1. Consider the following reversible chemical reactions : [Chemical Equilibrium]

$A_2(g) + B_2(g) \underset{}{\overset{K_1}{\rightleftharpoons}} 2AB(g)$ .....(1) **[Jee Main, Jan 2019]**

$6AB(g) \underset{}{\overset{K_2}{\rightleftharpoons}} 3A_2(g) + 3B_2(g)$ .....(2)

(1) $K_1K_2 = 3$ (2) $K_2 = K_1^{-3}$ (3) $K_2 = K_1^3$ (4) $K_1K_2 = \frac{1}{2}$

2. In a chemical reaction, $A + 2B \underset{}{\overset{K}{\rightleftharpoons}} 2C + D$, 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 PCI_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 = 0.082L atm K^{-1} mol^{-1}] **[JEE Main, June 2022]**

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

4. For a reaction at equilibrium

$$A(g) \rightleftharpoons B(g) + \frac{1}{2}C(g)$$

the relation between dissociation constant (K), degree of dissociation (α) and equilibrium pressure (p) is given by : **[JEE Main, June 2022]**

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

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

5. The equilibrium constant for the reaction

$$A(s) \rightleftharpoons M(s) + \frac{1}{2}O_2(g)$$

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

N_2O_4 (g) $\rightleftharpoons$ $2NO_2$(g) at 288 K is 47.9. The K_C for this reaction at same temperature is_____.

(Nearest integer)

(R = 0.083 L bar K^{-1} mol^{-1}) **[JEE Main, July 2021]**

7. For the reaction A(g) $\rightleftharpoons$ B(g) at 495 K, Δ_rG^0 = –9.478 kJ mol^{-1}. If we start the reaction in a closed container at 495 K with 22 millimoles of A, the amount of B is the equilibrium mixture is _____ millimoles. (Round off to the Nearest Integer). [R = 8.314 J mol^{-1} 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)