CHEM 130 **Name** _____
Quiz 10 – December 2, 2016

Complete the following problems. Write your final answers in the blanks provided.

1. Determine K_c for the reaction: $N_2(g) + O_2(g) + Cl_2(g) \rightleftarrows 2NOCl(g)$ from the following data at 298K: (8 points)

$\frac{1}{2}\ N_2(g) + O_2(g) \rightleftarrows NO_2(g)$ $K_p = 1.0 \times 10^{-9}$
$NOCl(g) + \frac{1}{2}\ O_2(g) \rightleftarrows NO_2Cl(g)$ $K_p = 1.1 \times 10^{2}$
$NO_2(g) + \frac{1}{2}\ Cl_2(g) \rightleftarrows NO_2Cl(g)$ $K_p = 0.3$

2. You have been tasked with determining the equilibrium constant for the reaction of H_2 and S_2 gases to produce hydrogen sulfide. In a 0.500 L flask, a mixture that initially contains no S_2 and is 0.992 M H_2 and 0.0587 M H_2S comes to equilibrium at 1670 K. At equilibrium, there is 8.00×10^{-4} mol of S_2 present. What are the values for K_c and K_p at this temperature? (9 points)

3. Consider the reaction below. If the initial concentrations of H_2, F_2, and HF are 0.0100M, 1.25 M, and 2.21 M, respectively, is the system at equilibrium? If not, which way will the reaction go to achieve the equilibrium condition? Set up, but do not complete the calculation you would use to determine the equilibrium concentrations of each of the species in the reaction. You DO NOT need to arrive at a numerical answer, just get to the point where you have one algebraic expression you could solve, given additional time. **Be sure to tell me what you would do with the result of your calculation.** (8 points)

$$H_2(g) + F_2(g) \rightleftarrows 2HF(g) \qquad K = 115$$

Possibly Useful Information

$\text{slope} = m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	$R = 0.08206\ \text{L atm mol}^{-1}\ \text{K}^{-1}$ $R = 8.314\ \text{J mol}^{-1}\ \text{K}^{-1}$
$pV = nRT$	$\Delta G = -RT\ln K$	$K_p = K_c(RT)^{\Delta n}$