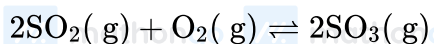


Questions with Answer Keys

MathonGo

Q1 (20 July 2021 Shift 1)



In an equilibrium mixture, the partial pressures are

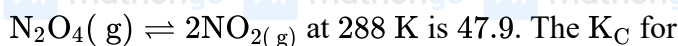
$$P_{\text{SO}_3} = 43\text{kPa}; P_{\text{O}_2} = 530\text{ Pa and}$$

$P_{\text{SO}_2} = 45\text{ kPa}$. The equilibrium constant

$$K_P = ___ 10^{-2}. \text{ (Nearest integer)}$$

Q2 (22 July 2021 Shift 1)

Value of K_P for the equilibrium reaction

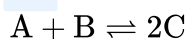


this reaction at same temperature is $______$ (Nearest integer)

$$\left(R = 0.083\text{ L bar K}^{-1}\text{ mol}^{-1} \right)$$

Q3 (25 July 2021 Shift 1)

For the reaction

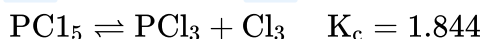


the value of equilibrium constant is 100 at 298 K. If the initial concentration of all the three species is 1M

each, then the equilibrium concentration of C is $x \times 10^{-1}\text{M}$. The value of x is

(Nearest integer)

Q4 (27 July 2021 Shift 1)



3.0 moles of PCl_5 is introduced in a 1 L closed

reaction vessel at 380 K. The number of moles of

$$\text{PCl}_5 \text{ at equilibrium is } \times 10^{-3}$$

(Round off to the Nearest Integer)

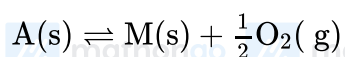
Q5 (27 July 2021 Shift 2)

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Questions with Answer Keys

MathonGo

The equilibrium constant for the reaction



is $K_p = 4$. At equilibrium, the partial pressure of O_2 is _____ atm. (Round off to the nearest integer)

Questions with Answer Keys

MathonGo

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Answer Key

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Q1 (172)

Q2 (2)

Q3 (25)

Q4 (1400)

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Q5 (16)

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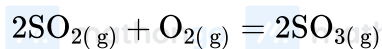
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Hints and Solutions

MathonGo

Q1



$$K_P = \frac{(p_{\text{SO}_3(\text{g})})^2}{p_{\text{SO}_2(\text{g})}^2 \times p_{\text{O}_2(\text{g})}}$$

$$= \frac{43 \times 43}{45 \times 45} \times 530 \text{ Pa}^{-1}$$

$$= 172.28 \times 10^{-5} \text{ Pa}^{-1}$$

$$= 172.28 \text{ atm}$$

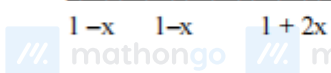
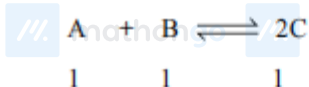
$$= 17228 \times 10^{-2} \text{ atm}$$

Ans is 17228

Q2

$$K_C = \frac{K_P}{RT} = \frac{47.9}{0.083 \times 288} = 2$$

Q3



$$K = \frac{[\text{C}]_{\text{eq}}^2}{[\text{A}]_{\text{eq}}[\text{B}]_{\text{eq}}} = \frac{(1+2x)^2}{(1-x)(1-x)}$$

$$100 = \left(\frac{1+2x}{1-x} \right)^2$$

$$\left(\frac{1+2x}{1-x} \right) = 10$$

$$x = \frac{3}{4}$$

$$[\text{C}]_{\text{eq}} = 1 + 2x$$

$$= 1 + 2 \left(\frac{3}{4} \right)$$

$$= 2.5\text{M}$$

$$25 \times 10^{-1}\text{M}$$

Hints and Solutions

MathonGo

Q4



$$t = 0.3 \text{ moles}$$

$$t = \infty \quad x \quad x$$

$$\Rightarrow \frac{[\text{PCl}_3][\text{Cl}_2]}{[\text{PCl}_5]} = \frac{x^2}{3-x} = 1.844$$

$$\Rightarrow x^2 + 1.844 - 5.532 = 0$$

$$\Rightarrow x = \frac{-1.844 + \sqrt{(1.844)^2 + 4 \times 5.532}}{2}$$

$$\cong 1.604$$

$$\Rightarrow \text{Moles of PCl}_5 = 3 - 1.604 \cong 1.396$$

Q5

$$k_p = P_{\text{O}_2}^{1/2} = 4$$

$$\therefore P_{\text{O}_2} = 16 \text{ bar} = 16 \text{ atm}$$