

**QUESTION 1**

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
505 EAST LAUREL AVENUE  
CHICAGO, ILLINOIS 60607

**EXPERIMENTAL PROCEDURE**

1. Weigh 0.500 g of the sample into a 100 mL beaker. Add 10 mL of water and stir until the sample is completely dissolved. Transfer the solution to a 100 mL volumetric flask and dilute to the mark with water. This is the stock solution.

2. Pipette 10.00 mL of the stock solution into a 100 mL volumetric flask and dilute to the mark with water. This is the standard solution.

3. Prepare a series of standard solutions by pipetting 1.00, 2.00, 3.00, 4.00, and 5.00 mL of the standard solution into 100 mL volumetric flasks and diluting to the mark with water. Measure the absorbance of each solution at the wavelength of maximum absorbance.

4. Plot absorbance versus concentration for the standard solutions. The resulting straight line is the calibration curve.

5. Measure the absorbance of the unknown solution at the wavelength of maximum absorbance. Use the calibration curve to determine the concentration of the unknown solution.

6. Calculate the mass of the sample in the original solution. Use the concentration of the unknown solution and the volume of the original solution to calculate the mass of the sample. Report the mass of the sample to the appropriate number of significant figures.

7. Calculate the percent of the sample in the original solution. Use the mass of the sample and the mass of the original solution to calculate the percent of the sample. Report the percent of the sample to the appropriate number of significant figures.

8. Calculate the standard deviation of the concentration of the unknown solution. Use the standard deviation of the absorbance of the unknown solution and the slope of the calibration curve to calculate the standard deviation of the concentration of the unknown solution.

9. Calculate the standard deviation of the percent of the sample in the original solution. Use the standard deviation of the concentration of the unknown solution and the mass of the original solution to calculate the standard deviation of the percent of the sample in the original solution.

