

# PYQSide

## JEE MAIN EQUILIBRIUM — DEGREE OF DISSOCIATION PROBLEMS AND VAPOUR DENSITY — PYQS

Max. Marks: 24

Questions: 6

### Section A (MCQ)

**Q.1** Given is a concentrated solution of a weak electrolyte  $A_xB_y$  of concentration 'c' and dissociation constant 'K'. The degree of dissociation is given by :

[JEE Main 2026 (Online) 6th April Evening Shift]

(1)  $[K \times c^{x+y-1} x^x y^y]^{x+y}$

(2)  $\left(\frac{K}{c^{x+y-1} x^x y^y}\right)^{\frac{1}{x+y}}$

(3)  $\left(\frac{c^{x+y-1} x^x y^y}{K}\right)^{x+y}$

(4)  $\left(\frac{c^{x+y-1} x^x y^y}{K}\right)^{\frac{1}{x+y}}$

Scan or tap for the full solution



**Q.2** The reaction  $A(g) \rightleftharpoons B(g) + C(g)$  was initiated with the amount 'a' of A(g). At equilibrium it is found that the amount of A(g) remaining is (a - x) at a total pressure of p.

The equilibrium constant  $K_p$  of the reaction can be calculated from the expression :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1)  $\frac{x^2}{a^2 + x^2} \times p$

(2)  $\frac{x^2}{a^2 - x^2} \times p$

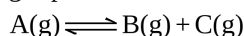
(3)  $\frac{a + x^2}{x^2} \times p$

(4)  $\frac{a^2 - x^2}{x^2} \times p$

Scan or tap for the full solution



**Q.3** Consider the following chemical equilibrium of the gas phase reaction at a constant temperature :



If p is the total pressure,  $K_p$  is the pressure equilibrium constant and  $\alpha$  is the degree of dissociation, then which of the following is true at equilibrium?

[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) If  $K_p$  value is extremely high compared to p,  $\alpha$  becomes much less than unity
- (2) When p increases,  $\alpha$  increases
- (3) If p value is extremely high compared to  $K_p$ ,  $\alpha \approx 1$
- (4) When p increases,  $\alpha$  decreases

Scan or tap for the full solution



**Q.4** At temperature T, compound  $AB_{2(g)}$  dissociates as  $AB_{2(g)} \rightleftharpoons AB_{(g)} + \frac{1}{2}B_{2(g)}$  having degree of dissociation x (small compared to unity). The correct expression for x in terms of  $K_p$  and p is:

[JEE Main 2025 (Online) 29th January Morning Shift]

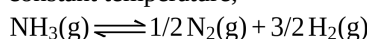
(1)  $\sqrt{K_p}$     (2)  $\sqrt[3]{\frac{2K_p^2}{p}}$     (3)  $\sqrt[3]{\frac{2K_p}{p}}$     (4)  $\sqrt[4]{\frac{2K_p}{p}}$

Scan or tap for the full solution



### Section B (Numerical)

**Q.5** For the following gas phase equilibrium reaction at constant temperature,



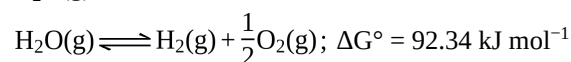
if the total pressure is  $\sqrt{3}$  atm and the pressure equilibrium constant ( $K_p$ ) is 9 atm, then the degree of dissociation is given as  $(x \times 10^{-2})^{-1/2}$ . The value of x is \_\_\_\_\_. (nearest integer)

[JEE Main 2026 (Online) 23rd January Morning Shift]

Scan or tap for the full solution



**Q.6** The equilibrium constant for decomposition of  $H_2O(g)$



is  $8.0 \times 10^{-3}$  at 2300 K and total pressure at equilibrium is 1 bar. Under this condition, the degree of dissociation ( $\alpha$ ) of water is \_\_\_\_\_  $\times 10^{-2}$  (nearest integer value).

[Assume  $\alpha$  is negligible with respect to 1]

[JEE Main 2025 (Online) 8th April Evening Shift]

Scan or tap for the full solution



**ANSWER KEY****Section A (MCQ)**

|              |   |   |   |   |  |  |  |  |  |  |  |
|--------------|---|---|---|---|--|--|--|--|--|--|--|
| <b>Ques.</b> | 1 | 2 | 3 | 4 |  |  |  |  |  |  |  |
| <b>Ans.</b>  | 2 | 2 | 4 | 2 |  |  |  |  |  |  |  |

**Section B (Numerical)**

|              |     |   |  |  |  |  |  |
|--------------|-----|---|--|--|--|--|--|
| <b>Ques.</b> | 5   | 6 |  |  |  |  |  |
| <b>Ans.</b>  | 125 | 5 |  |  |  |  |  |