Determination of the Iron in Multivitamins

Pre-lab report must be written inside your lab notebook.

IMPORTANT: Make sure that you always follow the proper laboratory safety protocol (refer to the course syllabus) BEFORE going to the lab.

Note: The experimental procedures for this assignment are provided as attachment to the same email these guidelines came with
You will start & finish this Experiment on Thursday (April 7) or Friday (April 8)
This experiment is a ONE lab period and individual work & individual report.

1. Title
2. Reference of procedures
3. Introduction - summarize the goal(s) for this part of the experiment as well as any techniques (*including any synthetic; analytical and/or purification techniques*) that you will be using in achieving such goal(s).
4. Procedures in flowchart format **(see handouts)**
5. MSDS information

The following chemicals will require you to use the SDS database on the Web:

Ascorbic Acid and Bipyridyl (also known as Dipyridyl or Bipyridine)

You should record the following SDS information in your notebook for the chemicals listed above. (**Printouts directly from the Web pages will NOT be accepted!**)

a. Product Name
b. Chemical Formula
c. CAS number
d. Formula Weight
e. Melting Point; Boiling Point and Density (i.e., specific gravity)
f. Health Hazard Data (**summarize in your own words**)
g. Spill and Disposal procedures (**summarize in your own words**)

6. Pre-lab study questions **(Review from 14BL)**

a. Briefly explain the ideas or concepts behind Beer-Lambert's Law.

b. What are the two conditions that will make the molar extinction coefficient (ε) a constant?

7. Data/observations (start a **NEW** page for this section)

Set up tables but leave blank. You **MUST** record all the observations into your lab notebook during your lab sessions.

Post-lab Report Guidelines for the Spectrophotometric Determination of the Iron in Multivitamins (DUE date on April 14 or April 15)

This is an individual report

1. Abstract

2. Data

Data tables with all the experimental data (should have proper titles/labels)

3. Graph(s)

Beer's Law calibration plot of absorbance vs. concentration for all the **standard solutions**

Your graph must have proper title, labels. Data points must be clearly marked.

Make sure you use the correct type of graph paper (i.e., mm graph paper).

Note: DO NOT use your lab notebook paper to plot the graph. You can ONLY use the mm graph paper.

If you use EXCEL to plot the graph, make sure that the gridlines are set properly.

4. Data Analysis (MUST SHOW ALL WORK FOR FULL CREDIT). Refer to lecture guide and concepts from 14BL for this part of the report.

a. Calculate the concentrations for all the standard solutions
b. From the Beer's law calibration graph, calculate the slope of the calibration line (with proper unit) (indicate which two points on the line you use for calculating the slope **or** use EXCEL to find the slope of the best fit line.)
c. From the calculated slope of the line and the absorbance of "unknown solution C", determine the concentration of iron in the "unknown solution C" (with proper unit)
d. Use the result from (3) to calculate the moles of iron in sample.

5. Error Analysis (Refer to lecture guide in 14 CL as well as lecture guides FROM 14 BL for details on error analysis)

Absolute uncertainties for various types of laboratory equipment are listed on page 27 of your lab manual

Note: If no error was given on the reagent bottle, you may assume the percentage relative error in the stock iron (II) sulfate solution is ±0.001 %

If you use 1-ml plastic disposable syringe when preparing the standards, the absolute error in the syringe to be ΔV= ±0.0001 mL and absolute error for a 25.00-mL volumetric flask is ΔV= ±0.02 mL.

Post-lab Report Guidelines for the Spectrophotometric Determination of the Iron in Multivitamins (DUE date on April 14 or April 15)

a. Error in concentration for **ONE** of your standard solution (all terms identified and error bar placed on graph)
b. Error in absorbance for **ONE** of your standard solution (all terms identified and error bar placed on graph)
c. Calculate the range of slopes of standard line. You **MUST** show either mathematically how you obtain those slopes (i.e. max. slope and min. slope must be labeled clearly on your graph)
d. Error in absorbance of your "solution C" unknown
e. Error in concentration of your "solution C" unknown
f. Calculate the percentage inherent error for unknown solution C

6. Conclusions

Summarize your results. Compare your experimentally determined value for the weight of iron in a tablet to the value given on the bottle (**65 mg Fe**). If the difference is greater than your estimated error discuss other possible sources of error.