Assessment

Chemistry: Lesson 16

Question 1

Express the equilibrium constant for the following reaction.

$$2\ CH_3Cl_{(g)} + Cl_{2\ (g)} \rightleftharpoons 2\ CH_2Cl_{2\ (g)} + H_{2\ (g)}$$

A) $K = \frac{[CH_2Cl_2].[H_2]}{[CH_3Cl].[Cl_2]}$

B) $K = \frac{[CH_2Cl_2]^2[H_2]}{[CH_3Cl]^2[Cl_2]}$

C) $K = \frac{[CH_3Cl]^2[Cl_2]}{[CH_2Cl_2]^2\ [H_2]}$

D) $K = \frac{[CH_2Cl_2]^2[H_2]}{[CH_3Cl][Cl_2]}$

Question 2

Express the equilibrium constant for the following reaction.

$$N_{2\,(g)} + 3\,H_{2\,(g)} \rightleftharpoons 2\,NH_{3\,(g)}$$

A) $K = \frac{[NH_3]^{1/2}}{[N_2].[H_2]^{1/3}}$

B) $K = \frac{[NH_3]}{[N_2].[H_2]}$

C) $K = \frac{[NH_3]^2}{[N_2].[H_2]^3}$

D) $K = \frac{[N_2].[H_2]^3}{[NH_3]^2}$

Question 3

Which of the following is the correct expression for the equilibrium constant?

A) $K_c = \frac{[\text{Reactants}]}{[\text{Products}]}$

B) $K_c = [\text{Reactants}].[\text{Products}]$

C) $K_c = \frac{[\text{Products}]}{[\text{Reactants}]}$

D) $K_c = [\text{Reactants}] + [\text{Products}]$

Question 4

If $K_c << 1$, the reverse reaction is favored.

A) True

B) False

Question 5

If K_c >> 1, the forward reaction is favored.

A) True

B) False

Question 6

A chemical system is considered to have reached dynamic equilibrium when ____.

A) the amount of the products equals the amount of the reactants

B) all of reactants have been converted to products

C) the sum of the concentrations of each of the reactant species is equal to the sum of the

D) the rate of the forward reaction is equal to the rate of the reverse reaction.

Question 7

Express the equilibrium constant for the following reaction.

$$P_{4\,(s)} + 5\ O_{2\,(g)} \rightleftharpoons P_4O_{10\,(s)}$$

A) $K = \frac{[P_4].[O_2]^5}{[P_4O_{10}]}$

B) $K = \frac{[P_4O_{10}]}{[P_4].[O_2]^5}$

C) $K = [O_2]^{-5}$

D) $K = [O_2]^5$

Question 8

Express the equilibrium constant for the following reaction.

$$2\ Na_{(s)} + 2\ H_2O_{(l)} \rightleftharpoons 2\ NaOH_{(aq)} + H_{2\ (g)}$$

A) $K = \frac{[NaOH]^2[H_2]}{[Na]^2[H_2O]^2}$

B) $K = [H_2][NaOH]^{-2}$

C) $K = \frac{[Na]^2[H_2O]^2}{[NaOH]^2[H_2]^2}$

D) $K = [H_2][NaOH]^2$

Question 9

Determine the value of Kc for the following reaction if the equilibrium concentrations are as follows:

$[N_2]_{eq} = 3.6\ M$

$[O_2]_{eq} = 4.1\ M$

$[N_2O]_{eq} = 3.3 \times 10^{-18}\ M$

$$2\ N_{2\,(g)} + O_{2\,(g)} \rightleftharpoons 2\ N_2O_{\,(g)}$$

A) 2.2×10^{-19}

B) 4.5×10^{18}

C) 2.0×10^{-37}

D) 5.0×10^{36}

Question 10

Determine the value of K_c for the following reaction if the equilibrium concentrations are as follows:

$[N_2]_{eq} = 1.5\ M$
$[H_2]_{eq} = 1.1\ M$
$[NH_3]_{eq} = 0.47\ M$

$$N_{2\,(g)} + 3\ H_{2\,(g)} \rightleftharpoons 2\ NH_{3\,(g)}$$

A) 3.5

B) 0.28

C) 9.1

D) 0.11