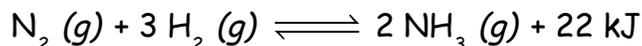


If a system at equilibrium is subjected to a _____, the equilibrium is displaced in the direction that relieves the _____.

- A stress is defined as any change which could affect the _____ of either or both the forward and/or reverse reaction.
- When, because of an applied stress, the forward reaction is faster than the reverse reaction, the system is said to shift to the (right, left). As a result, the [products] will (increase, decrease) and the [reactants] will (increase, decrease).
- When, because of an applied stress, the reverse reaction is faster than the forward reaction, the system is said to shift to the (right, left). As a result, the [products] will (increase, decrease) and the [reactants] will (increase, decrease).

In simpler terms: If anything is added to a system at _____, the system will try to consume whatever was _____. If anything is removed from a system at equilibrium, the system will try to replace whatever was _____. So, the reaction is favored away from what is (added, removed) and toward what is (added, removed).

1. In the following reaction, will the $[H_2]$ increase or decrease when equilibrium is reestablished after these stresses are applied?



$NH_3(g)$ is added _____ $N_2(g)$ is removed _____
 pressure is increased _____ temperature is increased _____

2. Note reaction: $2 NO(g) + H_2(g) \rightleftharpoons N_2O(g) + H_2O(g) + 36 \text{ kJ}$

In which direction, left or right, will the equilibrium shift if the following changes are made?

NO is added _____ the system is cooled _____
 H_2 is removed _____ pressure is increased _____
 N_2O is added _____ H_2 is removed _____

3. In this reaction: $\text{CO}_2 (g) + \text{H}_2 (g) + \text{heat} \rightleftharpoons \text{CO} (g) + \text{H}_2\text{O} (g)$

a. Is heat absorbed or released by the forward reaction?

b. In which direction will the equilibrium shift if these changes are made?

CO is added _____ temperature is increased _____

CO₂ is added _____ system is cooled _____

H₂ is removed _____ pressure is increased _____

catalyst is added _____

4. In this reaction: $2 \text{NO} (g) + \text{H}_2 (g) \rightleftharpoons \text{N}_2\text{O} (g) + \text{H}_2\text{O} (g) + \text{heat}$

What will happen to the [H₂O] when equilibrium is reestablished after these stresses are applied?

temperature is increased _____

a catalyst is added _____

pressure is decreased _____

NO is added _____

N₂O is removed _____

5. How would an increase in pressure affect the [H₂] in the following reactions?

