FLINN SCIENTIFIC

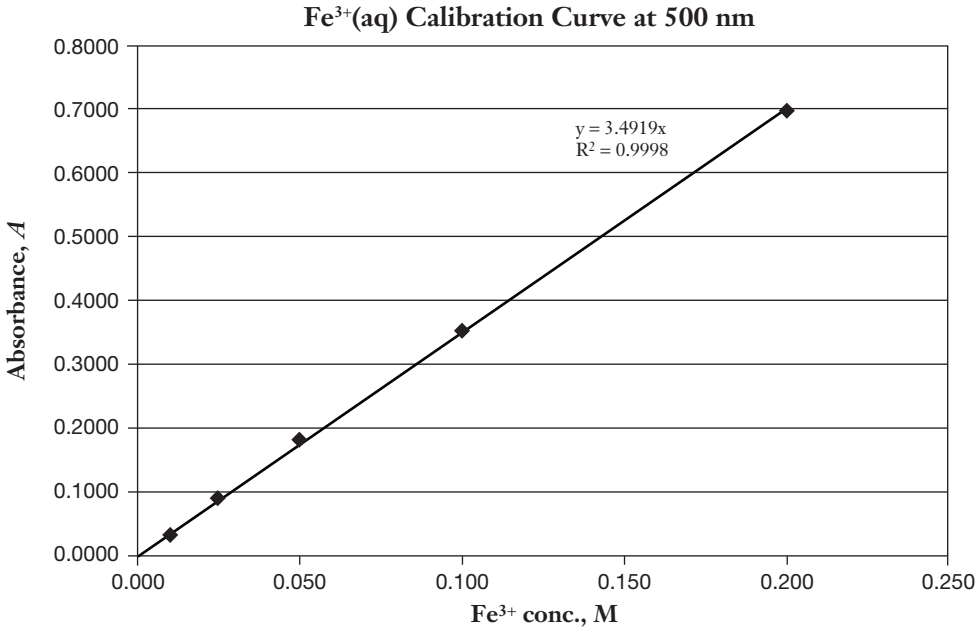
Name_____

Post-Laboratory Review Questions

1. Quality control samples were taken of a batch of nickel–iron alloy produced by Ironic Steel, Inc. in the furnace at their Springfield plant. The alloy must contain 43% nickel, ± 0.5%, with the remaining percent iron.

   A 1.200-g sample was dissolved in hydrochloric acid and diluted to 100 mL in a volumetric flask. The Beer's law plot for the absorbance of $Fe(NO_3)_3(aq)$ versus its concentration is listed below.

$Fe^{3+}(aq)$ Conc., M	Absorbance, *A*
0.200	0.6954
0.100	0.3530
0.050	0.1790
0.025	0.0883
0.010	0.0318
Sample	0.3730
Slope = 3.4919	



   Calculate the percent iron contained in the alloy sample. Based on your results, is the batch of 43% nickel–iron alloy acceptable?

2. The characteristic flame test colors of metal ions are due to atomic emission spectra. Discuss the relationship between the absorption and emission of light and the factors responsible for flame test colors. Include quantization of electron energy levels and Planck's law in your answer.

3. The wavelength of the characteristic, bright yellow-orange flame test color of sodium is 590 nm. Calculate the average energy (ΔE) associated with this atomic emission line.