Chemical Equilibrium

DPP-03

1. A reversible reaction having two reactants in equilibrium if the concentration of reactants are doubled, the equilibrium constant will

(1) Become 4 times

(2) Become $\frac{1}{4}^{th}$ times

(3) Become $\frac{1}{16}^{th}$ times

(4) Remains the same

2. Reaction $A(g) + B(g) \rightleftharpoons C(g) + D(g)$.

If the concentration of A is doubled then

(1) Equilibrium constant (K_c) will be doubled

(2) Equilibrium constant (K_c) will be halved

(3) Equilibrium constant (K_c) remains unaffected

(4) Equilibrium constant (K_c) will become four times

3. The concentration of a pure solid or liquid phase is not included in the expression of equilibrium constant because

(1) solid and liquid concentrations are independent of their quantities.

(2) solid and liquids react slowly.

(3) solid and liquids at equilibrium do not interact with gaseous phase.

(4) the molecules of solids and liquids cannot migrate to the gaseous phase.

4. If K_1 and K_2 are the equilibrium constants for a reversible reaction at T_1 K and T_2 K temperature. respectively ($T_1 < T_2$) and the reaction takes place with neither heat evolution nor absorption, then

(1) $K_1 > K_2$ at high temperature

(2) $K_1 < K_2$ at high temperature

(3) $K_1 = K_2$ only at high temperature

(4) $K_1 = K_2$ at any temperature

5. For the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, the relation between the degree of dissociation of $N_2O_4(g)$ at pressure, P with its equilibrium constant K_P is

(1) $\alpha = \dfrac{K_P/P}{4 + K_P/P}$

(2) $\alpha = \dfrac{K_P}{4 + K_P}$

(3) $\alpha = \left[\dfrac{K_P/P}{4 + K_P/P}\right]^{1/2}$

(4) $\alpha = \left[\dfrac{K_P}{4 + K_P}\right]^{1/2}$

6. At T K, a compound $AB_2(g)$ dissociates according to the reaction $2AB_2(g) \rightleftharpoons 2AB(g) + B_2(g)$, with degree of dissociation 'x' which is small compared with unity. The expression for 'x' in terms of the equilibrium constant, K_P and the total pressure P is

(1) $\dfrac{K_P}{P}$

(2) $(K_P)^{1/3}$

(3) $\left(\dfrac{2K_P}{P}\right)^{1/3}$

(4) $\left(\dfrac{K_P}{P}\right)^{1/3}$

7. The equilibrium $SOCl_2 \rightleftharpoons SO_2(g) + Cl_2(g)$ is attained at 25°C in a closed rigid container and helium gas is introduced. Which of the following statements is correct?

(1) Concentration of SO_2 is increased.

(2) More Cl_2 is formed.

(3) Concentrations of all change.

(4) Concentrations will not change.

8. Which of the following will shift the reaction $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$, $\Delta H = (+)$ ve to the left hand side?

(1) Addition of PCl_5

(2) Increase in pressure

(3) Increase in temperature

(4) Catalyst

9. For the given equilibrium reaction $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$. The addition of more $CaCO_3(s)$ causes

(1) The decrease in the concentration of $CO_2(g)$
(2) The increase in the concentration of $CO_2(g)$
(3) No change in the concentration of $CO_2(g)$
(4) Increase in the concentration of $CaO(s)$

10. Given the following reaction at equilibrium

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

Some inert gas is added at constant volume. Predict which of the following facts will be affected?

(1) More of $NH_3(g)$ is produced
(2) Less of $NH_3(g)$ is produced
(3) No affect on the degree of advancement of reaction at equilibrium
(4) K_p of reaction is increased

11. $\log \frac{K_P}{K_C} + \log RT = 0$ is a relationship for the reaction:

(1) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
(2) $2SO_2 + O_2 \rightleftharpoons 2SO_3$
(3) $H_2 + I_2 \rightleftharpoons 2HI$
(4) $N_2 + 3H_2 \rightleftharpoons 2NH_3$

12. For the dissociation reaction

N2O4(g) $\rightleftharpoons$ 2NO2(g), the degree of dissociation (α) in terms of Kp and total equilibrium pressure P is :

(1) $\alpha = \sqrt{\frac{4P + K_P}{K_P}}$ (2) $\alpha = \sqrt{\frac{K_P}{4P + K_P}}$

(3) $\alpha = \sqrt{\frac{K_P}{4P}}$ (4) None of these

13 In a vessel containing N_2, H_2 and NH_3 at equilibrium, some helium gas is introduced so that total pressure increase while temperature and volume remain constant. According to Le Chatelier's principle, the dissociation of NH_3:

(1) increases
(2) decreases
(3) remains unaltered
(4) changes unpredictably

1. **(4)**
2. **(3)**
3. **(1)**
4. **(4)**
5. **(3)**
6. **(3)**
7. **(4)**
8. **(1)**
9. **(3)**
10. **(3)**
11. **(2)**
12. **(2)**
13. **(3)**