FLINN
SCIENTIFIC

Name____

Data Tables and Graph

Reference Solutions

Temperature: _____________

Sample	$[FeSCN^{2+}]$	Absorbance
Reference solution 1		
Reference solution 2		
Reference solution 3		
Reference solution 4		
Reference solution 5		

Test Solutions

Temperature: _____________

Sample	$[Fe^{3+}]$*	$[SCN^{-}]$*	Absorbance
Test solution 6			
Test solution 7			
Test solution 8			
Test solution 9			
Test solution 10			

*These are the concentrations of ions in solution immediately after mixing and before any reaction has occurred. See the *Pre-Laboratory Assignment* for calculations.

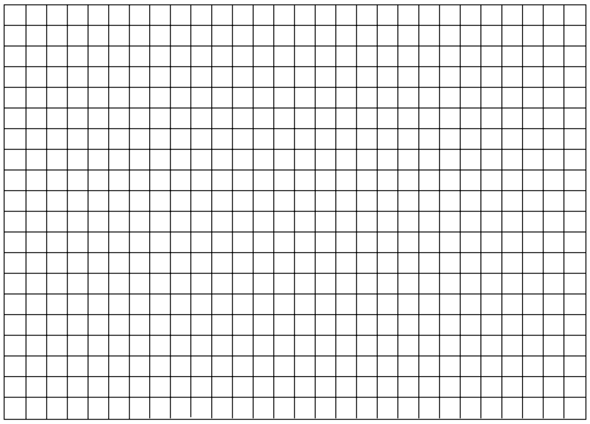
Results Table

Sample	$[FeSCN^{2+}]_{eq}$	$[Fe^{3+}]_{eq}$	$[SCN^{-}]_{eq}$	K_{eq}
Test Solution 6				
Test Solution 7				
Test Solution 8				
Test Solution 9				
Test Solution 10				

Average value: _____________

Average deviation: _____________

Absorbance versus Concentration Graph



Post-Laboratory Review Questions

1. On the previous page, plot the molar concentration of $FeSCN^{2+}$ versus absorbance as shown in Figure 1, and draw the best-fitting straight line through the data points. Include the origin (zero absorbance for zero concentration) as a valid point.

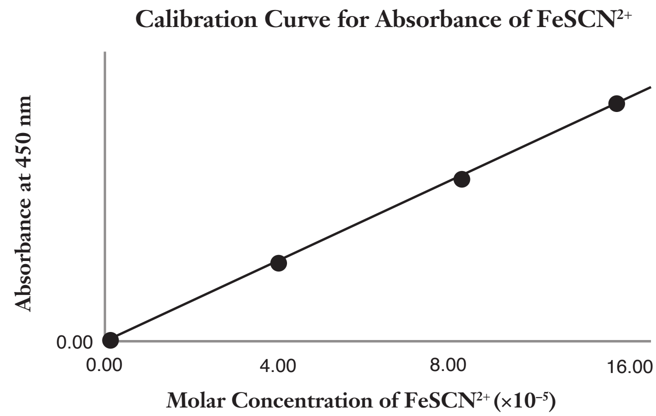


Figure 1.

2. The unknown concentration of $FeSCN^{2+}$ ions in each test solution can be determined from the graph. Find the absorbance value of the test solution, read across to the best-fit, straight-line curve, and then down to the x-axis to find the concentration.

3. Record the $FeSCN^{2+}$ concentration for each test solution in the Results Table.

4. Calculate the equilibrium concentration of Fe^{3+} ions in each test solution 6–10 by subtracting the equilibrium concentration of $FeSCN^{2+}$ ions from the initial concentration of Fe^{3+} ions (see the Test Solutions Data Table). Enter the results in the Results Table.

   $[Fe^{3+}]_{eq} = [Fe^{3+}]_{initial} - [FeSCN^{2+}]_{eq}$

5. Calculate the equilibrium concentration of SCN^- ions in each test solution 6–10 by subtracting the equilibrium concentration of $FeSCN^{2+}$ ions from the initial concentration of SCN^- ions (see the Test Solutions Data Table). Enter the results in the Results Table.

   $[SCN^-]_{eq} = [SCN^-]_{initial} - [FeSCN^{2+}]_{eq}$

6. Use Equation 4 in the *Background* section to calculate the value of the equilibrium constant K_{eq} for each test solution 6–10. Enter the results in the Results Table.

7. Calculate the *mean* (average value) of the equilibrium constant for the five test solutions and enter below the Results Table.

8. Calculate the *average deviation* for K_{eq} by finding the absolute value of the difference between each individual value of the equilibrium constant and the mean. The average of these differences for solutions 6–10 is equal to the average deviation. Record the average deviation below the Results Table.

9. The average deviation describes the precision of the results. Does the precision indicate that the equilibrium constant is indeed a "constant" for this reaction? Explain.

10. Describe the possible sources of error in this experiment and the likely effects on the results.