

A series of 100 mL solutions were made by mixing an unknown solution containing Cu. A 13.50 ppm standard of Cu and ammonia reagent were made (see Table 1). Each solution was diluted with water to 100 mL. Each solution was measured spectroscopically.

**Table 1:**

Vol Unk (mL)	Vol Std (mL)	Vol Con NH <sub>3</sub> (mL)	Total Volume (mL)	Final [Cu] (ppm)	Absorbance
5.00	0.00	15.00	100.00		0.119
5.00	1.00	15.00	100.00		0.223
5.00	1.50	15.00	100.00		0.302
5.00	2.00	15.00	100.00		0.361
5.00	2.50	15.00	100.00		0.406
5.00	3.00	15.00	100.00		0.504
5.00	4.00	15.00	100.00		0.639

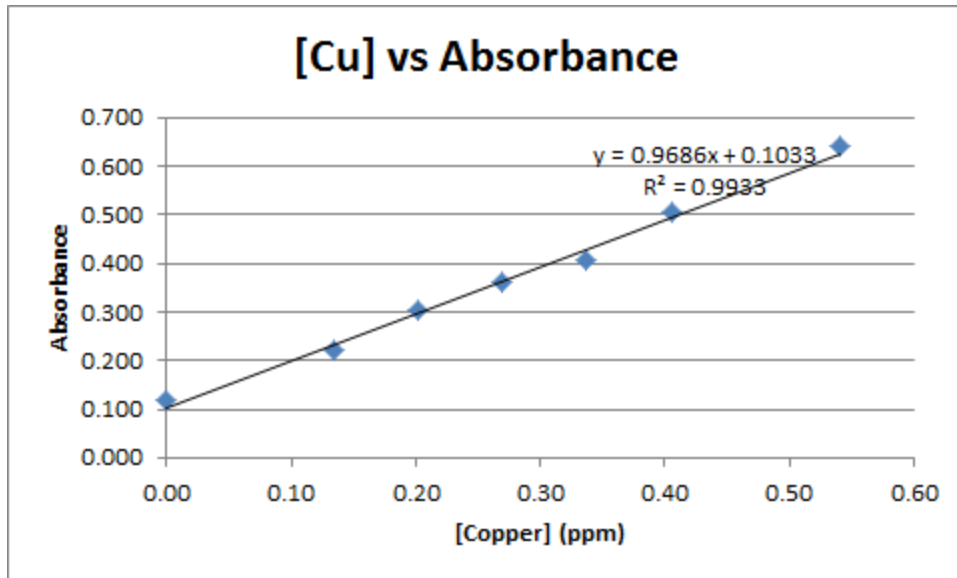
1. Determine what method of quantitative analysis should be used.
2. Calculate the final [Cu] in ppm for each solution in Table 1.
3. Generate a calibration curve using MS excel and perform a least squares fit. Determine the errors associated with A,  $\epsilon$ , b. Determine  $R^2$ .
4. Determine the unknown [Cu].
5. Calculate the absolute error of the final [Cu].

6. What are the 3 types of blanks and what are they used for?

Answer Sheet:

Graphing  
problem 2.

vol unk (mL)	vol std (mL)	vol con NH <sub>3</sub> (mL)	Total Volume (mL)	Final [Cu] (ppm)	absorbance
5.00	0.00	15.00	100.00	0.00	0.119
5.00	1.00	15.00	100.00	0.14	0.223
5.00	1.50	15.00	100.00	0.20	0.302
5.00	2.00	15.00	100.00	0.27	0.361
5.00	2.50	15.00	100.00	0.34	0.406
5.00	3.00	15.00	100.00	0.41	0.504
5.00	4.00	15.00	100.00	0.54	0.639



3) A,  $\epsilon$ , b. Determine  $R^2$ .

$$A = 0.97 \pm 0.04x + 0.10 \pm 0.01$$

4) 0.0107 ppm

5)  $0.01 \pm 0.44$

6) Method blank: is a sample containing all components except analyte, and it is taken through all steps of the analytical procedure. The measured value of the blank is subtracted from the sample data to find the [].

Reagent blank: Is similar to a method blank, but it has not been subjected to all the sample preparation procedures.

Field blank: Is similar to a method blank, but it has been exposed to the site of sampling. This shows the contamination accumulated from the field to the laboratory.