

Exercise 18.2a(H)

LeChâtelier's Principle

Name: _____

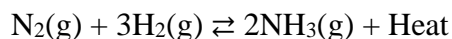
Date: _____ Per: _____

DIRECTIONS: Complete the following in the space provided:

1. Name the three stresses that may be applied to a system at equilibrium.

1. _____
2. _____
3. _____

2. Predict the effect (shifts forward, reverse, or no change) on the reaction for the stresses listed below.



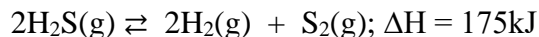
- a. Increase $[\text{N}_2]$ _____
- b. Decrease $[\text{H}_2]$ _____
- c. Increase Pressure _____
- d. Decrease Heat _____

3. Predict the effect on the reaction for the stresses listed below.



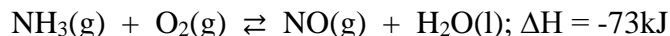
- a. Decrease $[\text{N}_2\text{O}_4]$ _____
- b. Increase $[\text{NO}_2]$ _____
- c. Increase Pressure _____
- d. Increase Heat _____

4. Predict the effect on the reaction for the stresses listed below.



- a. Decrease $[\text{H}_2\text{S}]$ _____
- b. Increase $[\text{S}_2]$ _____
- c. Decrease Pressure _____
- d. Increase Heat _____

5. Predict the effect on the **UNBALANCED** reaction for the stresses listed below.



- a. Increase $[\text{NH}_3]$ _____
- b. Decrease $[\text{O}_2]$ _____
- c. Increase Pressure _____
- d. Decrease Heat _____

6. Predict the effect on the **UNBALANCED** reaction for the stresses listed below.



- a. Increase $[\text{HI}]$ _____
- b. Increase $[\text{I}_2]$ _____
- c. Increase Pressure _____
- d. Decrease Heat _____

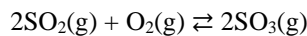
Exercise 18.2a(H)

LeChâtelier's Principle

Name: _____

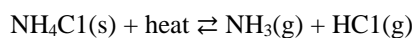
Date: _____ Per: _____

DIRECTIONS: Match the change to the equilibrium system below with the letter of the appropriate response. Each letter can be used once, more than once, or not at all:



- | | | |
|-----------|---|---|
| _____ 7. | O_2 is added to the reaction. | a. The equilibrium shifts to the right. |
| _____ 8. | SO_3 is removed from the reaction. | b. The equilibrium shifts to the left. |
| _____ 9. | SO_3 is added to the reaction. | c. There is no change in the equilibrium position |
| _____ 10. | The pressure is increased. | |

DIRECTIONS: If the statement is true, write "true." If it is false, change the underlined word or words to make the statement true. Write your answer on the line provided.

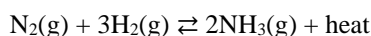


- _____ 11. The above reaction is exothermic.
- _____ 12. The production of ammonia from ammonium chloride will increase at higher temperature.
- _____ 13. The addition of NH_3 will cause the reaction to shift to the right.
- _____ 14. For the above reaction at equilibrium, an increase in pressure on the system causes a decrease in gaseous ammonia concentration.

DIRECTIONS: Answer each of the following questions in the space provided.

15. What factors alter the equilibrium position in chemical reactions?
16. Describe LeChatelier's principle.
17. Each of the following is effective in increasing the equilibrium concentration of D in the reaction
- $$2\text{A}(\text{g}) + \text{B}(\text{g}) \rightleftharpoons 3\text{C}(\text{g}) + \text{D}(\text{g})$$
- except,**
- increasing the concentration of A.
 - removing D as it forms.
 - decreasing the concentration of B.
 - decreasing the pressure on the system.

DIRECTIONS: Use the following reaction, which is at equilibrium, to answer each of the following questions in the space provided.



18. Describe what will happen if the pressure is increased. _____
19. Describe what will happen if the concentration of H_2 is increased. _____
20. Describe what will happen if the temperature is increased. _____
21. For the reaction $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{CO}_2(\text{g})$, $K_{\text{eq}} = 5.10$ at 527°C . If $[\text{CO}] = 0.15\text{M}$, $[\text{H}_2\text{O}] = 0.25\text{M}$, $[\text{H}_2] = 0.42\text{M}$, and $[\text{CO}_2] = 0.37\text{M}$, calculate the Q and determine how the reaction will proceed.