Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemistry

Le Chatlier’s Principle Quiz

**TRUE/FALSE: Write “T” is the statement is true and “F” is the statement is false.**

1. The effect of a catalyst on a chemical reaction is to react with product, effectively removing it and shifting the equilibrium to the right. **\_\_\_\_**
2. At constant temperature, reducing the volume of a gaseous equilibrium mixture causes the reaction to shift in the direction that increases the number of moles of gas in the system. **\_\_\_\_**
3. In a exothermic equilibrium reaction, increasing the reaction temperature favors the formation of reactants. **\_\_\_\_**
4. Le Chatlier’s principle states that if a system at equilibrium is disturbed, the equilibrium will shift to minimize the disturbance.**\_\_\_\_**

**Free-Response: Read the statements and respond to the questions.**

1. Consider the following equilibrium, for which ΔH<0 :

**2SO2*(g)* + O2*(g)* http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png 2SO3*(g)***

How will each of the following changes affect an equilibrium mixture of the three gases:

1. O2*(g)*is added to the system;
2. the reaction mixture is heated;
3. the total pressure of the system is increased by adding a noble gas.

**Multiple Choice: Read the statements and circle the correct statement for each question.**

1. When extra NH3 is added to the following system at equilibrium:

**3H2(*g*) + N2(*g)* http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png2 NH3(*g*)**

1. In order to restore equilibrium, the reaction shifts left, toward reactants.
2. In order to restore equilibrium, the reaction shifts right, toward products.
3. No change occurs.
4. When N2 is removed from the following system at equilibrium:

**3 H2(g) + N2(g) http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png 2 NH3(g)**

1. No change occurs.
2. In order to restore equilibrium, the reaction shifts left, toward reactants.
3. In order to restore equilibrium, the reaction shifts right, toward products.
4. When the temperature is increased on the following system at equilibrium:

**2 HCl(*aq*) + Mg(*s*) http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.pngMgCl2(*aq*) + H2(*g*) + heat**

1. In order to restore equilibrium, the reaction shifts left, toward reactants
2. No change occurs
3. In order to restore equilibrium, the reaction shifts right, toward products.

**KEY**

Le Chatlier’s Principle Quiz

**TRUE/FALSE: Write “T” is the statement is true and “F” is the statement is false.**

1. The effect of a catalyst on a chemical reaction is to react with product, effectively removing it and shifting the equilibrium to the right. **\_F\_\_\_**
2. At constant temperature, reducing the volume of a gaseous equilibrium mixture causes the reaction to shift in the direction that increases the number of moles of gas in the system. **\_\_ F\_\_\_**
3. In a exothermic equilibrium reaction, increasing the reaction temperature favors the formation of reactants. **\_\_T\_\_**
4. Le Chatlier’s principle states that if a system at equilibrium is disturbed, the equilibrium will shift to minimize the disturbance. **\_T\_\_\_**

**Free-Response: Read the statements and respond to the questions.**

1. Consider the following equilibrium, for which ΔH<0 :

**2SO2*(g)* + O2*(g)* http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png 2SO3*(g)***

How will each of the following changes affect an equilibrium mixture of the three gases:

1. O2*(g)*is added to the system;shift equilibrium to the right; more SO3 (g) is formed, the amount of SO2(g) will decrease.
2. the reaction mixture is heated; More SO2(g) and O2 will form, the amount of SO3 will decrease.
3. the total pressure of the system is increased by adding a noble gas. No effect. Does not appear in the equilibrium expression.

**Multiple Choice: Read the statements and circle the correct statement for each question.**

1. When extra NH3 is added to the following system at equilibrium:
2. **H2(*g*) + N2(*g)* http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png2 NH3(*g*)**
3. In order to restore equilibrium, the reaction shifts left, toward reactants.
4. In order to restore equilibrium, the reaction shifts right, toward products.
5. No change occurs.
6. When N2 is removed from the following system at equilibrium:

3 H2(g) + N2(g) **http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png** 2 NH3(g)

1. No change occurs.
2. In order to restore equilibrium, the reaction shifts left, toward reactants.
3. In order to restore equilibrium, the reaction shifts right, toward products.
4. When the temperature is increased on the following system at equilibrium:

2 HCl(*aq*) + Mg(*s*) **http://t0.gstatic.com/images?q=tbn:ANd9GcRM37wzjNK2E4qUzdMSmaRN2NmHy9ZAzflK1bcJQQK85OqIW2VC:www.geoff-hart.com/books/exchanges/exchange%2520arrows.png**MgCl2(*aq*) + H2(*g*) + heat

1. In order to restore equilibrium, the reaction shifts left, toward reactants
2. No change occurs
3. In order to restore equilibrium, the reaction shifts right, toward products.