Calculating Equilibrium Constants

Name: _____

1. An aqueous solution of acetic acid is found to have the following equilibrium concentrations at 25°C: $[HC_2H_3O_2] = 1.65 \times 10^{-2}M$; $[H^{+1}] = 5.44 \times 10^{-4}M$; and $[C_2H_3O_2^{-1}] = 5.44 \times 10^{-4}M$

   Calculate the equilibrium constant K_c for the ionization of acetic acid at 25°C. The reaction is:

   $HC_2H_3O_2(aq) \rightleftharpoons H^{+1}(aq) + C_2H_3O_2^{-1}(aq)$

2. Sulfur trioxide decomposes at high temperature in a sealed container:

   $2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$

   Initially, the vessel is charged at 1000K with $SO_3(g)$ at a partial pressure of 0.500atm. At equilibrium the SO_3 partial pressure is 0.2000atm. Calculate the value of K_p at 1000K.

	$2SO_3 \rightleftharpoons$	$2SO_2$	O_2
I			
C			
E			

3. At 448°C the equilibrium constant K_c for the reaction

   $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

   is 50.5. Predict in which direction the reaction will proceed to reach equilibrium at 448°C if we start with 2.0×10^{-2} mol of HI, 1.0×10^{-2}mol of H_2, and 3.0×10^{-2}mol of I_2 in a 2.00L container.

4. A 1.000L flask is filled with 1.000mol of H_2a nd 2.000mol of I_2 at 448°C. The value of the equilibrium constant K_c for the reaction is **50.5**.
   What are the equilibrium concentrations of H_2, I_2 and HI in moles per liter?

	H_2	I_2 $\rightleftharpoons$	2HI
I			
C			
E			