

Name _____

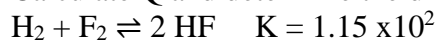
Equilibrium Worksheet

1. The decomposition of CaCO_3 is an endothermic process (you are smart enough to determine which side of the equations get the words "+ Heat" using this):



- a) Use Lechâtlier's Principle to explain how an increase in temperature would affect the equilibrium (answer either shift left or shift right).
- b) If more CO_2 is added to a flask in which this equilibrium exists, how is the equilibrium affected?
- c) If pressure within a flask in which this equilibrium exists is increased, how is the equilibrium affected (consider the effect on the concentration of all gases present)?

2. Calculate Q and determine the direction the reaction will shift



$$[\text{H}_2] = .0010$$

$$[\text{F}_2] = 5.0 \times 10^{-3}$$

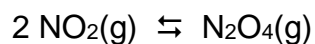
$$[\text{HF}] = .50 \text{ M}$$

$$[\text{H}_2] = .020$$

$$[\text{F}_2] = 2.0 \times 10^{-3}$$

$$[\text{HF}] = 5.0 \times 10^{-4} \text{ M}$$

3. The reaction below has an equilibrium constant, K , of 171 at 25°C . Using the reaction conditions given, determine the concentration of the other compound at equilibrium.

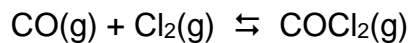


a) $2.0 \times 10^{-2} \text{ M NO}_2$

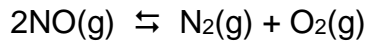
b) $2.1 \text{ M N}_2\text{O}_4$

c) $2.0 \times 10^{-3} \text{ mol NO}_2$ in a 5.0 mL flask

4. An equilibrium mixture contains 3.00 moles of carbon monoxide, 2.00 moles of chlorine gas, and 9.00 moles of COCl_2 gas in a 50.0 L reaction vessel at 800 K. Calculate K at this temperature. The reaction occurring is:



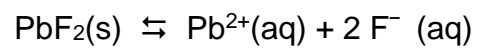
5. At 20°C the equilibrium constant K is 1.4×10^{30} , for the reaction:



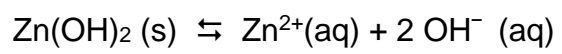
In the atmosphere at room temperature the concentration of nitrogen gas is 0.33 mol/L and the concentration of oxygen gas is 27% that value. Calculate the equilibrium concentration of nitrogen monoxide in the atmosphere.

6. Calculate the solubility and maximum concentrations of solutes in a saturated solutions for the following:





$$K_{\text{sp}} = 3.7 \times 10^{-8}$$



$$K_{\text{sp}} = 5 \times 10^{-17}$$