Unit 10C Practice Problems I
Calculating the Equilibrium Constant $K_{eq}$

Fill in the blanks and provide short answers.

1. What is equal in a state of equilibrium?  

2. Circle your answer from the choices within parenthesis:  
   When equilibrium is reached, the concentration of reactants (increases, decreases, remains the same) and  
   the concentration of products (increases, decreases, remains the same).

3. What does the value (the number) of $K_{eq}$ tell you?  

4. a. Write a balanced equation for the synthesis of ammonia ($\text{NH}_3$) from nitrogen and hydrogen, including the term “energy” as if it is a product of the reaction

   b. Write the $K_{eq}$ expression for the reaction above.

5. For the reaction, $2\text{SO}_3 \rightleftharpoons 2\text{SO}_2 + \text{O}_2$, $[\text{SO}_3] = 0.37\text{M}$, $[\text{SO}_2]=0.25\text{M}$, $[\text{O}_2] = 0.86\text{M}$. Write the $K_{eq}$ equation, calculate $K_{eq}$, and explain what this value means.

6. For the equilibrium system $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$, $K_{eq} = 35$. If the concentrations of $\text{PCl}_5$ and $\text{PCl}_3$ are 0.025M and 0.68M respectively, what is the concentration of the $\text{Cl}_2$?