Arjuna NEET (2024)

Chemical Equilibrium

DPP-05

1. In lime kiln, reversible reaction
$CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
Proceeds to completion because:
(1) High temperature
(2) CO_2 escapes
(3) CaO removed
(4) Low temperature

2. An unknown compound A dissociates at 500°C to give products as follows:
$$A_{(g)} \rightleftharpoons B_{(g)} + C_{(g)} + D_{(g)}$$
Vapour density of the equilibrium mixture is 50 when it dissociates to the extent to 10%. What will be the molecular weight of compound A:
(1) 120 (2) 130
(3) 134 (4) 140

3. At 250°C and 1 atmospheric pressure, the vapour density of PCl_5 is 57.9. What will be the dissociation of PCl_5?
(1) 1.00 (2) 0.90
(3) 0.80 (4) 0.65

4. N_2O_4 dissociates as $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$ at 273 K and 2 atm pressure. The equilibrium mixture has a density of 41. What will be the degree of dissociation:
(1) 14.2% (2) 16.2%
(3) 12.2% (4) None

5. The vapour density of undecomposed N_2O_4 is 46. When heated, vapour density decreases to 24.5 due to its dissociation to NO_2. The percent dissociation of N_2O_4 at the final temperature is:
(1) 87 (2) 60
(3) 40 (4) 70

6. The active mass of 64 gm of HI in a two litre flask would be:
(1) 2 (2) 1
(3) 5 (4) 0.25

7. One mole of N_2O_4(g) at 100 K is kept in a closed container at 1.0 atm pressure. It is heated to 400 K, where 30% by mass of N_2O_4(g) decomposes of NO_2(g). The resultant pressure will be:
(1) 4.2 (2) 5.2
(3) 3.2 (4) 6.2

8. At the equilibrium of the reaction,
$$N_2O_4(g) \rightleftharpoons 2\,NO_2\,(g),$$
the observed molecular weight of N_2O_4 is 80 g mol^{-1} at 350 K. The percentage of dissociation of N_2O_4 (g) at 350 K is:
(1) 10% (2) 15%
(3) 20% (4) 18%

9. The equilibrium constant for a reaction
$N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ is 4×10^{-4} at 2000 K. In the presence of catalyst, the equilibrium is attained 10 times faster. The equilibrium constant in the presence of catalyst, at 2000 K is:
(1) 40×10^{-4}
(2) 4×10^{-4}
(3) 4×10^{-2}
(4) Difficult to compute without more data

10. At a certain temp. $2HI \rightleftharpoons H_2 + I_2$ Only 50% HI is dissociated at equilibrium. The equilibrium constant is:
(1) 0.25 (2) 1.0
(3) 3.0 (4) 0.50

11. The reaction between N_2 and H_2 to form ammonia has $K_c = 6 \times 10^{-2}$ at the temperature 500°C.
The numerical value of K_p for this reaction is:
(1) 1.5×10^{-5}
(2) 1.5×10^{5}
(3) 1.5×10^{-6}
(4) 1.5×10^{6}

12. The equilibrium constant (K_p) for the decomposition of gaseous H_2O

$H_2O(g) \rightleftharpoons H_2(g) + \frac{1}{2} O_2(g)$

is related to degree of dissociation (α) at a total pressure p, given by:

(1) $K_p = \frac{\alpha^3 p^{1/2}}{(1+\alpha)(2+\alpha)^{1/2}}$

(2) $K_p = \frac{\alpha^3 p^{3/2}}{(1-\alpha)(2+\alpha)^{1/2}}$

(3) $K_p = \frac{\alpha^{3/2} p^2}{(1-\alpha)(2+\alpha)^{1/2}}$

(4) $K_p = \frac{\alpha^{3/2} p^{1/2}}{(1-\alpha)(2+\alpha)^{1/2}}$

13. If we take 1 mole $N_2O_{4(g)}$ in the reaction $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$, α is the part of N_2O_4 which dissociates then the total number of moles at equilibrium will be:

(1) 3
(2) 1
(3) $(1 - \alpha)^2$
(4) $(1 + \alpha)$

14. The effect of temperature on equilibrium constant is expressed as ($T_2 > T_1$)

$$\log \frac{K_2}{K_1} = \frac{-\Delta H}{2.303R}\left[\frac{1}{T_2} - \frac{1}{T_1}\right]$$

For endothermic reaction false statement is:

(1) $\left[\frac{1}{T_2} - \frac{1}{T_1}\right]$ = Positive

(2) ΔH = positive

(3) $\log K_2 > \log K_1$

(4) $K_2 > K_1$

Note: Kindly find the Video Solution of DPPs Questions in the DPPs Section.

Answer Key

1. **(2)**
2. **(1)**
3. **(3)**
4. **(3)**
5. **(1)**
6. **(4)**
7. **(2)**
8. **(2)**
9. **(2)**
10. **(1)**
11. **(1)**
12. **(4)**
13. **(4)**
14. **(1)**