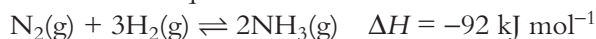


# Self-test Questions

## Topic 7 (SL)

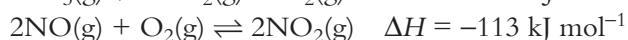
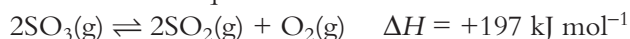
1 Consider the equilibrium



Which of the following would increase the percentage  $\text{NH}_3$  present at equilibrium?

- A decreasing the pressure
- B decreasing the temperature
- C removing nitrogen from the reaction mixture
- D adding a catalyst

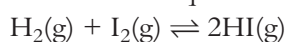
2 Consider these equilibria:



Which change in conditions would cause the position of equilibrium in **both** reactions to shift in the **same** direction.

- A increasing the pressure
- B adding  $\text{O}_2(\text{g})$
- C increasing the temperature
- D none of the above

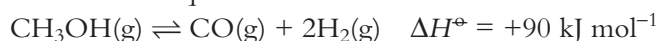
3 Consider the equilibrium



At 500 K and  $1.0 \times 10^6$  kPa the equilibrium mixture contained 82.5% HI. Which of the following could be the percentage of HI in the equilibrium mixture at 500 K and  $2.0 \times 10^6$  kPa?

- A 41.25%
- B 82.5%
- C 93.2%
- D 71.6%

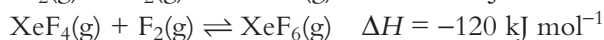
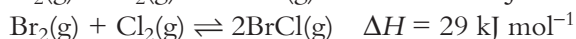
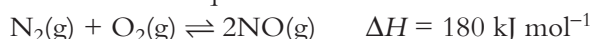
4 Consider the equilibrium



If the percentage  $\text{CH}_3\text{OH}$  in the reaction mixture at 500 K and  $1.0 \times 10^6$  kPa is 17%, which of the following could be the percentage  $\text{CH}_3\text{OH}$  in the equilibrium mixture at  $0.5 \times 10^6$  kPa and 1000 K?

- A 1%
- B 17%
- C 34%
- D 68%

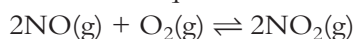
5 Consider these equilibria:



Which of the following is true?

- A All three equilibria are affected in the same way by a change in pressure.
- B The yield of  $\text{XeF}_6$  increases as the temperature is decreased.
- C The yield of NO increases as the pressure is increased.
- D The yield of BrCl increases as the temperature is decreased.

6 What is the equilibrium constant expression for the reaction



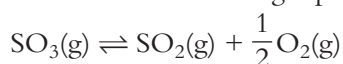
A  $K_c = \frac{[\text{NO}(\text{g})]^2[\text{O}_2(\text{g})]}{[\text{NO}_2(\text{g})]^2}$

B  $K_c = \frac{[\text{NO}(\text{g})][\text{O}_2(\text{g})]}{[\text{NO}_2(\text{g})]}$

C  $K_c = \frac{[\text{NO}_2(\text{g})]^2}{[\text{NO}_2(\text{g})]^2[\text{O}_2(\text{g})]}$

D  $K_c = \frac{[\text{NO}_2(\text{g})]^2}{[\text{NO}(\text{g})]^2 + [\text{O}_2(\text{g})]}$

7 Which of the following represents the reaction quotient for the reaction



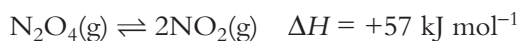
A  $Q = \frac{[\text{SO}_2(\text{g})]^2[\text{O}_2(\text{g})]}{[\text{SO}_3(\text{g})]^2}$

B  $Q = \frac{[\text{SO}_3(\text{g})]}{[\text{SO}_2(\text{g})][\text{O}_2(\text{g})]}$

C  $Q = \frac{[\text{SO}_2(\text{g})][\text{O}_2(\text{g})]^{1/2}}{[\text{SO}_3(\text{g})]}$

D  $Q = \frac{[\text{SO}_3(\text{g})]^2}{[\text{SO}_2(\text{g})]^2[\text{O}_2(\text{g})]}$

8 Consider the reaction



Which of the following changes would cause the value of the equilibrium constant for this reaction to increase?

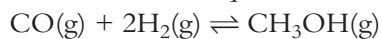
A increasing the temperature

B decreasing the temperature

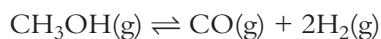
C decreasing the pressure

D introducing a catalyst

9 The value of the equilibrium constant for the reaction



at 1000 K is  $2.05 \times 10^6$ . What is the value of the equilibrium constant for the reaction



at the same temperature?

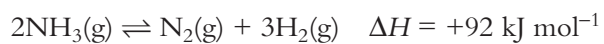
A  $2.05 \times 10^6$

B  $4.88 \times 10^{-7}$

C  $-2.05 \times 10^6$

D  $0.488 \times 10^6$

10 Consider the reaction



for which  $K_c = 3.83$  at 700 K.

1.00 mol of ammonia was placed in a sealed container at 700 K and left for some time. The concentrations of all the gases in the container were then measured. The reaction quotient  $Q$  was calculated to be 2.25. What can be concluded from this?

- A The temperature must have been higher than 700 K.
- B The reaction had not reached equilibrium.
- C Not enough ammonia was put in the container.
- D The position of the equilibrium had shifted to the left.