

Chemistry 312 Assignment – Part 2

**Due December 8, 2:00 PM (at the exam, no late submissions)**

I will correct/grade 2 of your answers– selected at random

- 1) In Bangladesh there is a severe problem with Arsenic poisoning due to the very high levels of the element in the drinking water. It is also true that high levels of Selenium are quite toxic but traces of this element are essential for good health. Selenium is used in key enzymes that are necessary for normal metabolic processes. Here is the interesting bit... The treatment for the Arsenic poisoning is high doses of Selenium that would normally be toxic. It appears that the Arsenic is displacing the Selenium from the enzyme and causing it to not function correctly. When treated with high concentrations, the Selenium is then able to out-compete the Arsenic for the enzyme and restore normal metabolic function.

Describe a complete method of routine analysis to determine As and Se in large numbers of blood samples. You are going to setup a new lab to test these samples. The expected concentration(s) are in the low PPM. (all the steps from sample to final #'s)

- 2) A colleague is attempting to set up a new analytical technique and needs you to calculate the detection limit. The following data was obtained from the calibration data: slope = 134 mV/ppm, intercept = 93 mV and after taking 10 blank measurements the average blank = 97.3 mV with a standard deviation of 12.4 mV. What is the detection limit?
- 3) What are isobaric interferences, what causes them, how are they corrected?
- 4) What is the analyte absorbance if the transmitted light is 63.096% when using a deuterium lamp source and 56.234% when using just the hollow cathode lamp?
- 5) A 1 ppm solution of Ce is introduced into an ICP-MS system equipped with a standard pneumatic nebulizer operating at 1 ml/min. The detected signal is 10000 ions per second. What is the fraction of Ce is actually detected as a signal?