CHEM 322 **Name**_____
Spring 2015 **Due In Class Friday, January 23**

Complete the following. Provide answers in the spaces below and attach all work and any computer printouts. You may work with a partner on this assignment and turn in a single copy of your results; however, you must ultimately be able to do these calculations yourself.

You have conducted an absorbance experiment to determine the quantity of an analyte in a drinking water sample. Over at least some concentration range, you expect the absorbance to be directly proportional to concentration. Using the data for experiments A and B below, evaluate the following items.

1. The slope and intercept for the linear relationship describing how absorbance depends on concentration, with the appropriate units and 95% confidence intervals for each.
2. The calibration sensitivity of the measurement (with appropriate units)
3. The analytical sensitivity of the measurement (with appropriate units)
4. The concentration and 95% confidence limit for the unknown in each experiment
5. The limit of detection for the measurement (with appropriate units).
6. The limit of quantitation for the measurement (with appropriate units).

Calibration and Blank Data

Analyte Concentration (mM)	Absorbance (AU)
2.89	3.30
0.529	1.93
0.243	0.923
0.0569	0.256
0.0295	0.158
0.00629	0.0733
0.000759	0.0530
Blank 1	0.0487
Blank 2	0.0490
Blank 3	0.0482

Unknown Results

For Experiment A, you measure three replicate unknowns and find their responses to be 0.0824 AU, 0.0819 AU, and 0.0822 AU.

For Experiment B, you measure only one unknown and find its response to be 0.0714 AU.

Answers: These Values were calculated by plotting all of the calibration and blank data in the linear range (9 values)

1. Slope and intercept at the 95% confidence level (3) — m = 3.56 +/- 0.01_7 AU/mM; b = 0.051 +/- 0.003_3 AU
2. Calibration sensitivity of the measurement: (1) — 3.56 +/- 0.01_7 AU/mM
3. Analytical sensitivity of the measurement: (1) — m/S_b = 2550 mM^{-1}
4A. Concentration and 95% confidence limit for the unknown in Experiment A: (1) — 0.0088 +/- 0.0001_8 mM
4B. Concentration and 95% confidence limit for the unknown in Experiment B: (1) — 0.006 +/- 0.002_6 mM
5. LOD: (2) — Based on $b + 3s_b$; 0.0012 mM
6 LOQ: (1) — Based on $b + 10s_b$; 0.0039 mM