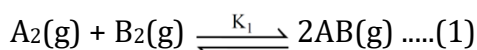


(Physical Chemistry)

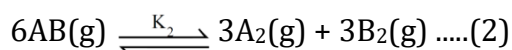
Chemical Equilibrium

1. Consider the following reversible chemical reactions :

[Chemical Equilibrium]



[JEE Main, Jan 2019]



- (1) $K_1 K_2 = 3$ (2) $K_2 = K_1^{-3}$ (3) $K_2 = K_1^3$ (4) $K_1 K_2 = \frac{1}{2}$

2. In a chemical reaction, $A + 2B \xrightleftharpoons{K} 2C + D$, the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant (K) for the aforesaid chemical reaction is : [JEE Main, Jan 2019]

- (1) $\frac{1}{4}$ (2) 4 (3) 16 (4) 1

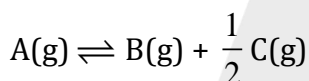
3. 4.0 moles of argon and 5.0 moles of PCl_5 are introduced into an evacuated flask of 100 litre capacity at 610 K. The system is allowed to equilibrate. At equilibrium, the total pressure of mixture was found to be 6.0 atm. The K_p for the reaction is

[Given: $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

[JEE Main, June 2022]

- (1) 2.25 (2) 6.24 (3) 12.13 (4) 15.24

4. For a reaction at equilibrium

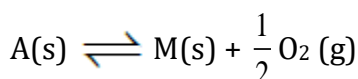


the relation between dissociation constant (K), degree of dissociation (α) and equilibrium pressure (p) is given by :

[JEE Main, June 2022]

- (1) $K = \frac{\alpha^{\frac{1}{2}} p^{\frac{3}{2}}}{\left(1 + \frac{3}{2}\alpha\right)^{\frac{1}{2}} (1-\alpha)}$ (2) $K = \frac{\alpha^{\frac{3}{2}} p^{\frac{1}{2}}}{(2+\alpha)^{\frac{1}{2}} (1-\alpha)}$
- (3) $K = \frac{(\alpha p)^{\frac{3}{2}}}{\left(1 + \frac{3}{2}\alpha\right)^{\frac{1}{2}} (1-\alpha)}$ (4) $K = \frac{(\alpha p)^{\frac{3}{2}}}{(1+\alpha)(1-\alpha)^{\frac{1}{2}}}$

5. 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)

[JEE Main, July 2021]

6. Value of K_p for the equilibrium reaction

$\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ at 288 K is 47.9. The K_c for this reaction at same temperature is ____.

(Nearest integer)

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

[JEE Main, July 2021]

7. For the reaction $\text{A}(\text{g}) \rightleftharpoons \text{B}(\text{g})$ at 495 K, $\Delta_r G^\circ = -9.478 \text{ kJ mol}^{-1}$. If we start the reaction in a closed container at 495 K with 22 millimoles of A, the amount of B in the equilibrium mixture is ____ millimoles. (Round off to the Nearest Integer). [$R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; $\ln 10 = 2.303$]

[JEE Main, March 2021]



ANSWERS KEY

1. (2) 2. (2) 3. (1) 4. (2) 5. (16) 6. (2) 7. (20)

A