Le Chatelier's Principle Worksheet

Organic Chemistry Tutor

1. Which of the following actions will cause the reaction to shift toward the left?

$$3\ H_{2\,(g)} + 1\ N_{2\,(g)} \leftrightarrow 2\ NH_{3\,(g)}$$

A. Increasing the concentration of N_2.
B. Removing NH_3 from the reaction vessel.
C. The addition of a catalyst.
D. Removing H_2 from the reaction vessel.
E. None of the above.

2. Which of the following actions will cause the concentration of CO to decrease in the reaction vessel?

$$1\ CO_{(g)} + 3\ H_{2\,(g)} \leftrightarrow 1\ CH_{4\,(g)} + 1\ H_2O_{\,(g)}$$

A. Adding more CH_4 to the reaction vessel.
B. Removing H_2 from the reaction vessel.
C. Increasing the partial pressure of H_2.
D. Adding an inert gas such as Xe to the reaction vessel.
E. None of the above.

3. Which of the following statements is true if O_2 is removed from the reaction vessel?

$$2\ SO_{2\,(g)} + 1\ O_{2\,(g)} \leftrightarrow 2\ SO_{3\,(g)}$$

I. The reaction will shift to the right.
II. The reaction will shift to the left.
III. The concentration of SO_3 will increase.
IV. The partial pressure of SO_2 will increase.

A. I and III
B. I and IV
C. II and III
D. II and IV
E. I, III, and IV

4. Which of the following statements is false?

$$2\ NO_{\,(g)} + 2\ H_{2\,(g)} \leftrightarrow 1\ N_{2\,(g)} + 2\ H_2O_{\,(g)}$$

A. Increasing the volume of the container will cause the reaction to shift to the left.

B. Decreasing the volume of the container will cause the partial pressure of N_2 to increase.

C. Adding an inert gas such as Neon will cause the pressure in the container to increase.

D. Decreasing the partial pressure of NO will cause the partial pressure of N_2 to increase.

E. The addition of a catalyst will speed up the reaction but will have no effect on the position of equilibrium.

5. Which of the following statements is true?

1 $Co(H_2O)_6^{2+}_{(aq)}$ + 4 $Cl^-_{(aq)}$ ↔ 1 $CoCl_4^{2-}_{(aq)}$ + 6 $H_2O_{(l)}$
(pink) (blue)

ΔH = +value

A. Increasing the temperature will cause the solution to turn pink.

B. Adding NaCl will cause the solution to become hot.

C. Placing the solution in an ice bath will cause the solution to turn blue.

D. Adding AgNO3 will raise the temperature of the solution.

E. Decreasing the temperature will reduce the concentration of the free Chloride ions.

6. Which of the following actions will cause the equilibrium constant K to increase for the exothermic reaction shown below?

2 $SO_{2\,(g)}$ + 1 $O_{2\,(g)}$ ↔ 2 $SO_{3\,(g)}$ Δ H = -(value)

A. Removing O_2 from the chamber.

B. The addition of a homogeneous catalyst.

C. Increasing the temperature of the reaction chamber.

D. Decreasing the temperature of the reaction chamber.

E. Increasing the pressure by decreasing the volume of the chamber.

7. Which of the following statements is false?

$CaCO_{3\,(s)}$ ↔ $CaO_{(s)}$ + $CO_{2\,(g)}$ ΔH = +value

A. Adding $CaCO_3$ will increase the partial pressure of CO_2.

B. Adding CaO to the reaction will have no effect on the position of equilibrium.

C. Decreasing the volume of the container will cause the mass of $CaCO_3$ to increase.

D. Decreasing the temperature will cause K to increase.

E. Increasing the partial pressure of CO_2 will cause the temperature of the reaction chamber to increase.

Answers:

1. D
2. C
3. D
4. D
5. D
6. D
7. D