

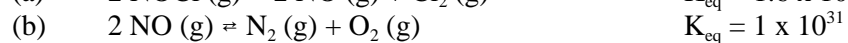
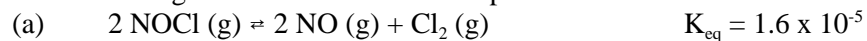
Equilibrium Questions – Part I
Chemistry II
2 points

Name: _____

Date: _____

- 1) Explain the concept of equilibrium in terms of
(a) the rates of the forward and reverse reactions
(b) the amounts of reactants and products

- 2) Consider the following reactions at the same temperature



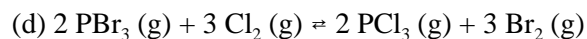
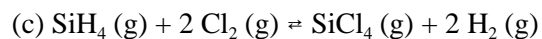
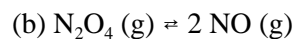
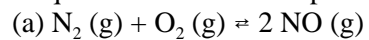
For each reaction, assume some of the reactants were placed in a closed container and allowed to come to equilibrium.

- Describe the relative amounts of reactants and products that would be present at equilibrium.

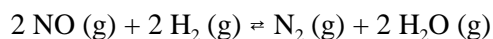
- At equilibrium, which is faster, the forward or reverse reaction in each case?

- 3) How is K_{eq} different from K_p ?

- 4) Write the equilibrium constant expression for each of the following:

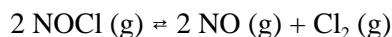


- 5) For the reaction



it is determined that, at equilibrium at a particular temperature, the concentrations are as follows: $[\text{NO}(\text{g})] = 8.1 \times 10^{-3} \text{ M}$, $[\text{H}_2(\text{g})] = 4.1 \times 10^{-5} \text{ M}$, $[\text{N}_2(\text{g})] = 5.3 \times 10^{-2} \text{ M}$, and $[\text{H}_2\text{O}(\text{g})] = 2.9 \times 10^{-3} \text{ M}$. Calculate the value of K_{eq} for this reaction.

- 6) At a particular temperature, a 3.0-L flask contains 2.4 mol of Cl_2 , 1.0 mol NOCl , and 4.5×10^{-3} mol NO . Calculate K_{eq} at this temperature for the following reaction (assuming the reaction is at equilibrium):



- 7) The following equilibrium pressures at a certain temperature were observed for the following reaction:



$$P_{\text{NO}_2} = 0.55 \text{ atm} \quad P_{\text{NO}} = 6.5 \times 10^{-5} \text{ atm} \quad P_{\text{O}_2} = 4.5 \times 10^{-5} \text{ atm}$$

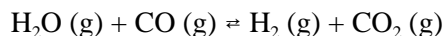
Calculate the value of the equilibrium constant K_p at this temperature.

- 8) At 327 °C, the equilibrium concentrations for the reaction



are $[\text{CH}_3\text{OH}] = 0.15 \text{ M}$, $[\text{CO}] = 0.24 \text{ M}$, and $[\text{H}_2] = 1.1 \text{ M}$. Calculate K_{eq} and K_p for this reaction.

- 9) Consider the following reaction:



Amounts of H_2O , CO , H_2 , and CO_2 were put into a flask so that the composition corresponds to equilibrium. If the CO placed in the flask is labeled with radioactive ^{14}C , will ^{14}C be found only in CO molecules for an indefinite period of time? Explain your answer.