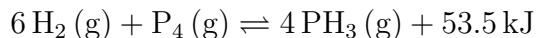


Name: \_\_\_\_\_

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### Le Châtelier's Principle

Consider the chemical equation:



1. Indicate which direction the equilibrium would shift as a result of each of the following:

(a) Adding  $\text{P}_4$

(c) Removing  $\text{H}_2$

(b) Removing  $\text{PH}_3$

(d) Decreasing the temperature

2. Write the equilibrium expression for the above reaction.

3. The value of  $K_{eq}$  for this reaction is 4.44 at  $25^\circ\text{C}$ . If the reaction is at equilibrium at  $25^\circ\text{C}$ , the concentration of  $\text{H}_2$  is  $1.00 \text{ M}$  and the concentration of  $\text{P}_4$  is  $0.025 \text{ M}$ , what is the concentration of  $\text{PH}_3$ ?

4. If the reaction is cooled to  $4^\circ\text{C}$ , the value of the equilibrium constant increases to 4.77. Is this consistent with the prediction made by Le Châtelier's Principle in question #1d above? Explain.