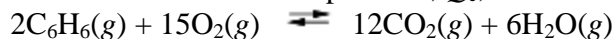


Practice Quiz: Equilibrium

1. Consider the equilibrium reaction shown below.
 $B_2(g) \rightleftharpoons 2B(g)$
If the rate constants are: $k_{\text{fwd}} = 7.00 \times 10^{-5} \text{ s}^{-1}$ and $k_{\text{rev}} = 2.00 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$, what is the value of K_c under these conditions?
- 1.75×10^5
 - 3.50
 - 0.286
 - 5.71×10^{-6}
 - 1.40×10^{-10}
2. Which of the following has an effect on the magnitude of the equilibrium constant?
- removing products as they are formed
 - adding more of a reactant
 - adding a catalyst
 - increasing the pressure, in a gas-phase reaction
 - change in temperature
3. The two equilibrium constants for the same reaction, K_c and K_p , will always equal one another when
- all of the reactants and products are gases.
 - in the reaction equation, the number of moles of gaseous products equals the number of moles of gaseous reactants.
 - in the reaction equation, the number of moles of gaseous products is greater than the number of moles of gaseous reactants.
 - in the reaction equation, the number of moles of gaseous products is smaller than the number of moles of gaseous reactants.
 - in the reaction equation, the total number of moles of reactants equals that of the products.
4. The reaction quotient, Q_c , for a reaction has a value of 75 while the equilibrium constant, K_c , has a value of 195. Which of the following statements is accurate?
- The reaction must proceed to the left to establish equilibrium.
 - The reaction must proceed to the right to establish equilibrium.
 - The concentrations of the products will be much smaller than the concentrations of the reactants when the system is at equilibrium.
 - The concentrations of the products will be about the same as the concentrations of the reactants when the system is at equilibrium.
 - None of these choices is correct.

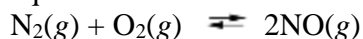
Practice Quiz: Equilibrium

5. Select the mass-action expression, Q_c , for the following chemical reaction equation.



- $\frac{[\text{CO}_2][\text{H}_2\text{O}]}{[\text{C}_6\text{H}_6][\text{O}_2]}$
- $\frac{[\text{CO}_2]^{12}[\text{H}_2\text{O}]^6}{[\text{C}_6\text{H}_6]^2[\text{O}_2]^{15}}$
- $\frac{[\text{C}_6\text{H}_6][\text{O}_2]}{[\text{CO}_2][\text{H}_2\text{O}]}$
- $\frac{[\text{C}_6\text{H}_6]^2[\text{O}_2]^{15}}{[\text{CO}_2]^{12}[\text{H}_2\text{O}]^6}$
- $\frac{[12\text{CO}_2][6\text{H}_2\text{O}]}{[2\text{C}_6\text{H}_6][15\text{O}_2]}$

6. The reaction of nitrogen with oxygen to form nitrogen monoxide can be represented by the following equation.



At 2000°C, the equilibrium constant, K_c , has a value of 4.10×10^{-4} . What is the value of K_p ?

- 2.17×10^{-8}
- 4.10×10^{-4}
- 7.65×10^{-2}
- 7.75
- None of these choices is correct.

7. At high temperatures, carbon reacts with O_2 to produce CO as follows:

$2\text{C}(s) + \text{O}_2(g) \rightleftharpoons 2\text{CO}(g)$. When 0.350 mol of O_2 and excess carbon were placed in a 5.00-L container and heated, the equilibrium concentration of CO was found to be 0.060 M. What is the equilibrium constant, K_c , for this reaction?

- 0.010
- 0.072
- 0.090
- 0.17
- 1.2

Practice Quiz: Equilibrium

8. At a certain temperature the reaction $\text{CO}_2(g) + \text{H}_2(g) \rightleftharpoons \text{CO}(g) + \text{H}_2\text{O}(g)$ has $K_c = 2.50$. If 2.00 mol of carbon dioxide and 1.5 mol of hydrogen are placed in a 5.00 L vessel and equilibrium is established, what will be the concentration of carbon monoxide?
- 0.091 M
- 0.191 M
- 0.209 M
- 0.913 M
- 1.05 M
9. When 0.152 mol of solid PH_3BCl_3 is introduced into a 3.0 L container at a certain temperature, 8.44×10^{-3} mol of PH_3 is present at equilibrium:
- $$\text{PH}_3\text{BCl}_3(s) \rightleftharpoons \text{PH}_3(g) + \text{BCl}_3(g)$$
- Construct a reaction table for the process, and use it to calculate K_c at this temperature.
10. Consider the following gas-phase equilibrium reaction:
- $$\text{N}_2(g) + \text{O}_2(g) \rightleftharpoons 2\text{NO}(g), K_c = 4.10 \times 10^{-4} \text{ at } 2000^\circ\text{C}$$
- If 1.0 mol of NO is introduced into a 1.0 L container at 2000°C , what is the concentration of NO when equilibrium is reached?