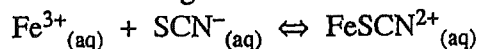


1. Consider the following reversible reaction:

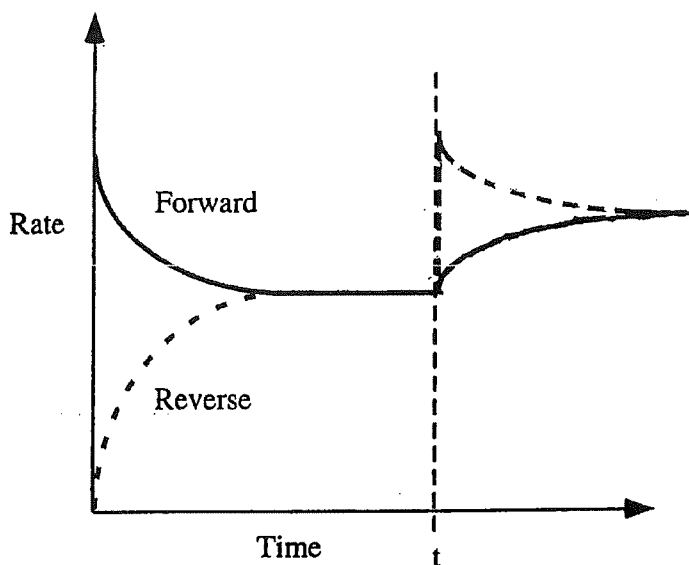
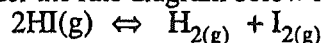


A solution of $\text{Fe}(\text{NO}_3)_3$ is added to a solution of KSCN . Which one of the following statements describes the changes in forward and reverse reaction rates as the reaction moves towards equilibrium?

** the NO_3^- and K^+ ions are spectator ions.*

- (D)
- A. Forward and reverse rates increase.
 - B. Forward and reverse rates decrease.
 - C. Forward rate increases and reverse decreases.
 - D. Forward rate decreases and reverse increases.
 - E. Forward and reverse rates remain constant.

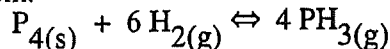
2. Consider the rate diagram below for the following reaction:



Which of the following occurs at time t_1 ?

- (B)
- A. addition of H_2
 - B. addition of HI
 - C. addition of a catalyst
 - D. a decrease in volume.
 - E. a decrease in pressure.

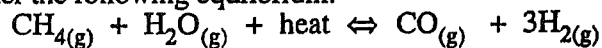
3. Consider the following system:



Which of the following changes would cause the above system to shift right?

- (C)
- A. Add more P_4
 - B. Add a catalyst
 - C. Increase pressure
 - D. Increase surface area

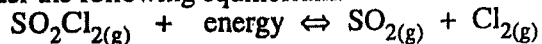
4. consider the following equilibrium:



In which of the following will both stresses shift the equilibrium left ?

- (B)
- A. a decrease in temperature and a decrease in volume.
 - B. an increase in temperature and a decrease in volume.
 - C. a decrease in temperature and an increase in volume.
 - D. an increase in temperature and an increase in volume.
 - E. an increase in temperature and a decrease in $[\text{H}_2\text{O}]$

5. Consider the following equilibrium:

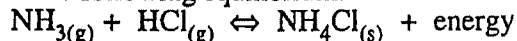


When the temperature is increased, the equilibrium shifts....

A

- A. left and $[\text{SO}_2\text{Cl}_2]$ increases. D. right and $[\text{SO}_2\text{Cl}_2]$ decreases.
B. left and $[\text{SO}_2\text{Cl}_2]$ decreases. E. right and $[\text{SO}_2\text{Cl}_2]$ remains constant.
C. right and $[\text{SO}_2\text{Cl}_2]$ increases.

6. Consider the following equilibrium:

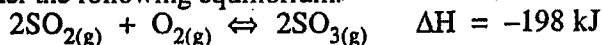


Which of the following will result in a decrease in the mass of NH_4Cl ?

B

- A. adding NH_3 D. decreasing the temperature
B. removing HCl E. add a catalyst.
C. decreasing the volume

7. Consider the following equilibrium:

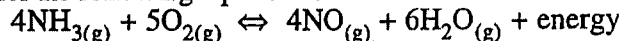


There will be no shift in equilibrium when.....

B

- A. more O_2 is added. D. the temperature is increased.
B. a catalyst is added. E. the temperature is decreased.
C. the volume is increased.

8. Consider the following equilibrium:

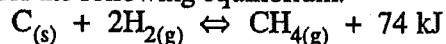


Which of the following will cause the equilibrium to shift to the left?

A

- A. adding $\text{H}_2\text{O}_{(g)}$ D. decreasing the temperature
B. removing some $\text{NO}_{(g)}$ E. adding a catalyst.
C. increasing the volume

9. Consider the following equilibrium:

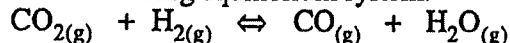


When a small amount of solid C is added to the system ...

D

- A. $[\text{H}_2]$ decreases.
B. $[\text{CH}_4]$ increases
C. the temperature increases.
D. all concentrations remain constant.
E. $[\text{C}]$ increases.

10. Consider the following equilibrium system:



Which of the following, when added to the system above, would result in a net decrease in $[\text{H}_2\text{O}]$?

C

- A. CO_2 C. CO
B. H_2 D. H_2O