructor whether you should include an abstract for this experiment. If so, it should be the first page of your report package.