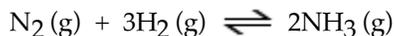


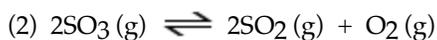
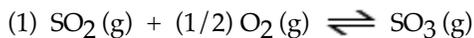
Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

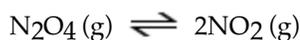
- 1) The equilibrium constant for the gas phase reaction

is $K_{\text{eq}} = 4.34 \times 10^{-3}$ at 300°C . At equilibrium, _____.

- A) reactants predominate
B) roughly equal amounts of products and reactants are present
C) only products are present
D) products predominate
E) only reactants are present
- 2) The equilibrium constant for reaction 1 is K. The equilibrium constant for reaction 2 is _____.



- A) K^2 B) $1/2K$ C) $2K$ D) $-K^2$ E) $1/K^2$
- 3) Which of the following expressions is the correct equilibrium-constant expression for the equilibrium between dinitrogen tetroxide and nitrogen dioxide?



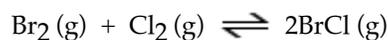
- A) $[\text{NO}_2]^2[\text{N}_2\text{O}_4]$
B) $\frac{[\text{NO}_2]}{[\text{N}_2\text{O}_4]}$
C) $\frac{[\text{NO}_2]}{[\text{N}_2\text{O}_4]^2}$
D) $[\text{NO}_2][\text{N}_2\text{O}_4]$
E) $\frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]}$

- 4) A reaction vessel is charged with hydrogen iodide, which partially decomposes to molecular hydrogen and iodine:



When the system comes to equilibrium at 425°C, $P_{\text{HI}} = 0.708$ atm, and $P_{\text{H}_2} = P_{\text{I}_2} = 0.0960$ atm. The value of K_{eq} at this temperature is _____.

- A) 6.80×10^{-2}
 - B) 1.30×10^{-2}
 - C) K_{eq} cannot be calculated for this gas reaction when the volume of the reaction vessel is not given.
 - D) 1.84×10^{-2}
 - E) 54.3
- 5) At 400 K, the equilibrium constant for the reaction



is $K_{\text{eq}} = 7.0$. A closed vessel at 400 K is charged with 1.00 atm of $\text{Br}_2(\text{g})$, 1.00 atm of $\text{Cl}_2(\text{g})$, and 2.00 atm of $\text{BrCl}(\text{g})$. Use Q to determine which of the statements below is true.

- A) The equilibrium partial pressure of Br_2 will be greater than 1.00 atm.
- B) At equilibrium, the total pressure in the vessel will be less than the initial total pressure.
- C) The equilibrium partial pressure of $\text{BrCl}(\text{g})$ will be greater than 2.00 atm.
- D) The reaction will go to completion since there are equal amounts of Br_2 and Cl_2 .
- E) The equilibrium partial pressures of Br_2 , Cl_2 , and BrCl will be the same as the initial values.

Answer Key

Testname: CH_13_EQUILIB QUIZ.TST

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) D
ID: chem9b 15.1-9
- 2) E
ID: chem9b 15.1-11
- 3) E
ID: chem9b 15.1-13
- 4) D
ID: chem9b 15.1-30
- 5) C
ID: chem9b 15.1-33

AP Chemistry Quiz:
Equilibrium, K, and Q

① When ~~K~~ $K < 1$, $[P] < [R]$ because $K = \frac{[P]}{[R]}$ (A)
thus reactants predominate. Mistake in the original key!
on in the value of K?!

② To go from $R \times n$ 1 to $R \times n$ 2, you must
(1) reverse the $r \times n$ and then (2) double it. (Actually,
the order of operations doesn't matter here.) (E)

(1) reverse $\rightarrow \frac{1}{K}$
(2) double the $r \times n \rightarrow \left(\frac{1}{K}\right)^2 \rightarrow \frac{1}{K^2}$

③ $K = \frac{[NO_2]^2 \rightarrow P}{[N_2O_4] \rightarrow R}$ (E)

④ $K = \frac{P_{H_2} \times P_{I_2}}{P_{HI}^2} = \frac{(0.960)^2}{(0.708)^2} = 1.84 \times 10^{-2}$ (D)

⑤ $Q = \frac{P_{BrCl}^2}{P_{Br_2} \times P_{Cl_2}} = \frac{2^2}{1^2} = 4$ $Q < K$, so $r \times n$
must shift right.

(C)

As $r \times n$ shifts right,
amount of product, BrCl,
must increase from its
initial P of 2.00 atm.