Pre-Lab Questions

1. Why will the absorbance measurements be done at a wavelength of about 460 nm? What color is 460 nm light? What color of light is being absorbed?

   It is done at 460nm as it is the maximum wavelength where it has maximum absorbance. The color is blue.

2. What is the purpose of diluting your samples in HNO_3 instead of water?

   Diluting the samples in HNO_3 instead of H_2O allows the pH to be decreased and further oxidation.

3. You will be varying the initial amounts of Fe^{3+} and SCN^- in part B. What is your hypothesis for how the equilibrium constant will vary with the trials? What is the only "variable" that can make the value of Kc change?

   Fe^{3+} increase would cause to shift right towards products and an increase of SCN^- will also shift the same way.

4. The reaction $O_2(g) + N_2(g) \rightleftharpoons 2NO(g)$ was prepared with the following initial concentrations:

   $$[O_2] = 0.01\ M \quad [N_2] = 0.01\ M \text{ and } [NO] = 0\ M.$$

   At equilibrium, [NO] was measured and found to be 0.00020 M.

   a. Set-up an ICE table and calculate the equilibrium concentration for the two reactants O_2 and N_2.

   b. Calculate Kc.

   Temperature can only make a change.

a)

I	0.01	0.01	0
C	$-x$	$-x$	$+2x$
E	0.01	0.01	
	$-x$	$-x$	

$[NO]$

$\rightarrow \dfrac{2x}{2} = \dfrac{0.00020}{2}$

$x = 0.00010\ M$

$[O_2] = 0.01 - 0.0001 = 0.0099$

$[N_2] = 0.01 - 0.0001 = 0.0099$

b)

$$K_c = \frac{[NO]^2}{[O_2][N_2]}$$

$$k_c = \frac{(0.0001)^2}{[0.0099][0.0099]}$$

$$k_c = \frac{1.0 \times 10^{-8}}{0.00009\ 8}$$

$$k_c = 0.000102$$

$$\text{or } 1.02 \times 10^{-4}$$

Determination of an Equilibrium Constant for the Iron(III) Thiocyanate Reaction