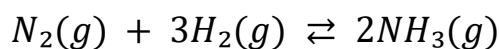


NAMUNAVIY MASALALAR

1)

Masala.



Boshlang'ich: $[N_2]_0 = 0.7\text{ M}$, $[H_2]_0 = 1.2\text{ M}$, $[NH_3]_0 = 0$.

Muvozanatda $[NH_3] = 0.30\text{ M}$. Toping: K_c .

Yechim.

Agar muvozanatda $[NH_3] = 0.30\text{ M}$ bo'lsa, $2 \cdot x = 0.30 \Rightarrow x = 0.15$.

Muvozanat konsentratsiyalari:

$$[N_2] = 0.7 - x = 0.7 - 0.15 = 0.55\text{ M}$$

$$[H_2] = 1.2 - 3 \cdot x = 1.2 - 0.45 = 0.75\text{ M}$$

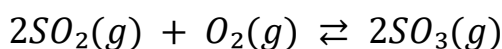
$$K_c = ([NH_3]^2) / ([N_2] \cdot [H_2]^3) = (0.30^2) / (0.55 \cdot 0.75^3)$$

$$\text{Hisob: } 0.30^2 = 0.09; 0.75^3 = 0.421875; 0.55 \cdot 0.421875 = 0.23203125$$

$$K_c = 0.09 / 0.23203125 \approx 0.388 (\approx 0.388)$$

2)

Masala.



Boshlang'ich: $[SO_2]_0 = 0.6\text{ M}$, $[O_2]_0 = 0.4\text{ M}$, $[SO_3]_0 = 0$.

Muvozanatda $[SO_3] = 0.40\text{ M}$. Toping: K_c .

Yechim.

$$2 \cdot x = 0.40 \Rightarrow x = 0.20.$$

$$[SO_2] = 0.6 - 2 \cdot x = 0.6 - 0.40 = 0.20\text{ M}$$

$$[O_2] = 0.4 - x = 0.4 - 0.20 = 0.20\text{ M}$$

$$K_c = ([SO_3]^2) / ([SO_2]^2 \cdot [O_2]) = (0.40^2) / (0.20^2 \cdot 0.20)$$

$$\text{Hisob: } 0.40^2 = 0.16; 0.20^2 = 0.04; 0.04 \cdot 0.20 = 0.008$$

$$K_c = 0.16 / 0.008 = 20.0$$

3)

Masala.



Boshlang'ich: $[A]_0 = 2.0\text{ M}$, $[B]_0 = 1.0\text{ M}$, $[C]_0 = 0$.

Berilgan: $K_c = 2.0$. Toping: muvozanatdagi $[C]$.

Yechim.

$$ICE: [A] = 2 - x, [B] = 1 - x, [C] = x.$$

$$Kc = x / ((2 - x)(1 - x)) = 2.$$

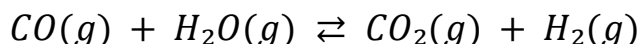
Yecha ketish: $x / ((2 - x)(1 - x)) = 2 \Rightarrow$ yechimlardan mosini tanlaymiz.
Tenglama ildizlari hisoblanganda mos ($0 \leq x \leq 1$) qiymat: $x \approx 0.719$
(yaqincha 0.7192).

Tekshiruv: $Kc \approx 0.719 / ((1.281) \cdot (0.281)) \approx 2.0$ (doiraviy tekshiruvga mos).

Natija: $[C] \approx 0.719 M$.

4)

Masala.



Boshlang'ich: $[CO]_0 = 0.50 M, [H_2O]_0 = 0.50 M, [CO_2]_0 = [H_2]_0 = 0$.

Muvozanatda $[CO_2] = 0.15 M$. Topping: Kc .

Yechim.

$$CO_2 = x = 0.15 \Rightarrow [CO] = 0.50 - x = 0.35 M, [H_2O] = 0.35 M, [H_2] = 0.15 M.$$

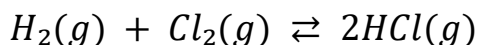
$$Kc = ([CO_2] \cdot [H_2]) / ([CO] \cdot [H_2O]) = (0.15 \cdot 0.15) / (0.35 \cdot 0.35)$$

Hisob: $0.15 \cdot 0.15 = 0.0225$; $0.35 \cdot 0.35 = 0.1225$

$$Kc = 0.0225 / 0.1225 = 0.184 (\approx 0.1837)$$

5)

Masala.



Muvozanatda: $[H_2] = 0.40 M, [Cl_2] = 0.40 M, [HCl] = 1.20 M$. Topping: Kc .

Yechim.

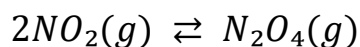
$$Kc = ([HCl]^2) / ([H_2] \cdot [Cl_2]) = (1.20^2) / (0.40 \cdot 0.40)$$

Hisob: $1.20^2 = 1.44$; $0.40 \cdot 0.40 = 0.16$

$$Kc = 1.44 / 0.16 = 9.00$$

6)

Masala.



Boshlang'ich: $[NO_2]_0 = 0.80 M, [N_2O_4]_0 = 0$.

Muvozanatda $[N_2O_4] = 0.30 M$. Topping: Kc .

Yechim.

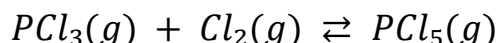
Agar $[N_2O_4] = x = 0.30 \Rightarrow NO_2$ iste'moli $2 \cdot x = 0.60 \Rightarrow [NO_2] = 0.80 - 0.60 = 0.20 M$.

$$Kc = [N_2O_4] / ([NO_2]^2) = 0.30 / (0.20^2)$$

Hisob: $0.20^2 = 0.04$; $0.30 / 0.04 = 7.50$

7)

Masala.



Boshlang'ich: $[PCl_3]_0 = 0.30 M$, $[Cl_2]_0 = 0.30 M$, $[PCl_5]_0 = 0$.

Muvozanatda $[PCl_5] = 0.15 M$. Toping: Kc .

Yechim.

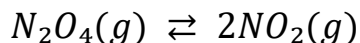
Agar $[PCl_5] = x = 0.15 \Rightarrow [PCl_3] = 0.30 - x = 0.15 M$, $[Cl_2] = 0.30 - x = 0.15 M$.

$$Kc = [PCl_5] / ([PCl_3] \cdot [Cl_2]) = 0.15 / (0.15 \cdot 0.15)$$

Hisob: $0.15 \cdot 0.15 = 0.0225$; $0.15 / 0.0225 = 6.67 (\approx 6.6667)$

8)

Masala.



Boshlang'ich: $[N_2O_4]_0 = 1.00 M$, $[NO_2]_0 = 0$.

Muvozanatda $[NO_2] = 0.60 M$. Toping: Kc .

Yechim.

$$2 \cdot x = 0.60 \Rightarrow x = 0.30.$$

$$[N_2O_4] = 1.00 - x = 0.70 M.$$

$$Kc = ([NO_2]^2) / [N_2O_4] = 0.60^2 / 0.70$$

Hisob: $0.60^2 = 0.36$; $0.36 / 0.70 = 0.514 (\approx 0.5143)$

9)

Masala.

$CH_3COOH(aq) \rightleftharpoons CH_3COO^-(aq) + H^+(aq)$ (zaif kislota dissotsiatsiyasi)

Boshlang'ich: $[CH_3COOH]_0 = 0.100 M$, $[CH_3COO^-]_0 = [H^+]_0 = 0$.

Muvozanatda $[H^+] = 0.0100 M$. Toping: Ka .

Yechim.

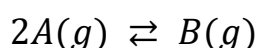
$$[H^+] = x = 0.0100 \Rightarrow [CH_3COO^-] = x = 0.0100, [CH_3COOH] = 0.100 - x = 0.0900 M.$$

$$K_a = ([H^+] \cdot [CH_3COO^-]) / [CH_3COOH] = (0.0100 \cdot 0.0100) / 0.0900$$

$$\text{Hisob: } 0.0001 / 0.0900 = 1.11 \cdot 10^{-3} (\approx 1.11 \times 10^{-3})$$

10)

Masala.



Boshlang'ich: $[A]_0 = 0.50 M$, $[B]_0 = 0.10 M$. Berilgan: $K_c = 0.50$. Toping: muvozanatdagi $[A]$ va $[B]$.

Yechim.

O'zgarish: $2A \rightarrow B$: $A: 0.50 - 2 \cdot x$; $B: 0.10 + x$.

$$K_c = ([B]) / ([A]^2) = 0.50 \Rightarrow (0.10 + x) / (0.50 - 2 \cdot x)^2 = 0.50.$$

Tenglamani yechish (maqbul ildiz, shart: $0.50 - 2 \cdot x \geq 0$): $x \approx 0.01266$.

Shunday qilib:

$$[A] = 0.50 - 2 \cdot 0.01266 \approx 0.47468 M$$

$$[B] = 0.10 + 0.01266 \approx 0.11266 M$$

Tekshiruv: $K_c \approx 0.11266 / (0.47468^2) \approx 0.50$ (mos).

Natija: $[A] \approx 0.4747 M$, $[B] \approx 0.1127 M$.