

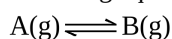
JEE MAIN EQUILIBRIUM — NUMERICAL ON EQUILIBRIUM CONCENTRATIONS — PYQS

Max. Marks: 32

Questions: 8

Section A (MCQ) — 4 questions

- Q.1** One mole each of He and A(g) are taken in a 10 L closed flask and heated to 400 K to establish the following equilibrium.



K_c for this reaction at 400 K is 4.0. The partial pressures (in atm) of He and B(g) are respectively (at equilibrium)

(Assume He, A(g) and B(g) behave as ideal gases)
(Given : $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$)

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

- (1) 3.28, 2.624 (2) 2.624, 3.28
(3) 3.28, 0.656 (4) 0.656, 6.56

Scan or tap for the
full solution

- Q.2** Observe the following equilibrium in a 1 L flask.
 $\text{A(g)} \rightleftharpoons \text{B(g)}$

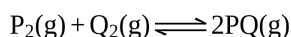
At T(K), the equilibrium concentrations of A and B are 0.5 M and 0.375 M respectively. 0.1 moles of A is added into the flask and heated to T(K) to establish the equilibrium again. The new equilibrium concentrations (in M) of A and B are respectively

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) 0.742, 0.557 (2) 0.367, 0.275
(3) 0.53, 0.4 (4) 0.557, 0.418

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- Q.3** Consider the following gaseous equilibrium in a closed container of volume 'V' at T(K).



2 moles each of $\text{P}_2(\text{g})$, $\text{Q}_2(\text{g})$ and $\text{PQ}(\text{g})$ are present at equilibrium. Now one mole each of ' P_2 ' and ' Q_2 ' are added to the equilibrium keeping the temperature at T(K). The number of moles of P_2 , Q_2 and PQ at the new equilibrium, respectively, are

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 2.56, 1.62, 2.24 (2) 2.67, 2.67, 2.67
(3) 1.21, 2.24, 1.56 (4) 1.66, 1.66, 1.66

Scan or tap for the
full solution

- Q.4** A vessel at 1000 K contains CO_2 with a pressure of 0.5 atm. Some of CO_2 is converted into CO on addition of graphite. If total pressure at equilibrium is 0.8 atm, then K_p is :

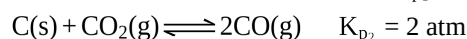
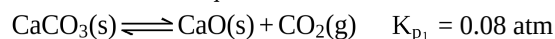
[JEE Main 2025 (Online) 22nd January Morning Shift]

- (1) 0.18 atm (2) 0.3 atm
(3) 3 atm (4) 1.8 atm

Scan or tap for the
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Section B (Numerical) — 4 questions

- Q.5** Solid carbon, CaO and CaCO_3 are mixed and allowed to attain equilibrium at T K.



The partial pressure of CO is _____ $\times 10^{-1}$ atm

[JEE Main 2026 (Online) 8th April Evening Shift]

Scan or tap for the
full solution

- Q.6** $\text{X}_2(\text{g}) + \text{Y}_2(\text{g}) \rightleftharpoons 2\text{Z}(\text{g})$

$\text{X}_2(\text{g})$ and $\text{Y}_2(\text{g})$ are added to a 1 L flask and it is found that the system attains the above equilibrium at T(K) with the number of moles of $\text{X}_2(\text{g})$, $\text{Y}_2(\text{g})$ and $\text{Z}(\text{g})$ being 3, 3 and 9 mol respectively (equilibrium moles). Under this condition of equilibrium, 10 mol of $\text{Z}(\text{g})$ is added to the flask and the temperature is maintained at T(K). Then the number of moles of $\text{Z}(\text{g})$ in the flask when the new equilibrium is established is _____. (Nearest integer)

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

Scan or tap for the
full solution

- Q.7** Consider the following equilibrium,
 $\text{CO(g)} + 2\text{H}_2\text{(g)} \rightleftharpoons \text{CH}_3\text{OH(g)}$
 0.1 mol of CO along with a catalyst is present in a 2 dm³ flask maintained at 500 K. Hydrogen is introduced into the flask until the pressure is 5 bar and 0.04 mol of CH₃OH is formed. The K_p^θ is _____ $\times 10^{-3}$ (nearest integer).
 Given : $R = 0.08 \text{ dm}^3 \text{ bar K}^{-1} \text{ mol}^{-1}$
 Assume only methanol is formed as the product and the system follows ideal gas behaviour.

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

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full solution

- Q.8** 37.8 g N₂O₅ was taken in a 1 L reaction vessel and allowed to undergo the following reaction at 500 K
 $2\text{N}_2\text{O}_{5\text{(g)}} \rightleftharpoons 2\text{N}_2\text{O}_{4\text{(g)}} + \text{O}_{2\text{(g)}}$
 The total pressure at equilibrium was found to be 18.65 bar.
 Then, $K_p = \text{_____} \times 10^{-2}$ [nearest integer]
 Assume N₂O₅ to behave ideally under these conditions.
 Given: $R = 0.082 \text{ bar L mol}^{-1} \text{ K}^{-1}$

[JEE Main 2025 (Online) 24th January Morning Shift]

Scan or tap for the
full solution**ANSWER KEY****Section A (MCQ) — 4 questions**

Ques.	1	2	3	4							
Ans.	1	4	2	4							

Section B (Numerical) — 4 questions

Ques.	5	6	7	8			
Ans.	4	15	74	962			