Name _____

# Equilibrium

Use the following equation to answer questions 1-5: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

1) Write the equilibrium expression for the reaction if all the compounds were gases.

2) Write the equilibrium expression for the reaction if the water was condensed into a liquid.

3) Write the equilibrium expression for the reaction if it was done at -44°C when both water and $CO_2$ are solids.

4) Write the equilibrium expression for the reaction if it was done at -158°C when the methane would be a liquid and the water and carbon dioxide would be solids.

5) Write the equilibrium expression for the reaction if the carbon dioxide was being dissolved into the liquid water that had been condensed.

Use the following equilibrium expression for the following reaction in a sealed container to answer questions 6-14:     $Mg_{(s)} + 2HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$   $\Delta H$=-256kJ/mol     $k_{eq} = \dfrac{[MgCl_2][H_2]}{[HCl]^2}$

6) If the $k_{eq} = 3.6\times10^3$ would we expect to find more reactants or products in the container?

7) If the $k_{eq} = 1$ would we expect to find more reactants or products in the container?

8) If the $k_{eq} = 4.2\times10^{-8}$ would we expect to find more reactants or products in the container?

9) If the pressure in the container was raised, which way would the equilibrium shift?

10) If the temperature of the container was reduced, then which way would the equilibrium shift?

11) If the amount of HCl was increased, then which way would the equilibrium shift?

12) If the amount of magnesium was increased, then which way would the equilibrium shift?

13) If the amount of hydrogen was decreased then what would happen to the amount of magnesium chloride in the container?

14) If the temperature was increased, then would we find more reactants or less reactants in the container later?