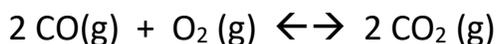


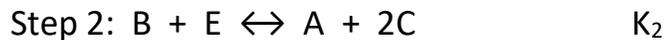
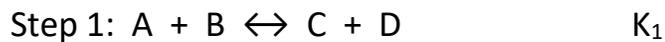
Day 8.3 Warm-Up

- Which of the following is the best definition of chemical equilibrium?
 - A condition where the forward and reverse reaction rates are equal and constant.
 - There are equal amounts of reactants and products.
 - The forward and reverse reaction rates have stopped.
 - The product concentrations are larger than reactant concentrations.
 - The reactant concentrations are larger than product concentrations.
- Which of the following will require the least time for a reaction to reach equilibrium?
 - K_c is a very small number.
 - K_c is a very large number.
 - K_c is approximately one.
 - Cannot tell without knowing the value of K_c .
 - Cannot tell, since the time required to reach equilibrium does not depend on K_c .

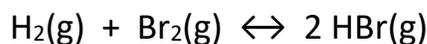


- What is the equilibrium constant for the reaction represented by the equation above at 25°C?
 - $\frac{(P_{\text{CO}_2})^2}{(P_{\text{CO}})^2 P_{\text{O}_2}}$
 - $\frac{P_{\text{CO}_2}}{P_{\text{CO}} P_{\text{O}_2}}$
 - $2P_{\text{CO}} + P_{\text{O}_2}$
 - $\frac{P_{\text{CO}_2}}{2P_{\text{CO}} + P_{\text{O}_2}}$
 - $\frac{(2P_{\text{CO}_2})^2}{(2P_{\text{CO}})^2 P_{\text{O}_2}}$

4. The following two-step process has equilibrium constants K_1 and K_2 .



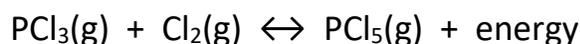
- a. $K_3 = K_1K_2$
- b. $K_3 = (K_1)^2 + K_2$
- c. $K_3 = (K_1)^2K_2$
- d. $K_3 = (K_1)^2/K_2$
- e. $K_3 = K_2/K_1$



5. Consider the equilibrium above with $K_c = 25$ at a certain temperature. A reaction vessel contains a mixture with the following concentrations: $[H_2] = 0.10 \text{ M}$, $[Br_2] = 0.10 \text{ M}$ and $[HBr] = 0.50 \text{ M}$. Which of the following statements concerning the reaction and the reaction quotient, Q , is true?

- a. $Q = K_c$
- b. $Q < K_c$; more HBr will be produced.
- c. $Q < K_c$; more H_2 and Br_2 will be produced.
- d. $Q > K_c$; more HBr will be produced.
- e. $Q > K_c$; more H_2 and Br_2 will be produced.

6.



Some PCl_3 and Cl_2 are mixed in a container at 200°C and the system reaches equilibrium according to the equation above. Which of the following causes an increase in the number of moles of PCl_5 present at equilibrium?

- I. Decreasing the volume of the container.
- II. Raising the temperature.
- III. Adding a mole of He gas at constant volume.

- a. I only
- b. II only
- c. I and III only
- d. II and III only
- e. I, II, and III