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CHEMISTRY · JEE MAIN

Chemical Equilibrium

Previous Year Questions with answers

124 questions · **105** papers · **2002–2026** · newest paper first

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What is in this PDF: every Chemical Equilibrium question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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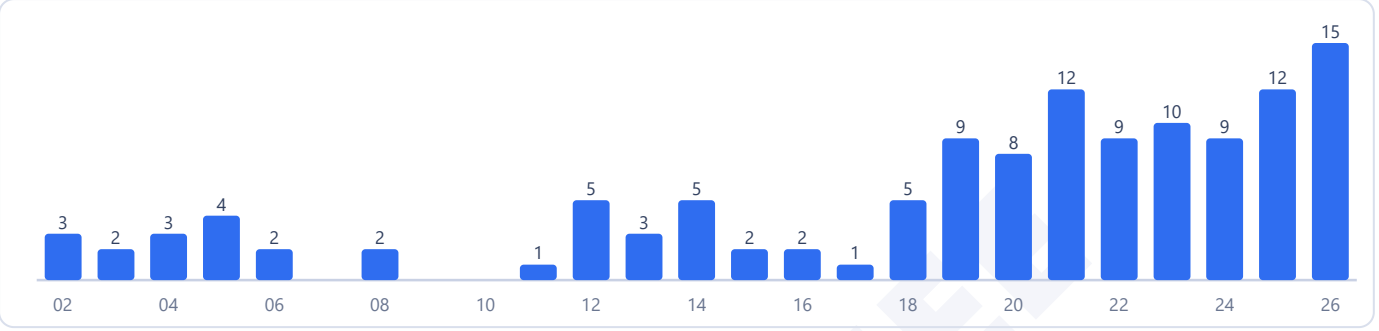
Chapter at a glance

1.8%	124	76 of 162	83 / 41
of Chemistry questions, 2019–2026	questions, 2002–2026	papers asked it, 2019–2026	MCQ / numerical, 2002–2026

Trend. Rising: 0.6 questions per paper in 2024–2026 against 0.5 in 2019–2023.

Questions per year



Counts are the questions we hold: 124 in 105 papers. 4 questions in this chapter came back in more than one paper.

Most-asked topics in this chapter (2002–2026)

Equilibrium Constant	52
Equilibrium Calculations	45
Le Chatelier's Principle	27

How often it comes up

Chemical equilibrium investigates reversible reactions and equilibrium constants under Unit 6: Equilibrium in the Class 11 curriculum, holding rank 27 among 31 chemistry chapters with a 1.8 percent share of total chemistry questions. In the computer-based testing era from 2019 to 2026, candidates answered 84 questions across 162 papers, representing an average rate of 0.5 questions per shift. The chapter featured in 76 of those 162 papers, and questions appeared every single year throughout the cycle. During the recent 2024 to 2026 examination sessions, testing registered 36 questions across 58 papers, maintaining an average of 0.6 questions per shift and achieving a 2.3 percent subject share. The chapter's share is down compared to the 2002 to 2018 window, which logged 40 questions across 38 papers for a 3.0 percent share. When compared against the broader 2019 to 2026 baseline, the recent share has stayed about the same. In 2026 alone, examiners presented 15 questions across 19 papers, showing up in 12 separate shifts. A total of 41 questions between 2019 and 2026 appeared as numerical answer questions, meaning nearly half of all chemical equilibrium items require final numerical entry.

Most-asked topics

Questions in this chapter concentrate across three defined areas:

- **Equilibrium Constant**: 52 questions historically, with 36 asked between 2019 and 2026, tested up to 2026. This dominant area tests relations connecting K p and K c via delta n g, multiplying or reversing chemical equations and finding the new equilibrium constant, units of equilibrium constants, and reaction quotient Q comparisons against K to determine reaction direction.
- **Equilibrium Calculations**: 45 total problems, including 33 from 2019 to 2026, tested through 2026. Core concepts evaluate degree of dissociation alpha in gaseous decomposition reactions like ammonia and dinitrogen tetroxide, equilibrium partial pressures, total vessel pressure, and standard Gibbs free energy conversions.

- **Le Chatelier's Principle**: 27 lifetime problems, with 15 between 2019 and 2026, continuing in 2026. Concepts explore equilibrium shifts induced by changes in concentration, pressure, volume, temperature, and addition of inert gases at constant volume or constant pressure, alongside van't Hoff isochore temperature plots.

What the questions look like

JEE Main tests chemical equilibrium through stoichiometric ICE tables and algebraic pressure relationships:

- **Degree of dissociation from partial pressures**: Evaluating the fractional dissociation of ammonia or dimer gas into elemental components at a stated total pressure given the equilibrium constant K p.
- **Le Chatelier re-equilibration after concentration perturbation**: An initial equilibrium mixture of reactants and products receives an additional injection of moles of product. Students recalculate the final mole counts after the system shifts backward to establish new equilibrium.
- **K p versus K c stoichiometric power exponents**: Identifying integer stoichiometric coefficients x and y for a general reaction from measured pairs of K p and K c at a specified absolute temperature.
- **Temperature dependence of equilibrium constants**: Extracting the standard reaction enthalpy and entropy from the slope and intercept of a plot of log K against inverse temperature.

How to practise it

Master the connection between K p and K c. The formula K p equals K c multiplied by R T raised to the power delta n g is central. Remember that delta n g counts only gaseous species in products minus reactants, omitting pure solids and pure liquids entirely.

Set up rigorous Initial, Change, Equilibrium (ICE) tables in terms of initial moles and degree of dissociation alpha. For gaseous systems, express partial pressures as mole fractions multiplied by total pressure P, and simplify algebraic expressions before substituting numerical values.

For Le Chatelier's principle, remember that adding an inert gas at constant volume produces no change in partial pressures and causes zero shift in equilibrium. In contrast, adding inert gas at constant pressure expands the system volume, shifting the reaction toward the side with more gaseous moles.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

Consider the following reactions in which all the reactants and products are present in gaseous state

$2xy \rightleftharpoons x_2 + y_2 \quad K_1 = 2.5 \times 10^5$

$xy + \frac{1}{2}z_2 \rightleftharpoons xyz \quad K_2 = 5 \times 10^{-3}$

The value of K_3 for the equilibrium $\frac{1}{2}x_2 + \frac{1}{2}y_2 + \frac{1}{2}z_2 \rightleftharpoons xyz$ is :

(A) 2.5×10^{-3}

(B) 2.5×10^{3}

(C) 1.0×10^{-5}

(D) 5×10^{-3}

Answer: (C) 1.0×10^{-5} · Official NTA final key

Q2 JEE Main 2026 · 8 Apr · Shift 2 Numerical

Solid carbon, CaO and $CaCO_3$ are mixed and allowed to attain equilibrium at T K.

$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g) \quad K_{p_1} = 0.08$ atm

$C(s) + CO_2(g) \rightleftharpoons 2CO(g) \quad K_{p_2} = 2$ atm

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

Numerical value type: the answer is a number.

Answer: 4. · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 1 MCQ

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.

A(g) $\rightleftharpoons$ B (g)

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 L atm K^{-1} mol^{-1})

(A) 3.28, 2.624

(B) 2.624, 3.28

(C) 3.28, 0.656

(D) 0.656, 6.56

Answer: (A) 3.28, 2.624 · Official NTA final key

Q4 JEE Main 2026 · 6 Apr · Shift 2 Numerical

In a closed flask at 600 K, one mole of $X_2Y_4(g)$ attains equilibrium as given below :

$X_2Y_4(g) \rightleftharpoons 2XY_2(g)$

At equilibrium, 75% $X_2Y_4(g)$ was dissociated and the total pressure is 1 atm. The magnitude of $\Delta_r G^{\ominus}$ (in kJ mol^{-1}) at this temperature is _____. (Nearest Integer)
(Given : R = 8.3 J mol^{-1} K^{-1}; ln 10 = 2.3, log 2 = 0.3, log 3 = 0.48, log 5 = 0.69, log 7 = 0.84)

Numerical value type: the answer is a number.

Answer: 8. · Official NTA final key

Q5 JEE Main 2026 · 5 Apr · Shift 1 Numerical

The values of pressure equilibrium constant recorded at different temperatures for the following equilibrium reaction have been given below

$A(g) \rightleftharpoons B(g) + C(g)$

$\frac{1}{T}$ (K^{-1})	$\log_{10} K_p$
0.05	3.5
0.06	2.5
0.07	1.5

The magnitude of $\frac{\Delta H^{\circ}}{R}$ calculated from the above data is _____. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 230. · Official NTA final key

Q6 JEE Main 2026 · 5 Apr · Shift 2 MCQ

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 Kp of the reaction can be calculated from the expression :

(A) $\frac{x^2}{a^2+x^2} \times p$
(B) $\frac{x^2}{a^2-x^2} \times p$
(C) $\frac{a+x^2}{x^2} \times p$
(D) $\frac{a^2-x^2}{x^2} \times p$

Answer: (B) $\frac{x^2}{a^2-x^2} \times p$ · Official NTA final key

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Q7 JEE Main 2026 · 4 Apr · Shift 1 MCQ

At T(K), the equilibrium constant of $A_2(g) + B_2(g) \rightleftharpoons C(g)$ is 2.7×10^{-5}. What is the equilibrium constant for $\frac{1}{3}A_2(g) + \frac{1}{3}B_2(g) \rightleftharpoons \frac{1}{3}C(g)$ at the same temperature?

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(A) $(2.7 \times 10^{-5})^3$
(B) 6×10^{-2}
(C) $\sqrt{2.7 \times 10^{-5}}$
(D) 3×10^{-2}

Answer: (D) 3×10^{-2} · Official NTA final key

Q8 JEE Main 2026 · 4 Apr · Shift 2 Numerical

For the following reaction at 50 °C and at 2 atm pressure,

$2N_2O_5(g) \rightleftharpoons 2N_2O_4(g) + O_2(g)$

N_2O_5 is 50% dissociated.

The magnitude of standard free energy change at this temperature is x.

$x =$ _____ J mol^{-1} [Nearest integer].

Given : R = 8.314 J mol^{-1} K^{-1}, log 2 = 0.30, log 3 = 0.48, ln10 = 2.303,
°C + 273 = K

Numerical value type: the answer is a number.

Answer: 2474. · Official NTA final key

Q9 JEE Main 2026 · 28 Jan · Shift 2 MCQ

The plot of $\log_{10} K$ vs $\frac{1}{T}$ gives a straight line. The intercept and slope respectively are (where K is equilibrium constant).

(A) $\frac{2{\cdot}303R}{\Delta H^\circ}, \frac{2{\cdot}303R}{\Delta S^\circ}$
(B) $-\frac{\Delta S^\circ R}{2{\cdot}303}, \frac{\Delta H^\circ R}{2{\cdot}303}$
(C) $\frac{\Delta S^\circ}{2{\cdot}303R}, -\frac{\Delta H^\circ}{2{\cdot}303R}$
(D) $-\frac{\Delta H^\circ}{2{\cdot}303R}, \frac{\Delta S^\circ}{2{\cdot}303R}$

Answer: (C) $\frac{\Delta S^\circ}{2{\cdot}303R}, -\frac{\Delta H^\circ}{2{\cdot}303R}$ · Official NTA final key

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Q10 JEE Main 2026 · 28 Jan · Shift 2 MCQ

Observe the following equilibrium in a 1 L flask.

A(g) $\rightleftharpoons$ 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

(A) 0.742, 0.557.
(B) 0.367, 0.275.
(C) 0.53, 0.4.
(D) 0.557, 0.418.

Answer: (D) 0.557, 0.418. · Official NTA final key

Q11 JEE Main 2026 · 24 Jan · Shift 2 MCQ

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

$\mathrm{P_2(g) + Q_2(g) \rightleftharpoons 2PQ(g)}$

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

(A) 1.21, 2.24, 1.56
(B) 2.67, 2.67, 2.67
(C) 1.66, 1.66, 1.66
(D) 2.56, 1.62, 2.24

Answer: (B) 2.67, 2.67, 2.67 · Official NTA final key

Q12 JEE Main 2026 · 23 Jan · Shift 1 MCQ

Consider the general reaction given below at 400 K

$x\mathrm{A(g)} \rightleftharpoons y\mathrm{B(g)}$.

The values of $\mathrm{K_p}$ and $\mathrm{K_c}$ are studied under the same condition of temperature but variation in x and y.

(i) $\mathrm{K_p} = 85.87$ and $\mathrm{K_c} = 2.586$ appropriate units

(ii) $\mathrm{K_p} = 0.862$ and $\mathrm{K_c} = 28.62$ appropriate units

The values of x and y in (i) and (ii) respectively are :

(A) (i) 4, 1 ; (ii) 4, 1
(B) (i) 3, 1 ; (ii) 3, 1
(C) (i) 1, 3 ; (ii) 2, 1
(D) (i) 1, 2 ; (ii) 2, 1

Answer: (D) (i) 1, 2 ; (ii) 2, 1 · Official NTA final key

Q13 JEE Main 2026 · 23 Jan · Shift 1 Numerical

For the following gas phase equilibrium reaction at constant temperature,

$\mathrm{NH_3(g) \rightleftharpoons \frac{1}{2}N_2(g) + \frac{3}{2}H_2(g)}$

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)

Numerical value type: the answer is a number.

Answer: 125. · Official NTA final key

Q14 JEE Main 2026 · 23 Jan · Shift 2 Numerical

$X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$

$X_2(g)$ and $Y_2(g)$ 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 $X_2(g)$, $Y_2(g)$ and $Z(g)$ being 3, 3 and 9 mol respectively (equilibrium moles). Under this condition of equilibrium, 10 mol of Z(g) is added to the flask and the temperature is maintained at T(K). Then the number of moles of Z(g) in the flask when the new equilibrium is established is _____. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 15. · Official NTA final key

Q15 JEE Main 2026 · 22 Jan · Shift 1 Numerical

Dissociation of a gas A_2 takes place according to the following chemical reaction. At equilibrium, the total pressure is 1 bar at 300K.

$A_2(g) \rightleftharpoons 2A(g)$

The standard Gibbs energy of formation of the involved substances has been provided below:

Substance	ΔG_f° / kJ mol^{-1}
A_2	-100.00
A	-50.832

The degree of dissociation of $A_2(g)$ is given by $(x \times 10^{-2})^{1/2}$ where x = _____. (Nearest integer).

[Given: R = 8 J mol^{-1} K^{-1}, log 2 = 0.3010, log 3 = 0.48]

Assume degree of dissociation is not negligible.

Numerical value type: the answer is a number.

Answer: 33. · Official NTA final key

Q16 JEE Main 2025 · 8 Apr · Shift 2 Numerical

The equilibrium constant for decomposition of H_2O (g)

$H_2O(g) \rightleftharpoons H_2(g) + \frac{1}{2}O_2(g)$ ($\Delta G^\circ = 92.34$ kJ mol^{-1})

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

[Assume α is negligible with respect to 1]

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q17 JEE Main 2025 · 3 Apr · Shift 1 MCQ

In the following system, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at equilibrium, upon addition of xenon gas at constant T & p, the concentration of

(A) PCl_3 will increase
(B) PCl_5, PCl_3 & Cl_2 remain constant
(C) Cl_2 will decrease
(D) PCl_5 will increase

Answer: (C) Cl_2 will decrease · Checked by our team

Q18 JEE Main 2025 · 3 Apr · Shift 1 MCQ

Given below are two statements:

Statement I : A catalyst cannot alter the equilibrium constant (K_c) of the reaction, temperature remaining constant.

Statement II : A homogenous catalyst can change the equilibrium composition of a system, temperature remaining constant.

In the light of the above statements, choose the correct answer from the options given below

(A) Both Statement I and Statement II are false
(B) Both Statement I and Statement II are true
(C) Statement I is true but Statement II is false
(D) Statement I is false but Statement II is true

Answer: (C) Statement I is true but Statement II is false · Checked by our team

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Q19 JEE Main 2025 · 2 Apr · Shift 1 Numerical

Consider the following equilibrium,

$CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$

0.1 mol of CO along with a catalyst is present in a $2dm^3$ flask maintained at 500 K . Hydrogen is introduced into the flask until the pressure is 5 bar and 0.04 mol of CH_3OH is formed. The K_p^θ is _____ $\times 10^{-3}$ (nearest integer).

Given : $R = 0.08 dm^3$ bar $K^{-1}mol^{-1}$

Assume only methanol is formed as the product and the system follows ideal gas behaviour.

Numerical value type: the answer is a number.

Answer: 74. · Key from source paper

Q20 JEE Main 2025 · 2 Apr · Shift 2 MCQ

Consider the following chemical equilibrium of the gas phase reaction at a constant temperature :

$A(g) \rightarrow B(g) + C(g)$

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

(A) When p increases α increases

(B) If p value is extremely high compared to $K_p, \alpha \approx 1$

(C) When p increases α decreases

(D) If K_p value is extremely high compared to p, α becomes much less than unity

Answer: (C) When p increases α decreases · Key from source paper

Q21 JEE Main 2025 · 29 Jan · Shift 1 MCQ

At temperature T, compound $\mathrm{AB}_{2(\mathrm{g})}$ dissociates as $\mathrm{AB}_{2(\mathrm{g})} \rightleftharpoons \mathrm{AB}_{(\mathrm{g})} + \frac{1}{2}\mathrm{B}_{2(\mathrm{g})}$ having degree of dissociation x (small compared to unity). The correct expression for x in terms of $\mathrm{K_p}$ and p is

(A) $\sqrt[4]{\frac{2K_p}{p}}$

(B) $\sqrt[3]{\frac{2K_p}{p}}$

(C) $\sqrt[3]{\frac{2\,K_p^2}{p}}$

(D) $\sqrt{K_p}$

Answer: (C) $\sqrt[3]{\frac{2\,K_p^2}{p}}$ · Key from source paper

Q22 JEE Main 2025 · 29 Jan · Shift 2 MCQ

Consider the equilibrium $\mathrm{CO(g) + 3H_2(g) \rightleftharpoons CH_4(g) + H_2O(g)}$ If the pressure applied over the system increases by two fold at constant temperature then (A) Concentration of reactants and products increases. (B) Equilibrium will shift in forward direction. (C) Equilibrium constant increases since concentration of products increases. (D) Equilibrium constant remains unchanged as concentration of reactants and products remain same. Choose the correct answer from the options given below :

(A) (A), (B) and (C) only

(B) (A) and (B) only

(C) (A), (B) and (D) only

(D) (B) and (C) only

Answer: (B) (A) and (B) only · Key from source paper

Q23 JEE Main 2025 · 28 Jan · Shift 1 MCQ

Ice and water are placed in a closed container at a pressure of 1 atm and temperature 273.15 K . If pressure of the system is increased 2 times, keeping temperature constant, then identify correct

observation from following

(A) Volume of system increases .

(B) The solid phase (ice) disappears completely.

(C) Liquid phase disappears completely.

(D) The amount of ice decreases.

Answer: (B) The solid phase (ice) disappears completely. · Key from source paper

Q24 JEE Main 2025 · 24 Jan · Shift 1 Numerical

37.8 g N_2O_5 was taken in a 1 L reaction vessel and allowed to undergo the following reaction at 500 K $2\,N_2O_{5(g)} \rightleftharpoons 2\,N_2O_{4(g)} + O_{2(g)}$ The total pressure at equilibrium was found to be 18.65 bar. Then, Kp = _____ $\times 10^{-2}$ [nearest integer] Assume N_2O_5 to behave ideally under these conditions. Given: R = 0.082 bar $Lmol^{-1}\,K^{-1}$

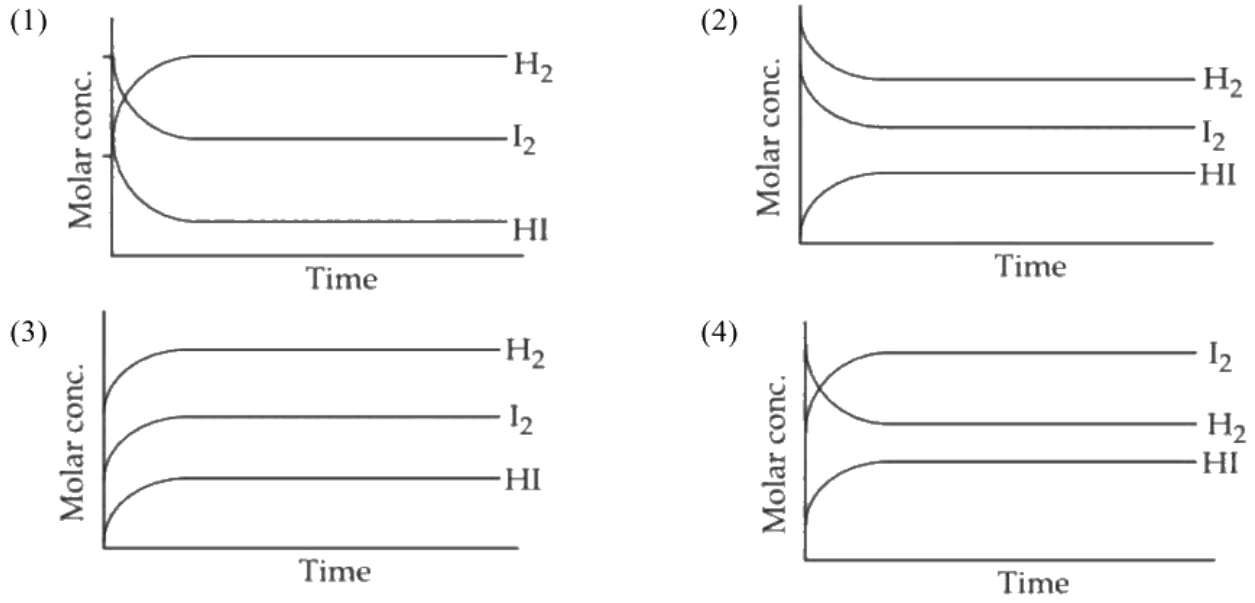
Numerical value type: the answer is a number.

Answer: 962. · Key from source paper

Q25 JEE Main 2025 · 24 Jan · Shift 2 MCQ

For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ Attainment of equillibrium is predicted correctly by :

Q58. For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ Attainment of equillibrium is predicted correctly by :



(A) *see figure*

(B) *see figure*

(C) *see figure*

(D) *see figure*

Answer: (B) · Key from source paper

Q26 JEE Main 2025 · 23 Jan · Shift 2 MCQ

Consider the reaction $\mathrm{X_2Y(\ g) = X_2(\ g) + \frac{1}{2}Y_2(\ g)}$ The equation representing correct relationship between the degree of dissociation (x) of $\mathrm{X_2Y(g)}$ with its equilibrium constant Kp is _____ . Assume x to be very very small.

(A) $x = \sqrt[3]{\frac{2\mathrm{Kp}}{\mathrm{p}}}$

(B) $x = \sqrt[3]{\frac{2\mathrm{Kp}^2}{\mathrm{p}}}$

(C) $x = \sqrt[3]{\frac{\mathrm{Kp}}{\mathrm{p}}}$

(D) $x = \sqrt[3]{\frac{\mathrm{Kp}}{2\mathrm{p}}}$

Answer: (B) $x = \sqrt[3]{\frac{2\mathrm{Kp}^2}{\mathrm{p}}}$ · Key from source paper

Q27 JEE Main 2025 · 22 Jan · Shift 1 MCQ

A vessel at 1000 K contains $\mathrm{CO_2}$ with a pressure of 0.5 atm . Some of $\mathrm{CO_2}$ is converted into CO on addition of graphite. If total pressure at equilibrium is 0.8 atm , then Kp is :

(A) 1.8 atm

(B) 0.3 atm

(C) 3 atm

(D) 0.18 atm

Answer: (A) 1.8 atm · Key from source paper

Q28 JEE Main 2024 · 8 Apr · Shift 1 MCQ

For the given hypothetical reactions, the equilibrium constants are as follows :

$\mathrm{X \rightleftharpoons Y;\ K_1 = 1.0}$

$\mathrm{Y \rightleftharpoons Z;\ K_2 = 2.0}$

$\mathrm{Z \rightleftharpoons W;\ K_3 = 4.0}$

The equilibrium constant for the reaction $\mathrm{X \rightleftharpoons W}$ is

(A) 6.0

(B) 12.0

(C) 7.0

(D) 8.0

Answer: (D) 8.0 · Key from source paper

Q29 JEE Main 2024 · 6 Apr · Shift 1 MCQ

At -20°C and 1 atm pressure, a cylinder is filled with equal number of H_2, I_2 and HI molecules for the reaction $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$, the K_p for the process is $x \times 10^{-1}$. x = _____ [Given : R = 0.082 L atm $\mathrm{K^{-1}\ mol^{-1}}$]

(A) 0.01
(B) 10
(C) 2
(D) 1

Answer: (B) 10 · Key from source paper

Q30 JEE Main 2024 · 6 Apr · Shift 2 MCQ

The ratio $\frac{K_P}{K_C}$ for the reaction : $CO_{(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons CO_{2(g)}$ is :

(A) $\frac{1}{\sqrt{RT}}$
(B) $(RT)^{1/2}$
(C) RT
(D) 1

Answer: (A) $\frac{1}{\sqrt{RT}}$ · Key from source paper

Q31 JEE Main 2024 · 5 Apr · Shift 1 MCQ

The following reaction occurs in the Blast furnace where iron ore is reduced to iron metal $\mathrm{Fe_2O_{3(s)} + 3CO_{(g)} \rightleftharpoons Fe_{(l)} + 3CO_{2(g)}}$ Using the Le-chatelier's principle, predict which one of the following will not disturb the equilibrium.

(A) Addition of $\mathrm{CO_2}$
(B) Removal of $\mathrm{CO_2}$
(C) Addition of $\mathrm{Fe_2O_3}$
(D) Removal of CO

Answer: (C) Addition of $\mathrm{Fe_2O_3}$ · Key from source paper

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Q32 JEE Main 2024 · 4 Apr · Shift 2 MCQ

The equilibrium constant for the reaction $\mathrm{SO_3(g) \rightleftharpoons SO_2(g) + \frac{1}{2}O_2(g)}$ is $K_c = 4.9 \times 10^{-2}$. The value of K_c for the reaction given below is $\mathrm{2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)}$ is :

(A) 4.9
(B) 49
(C) 41.6
(D) 416

Answer: (D) 416 · Key from source paper

Q33 JEE Main 2024 · 31 Jan · Shift 1 MCQ

For the given reaction, choose the correct expression of K_C from the following:

$Fe^{3+}{}_{aq} + SCN^{-}{}_{aq} \rightleftharpoons (FeSCN)^{2+}{}_{aq}$

(A) $K_C = \frac{FeSCN^{2+}}{Fe^{3+}\ SCN^-}$
(B) $K_C = \frac{Fe^{3+}\ SCN^-}{FeSCN^{2+}}$
(C) $K_C = \frac{FeSCN^{2+}}{Fe^{3+\,2}\ SCN^{-2}}$
(D) $K_C = \frac{FeSCN^{2+\,2}}{Fe^{3+}\ SCN^-}$

Answer: (A) $K_C = \frac{FeSCN^{2+}}{Fe^{3+}\ SCN^-}$ · Key from source paper

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Q34 JEE Main 2024 · 31 Jan · Shift 2 MCQ

$A_g \rightleftharpoons B_g + \frac{C}{2}g$. The correct relationship between K_P, α and equilibrium pressure P is

(A) $K_P = \frac{\alpha^{1/2}P^{1/2}}{2+\alpha^{1/2}}$
(B) $K_P = \frac{\alpha^{3/2}P^{1/2}}{2+\alpha^{1/2}\ 1-\alpha}$
(C) $K_P = \frac{\alpha^{1/2}P^{3/2}}{2+\alpha^{3/2}}$
(D) $K_P = \frac{\alpha^{1/2}P^{1/2}}{2+\alpha^{3/2}}$

Answer: (B) $K_P = \frac{\alpha^{3/2}P^{1/2}}{2+\alpha^{1/2}\ 1-\alpha}$ · Key from source paper

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Q35 JEE Main 2024 · 29 Jan · Shift 1 Numerical

For the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, $K_p = 0.492$ atm at 300 K. K_c for the reaction at same temperature is _____ $\times 10^{-2}$. (Given :R = 0.082 L atm mol^{-1} K^{-1})

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q36 JEE Main 2024 · 29 Jan · Shift 2 Numerical

The following concentrations were observed at 500 K for the formation of NH_3 from N_2 and H_2. At equilibrium : $[N_2] = 2 \times 10^{-2}$M, $[H_2] = 3 \times 10^{-2}$M and $[NH_3] = 1.5 \times 10^{-2}$M. Equilibrium constant for the reaction is _____.

Numerical value type: the answer is a number.

Answer: 417. · Key from source paper

Q37 JEE Main 2023 · 11 Apr · Shift 1 Numerical

A mixture of one mole of H_2O and 1 mole of CO is taken in a 10 litre container and heated to 725 K. At equilibrium 40% of water by mass reacts with carbon monoxide according to the equation: $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$. The equilibrium constant $K_C \times 10^2$ for the reaction is _____ (Nearest integer)

Numerical value type: the answer is a number.

Answer: 44. · Key from source paper

Q38 JEE Main 2023 · 11 Apr · Shift 2 Numerical

4.5 moles each of hydrogen and iodine is heated in a sealed ten litre vessel. At equilibrium, 3 moles of HI were found. The equilibrium constant for $H_2(g) + I_2(g) \rightleftharpoons 2HI_{(g)}$ is _____

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q39 JEE Main 2023 · 10 Apr · Shift 1 Numerical

The number of correct statement/s involving equilibria in physical processes from the following is _____

(A) Equilibrium is possible only in a closed system at a given temperature.
(B) Both the opposing processes occur at the same rate.
(C) When equilibrium is attained at a given temperature, the value of all its parameters became equal
(D) For dissolution of solids in liquids, the solubility is constant at a given temperature.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q40 JEE Main 2023 · 6 Apr · Shift 2 Numerical

The equilibrium composition for the reaction $PCl_3 + Cl_2 \rightleftharpoons PCl_5$ at 298 K is given below:

$[PCl_3]_{eq} = 0.2\ mol\ L^{-1}$, $[Cl_2]_{eq} = 0.1\ mol\ L^{-1}$, $[PCl_5]_{eq} = 0.40\ mol\ L^{-1}$

If 0.2 mol of Cl_2 is added at the same temperature, the equilibrium concentrations of PCl_5 is _____ $\times 10^{-2}\ mol\ L^{-1}$

Given: K_c for the reaction at 298 K is 20

Numerical value type: the answer is a number.

Answer: 49. · Key from source paper

Q41 JEE Main 2023 · 1 Feb · Shift 1 Numerical

(i) $X(g) \rightleftharpoons Y(g) + Z(g)$ K_{p1} = 3
(ii) $A(g) \rightleftharpoons 2\,B(g)$ K_{p2} = 1
If the degree of dissociation and initial concentration of both the reactants $X(g)$ and $A(g)$ are equal, then the ratio of the total pressure at equilibrium $\frac{p_1}{p_2}$ is equal to x: 1. The value of x is (Nearest integer)

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q42 JEE Main 2023 · 1 Feb · Shift 2 MCQ

The effect of addition of helium gas to the following reaction in equilibrium state at constant volume, is :

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(A) the equilibrium will shift in the forward direction and more of Cl_2 and PCl_3 gases will be produced.

(B) the equilibrium will go backward due to suppression of dissociation of PCl_5.

(C) helium will deactivate PCl_5 and reaction will stop.

(D) addition of helium will not affect the equilibrium.

Answer: (D) addition of helium will not affect the equilibrium. · Key from source paper

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Q43 JEE Main 2023 · 31 Jan · Shift 1 Numerical

For reaction: $SO_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons SO_3(g)$ $K_p = 2 \times 10^{12}$ at $27^\circ C$ and 1 atm pressure. The K_c for the same reaction is $\times 10^{13}$. (Nearest integer)
(Given R = 0.082 $L\ atm\ K^{-1}\ mol^{-1}$)

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q44 JEE Main 2023 · 30 Jan · Shift 2 Numerical

Consider the following equation:
$2\,SO_2(g) + O_2(g) \rightleftharpoons 2\,SO_3(g)$, $\Delta H = -190$ kJ.
The number of factors which will increase the yield of SO_3 at equilibrium from the following is _____ .
A. Increasing temperature
B. Increasing pressure
C. Adding more SO_2
D. Adding more O_2
E. Addition of catalyst

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q45 JEE Main 2023 · 29 Jan · Shift 1 Numerical

Water decomposes at $2300\ K$

$H_2O(g) \rightarrow H_2(g) + \frac{1}{2}O_2(g)$

The percent of water decomposing at $2300\ K$ and 1 bar is _____ (Nearest integer). Equilibrium constant for the reaction is 2×10^{-3} at $2300\ K$

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q46 JEE Main 2023 · 29 Jan · Shift 2 Numerical

At 298 K
$N_2(g) + 3H_2(g) \rightleftharpoons 2\,NH_3(g), K_1 = 4 \times 10^5$
$N_2(g) + O_2(g) \rightleftharpoons 2\,NO(g), K_2 = 1.6 \times 10^{12}$
$H_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons H_2O(g), K_3 = 1.0 \times 10^{-13}$
Based on above equilibria, the equilibrium constant of the reaction,
$2\,NH_3(g) + \frac{5}{2}O_2(g) \rightleftharpoons 2\,NO(g) + 3H_2O(g)$
is _____ $\times 10^{-33}$ (Nearest integer)

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q47 JEE Main 2022 · 28 Jul · Shift 2 Numerical

At $600\ K$, $2\ mol$ of NO are mixed with $1\ mol$ of O_2.
$2\,NO_{(g)} + O_2(g) \rightleftarrows 2\,NO_2(g)$
The reaction occurring as above comes to equilibrium under a total pressure of $1\ atm$. Analysis of the system shows that $0.6\ mol$ of oxygen are present at equilibrium. The equilibrium constant for the reaction is _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q48 JEE Main 2022 · 26 Jul · Shift 1 Numerical

At 298 K, the equilibrium constant is 2×10^{15} for the reaction:
$Cu(s) + 2\,Ag^+(aq) \rightleftharpoons Cu^{2+}(aq) + 2\,Ag(s)$
The equilibrium constant for the reaction
$\frac{1}{2}Cu^{2+}(aq) + Ag(s) \rightleftharpoons \frac{1}{2}Cu(s) + Ag^+(aq)$ is x $\times 10^{-8}$. The value of x is _____ . (Round off the answer to the nearest integer)

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q49 JEE Main 2022 · 29 Jun · Shift 2 MCQ

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

(A) 2.25
(B) 6.24
(C) 12.13
(D) 15.24

Answer: (A) 2.25 · Key from source paper

Q50 JEE Main 2022 · 27 Jun · Shift 1 · Numerical

$2\,\mathrm{NOCl(g)} \rightleftharpoons 2\,\mathrm{NO(g)} + \mathrm{Cl_2(g)}$
In an experiment, 2.0 moles of NOCl was placed in a one-litre flask and the concentration of NO after equilibrium established, was found to be $0.4\ \mathrm{mol/L}$. The equilibrium constant at $30\ ^\circ\mathrm{C}$ is _____ $\times 10^{-4}$.

Numerical value type: the answer is a number.

Answer: 125. · Key from source paper

Q51 JEE Main 2022 · 26 Jun · Shift 2 · Numerical

40% of HI undergoes decomposition to $\mathrm{H_2}$ and $\mathrm{I_2}$ at $300\ \mathrm{K}$. $\Delta G^{\ominus}$ for this decompostion reaction at one atmopsphere pressure is _____ $\mathrm{Jmol^{-1}}$-[nearest integer]
(Use $\mathrm{R} = 8.31\ \mathrm{J\ K^{-1}\ mol^{-1}}$; $\log 2 = 0.3010$, $\ln 10 = 2.3$, $\log 3 = 0.477$)

Numerical value type: the answer is a number.

Accepted answers: 2735 or 5470. · Key from source paper

Q52 JEE Main 2022 · 25 Jun · Shift 1 · Numerical

The standard free energy change ΔG° for 50% dissociation of $\mathrm{N_2O_4}$ into $\mathrm{NO_2}$ at $27^{\circ}\mathrm{C}$ and $1\ \mathrm{atm}$ pressure is $-x\ \mathrm{J\ mol^{-1}}$. The value of x is $-$_____ J. (Nearest Integer)
[Given : $R = 8.31\ \mathrm{J\ K^{-1}\ mol^{-1}}$, $\log 1.33 = 0.1239$ $\ln 10 = 2.3$]

Numerical value type: the answer is a number.

Answer: 710. · Key from source paper

Q53 JEE Main 2022 · 24 Jun · Shift 1 · MCQ

For a reaction at equilibrium
$\mathrm{A(g)} \rightleftharpoons \mathrm{B(g)} + \frac{1}{2}\mathrm{C(g)}$
the relation between dissociation constant (K), degree of dissociation (α) and equilibrium pressure (p) is given by :

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

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

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

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

Answer: (A) $K=\frac{\alpha^{\frac{3}{2}} p^{\frac{1}{2}}}{(2+\alpha)^{\frac{1}{2}}(1-\alpha)}$ · Key from source paper

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Q54 JEE Main 2022 · 24 Jun · Shift 1 Numerical

$2O_3(g) \rightleftharpoons 3O_2(g)$

At $300\ K$, ozone is fifty percent dissociated. The standard free energy change at this temperature and $1\ atm$ pressure is $(-)$ _____ $J\ mol^{-1}$. (Nearest integer)

[Given: $\ln 1.35 = 0.3$ and $R = 8.3\ J\ K^{-1}\ mol^{-1}$]

Numerical value type: the answer is a number.

Answer: 747. · Key from source paper

Q55 JEE Main 2022 · 24 Jun · Shift 2 Numerical

PCl_5 dissociates as $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ 5 moles of PCl_5 are placed in a 200 litre vessel which contains 2 moles of N_2 and is maintained at $600\ K$. The equilibrium pressure is $2.46\ atm$. The equilibrium constant K_p for the dissociation of PCl_5 is _____ $\times 10^{-3}$. (nearest integer) (Given: $R = 0.082\ L\ atm\ K^{-1}\ mol^{-1}$; Assume ideal gas behaviour)

Numerical value type: the answer is a number.

Answer: 1107. · Key from source paper

Q56 JEE Main 2021 · 27 Aug · Shift 2 Numerical

When $5.1\ g$ of solid NH_4HS is introduced into a two litre evacuated flask at $27^\circ C$, 20% of the solid decomposes into gaseous ammonia and hydrogen sulphide. The K_p for the reaction at $27^\circ C$ is $x \times 10^{-2}$. The value of x is (Integer answer)

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

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q57 JEE Main 2021 · 26 Aug · Shift 2 Numerical

The equilibrium constant K_c at $298\ K$ for the reaction

$A + B \rightleftharpoons C + D$ is 100. Starting with an equimolar solution with concentrations of A, B, C and D all equal to $1M$, the equilibrium concentration of D is _____$\times 10^{-2} M$. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 182. · Key from source paper

Q58 JEE Main 2021 · 26 Aug · Shift 2 Numerical

The reaction rate for the reaction
$[PtCl_4]^{2-} + H_2O \rightleftharpoons [Pt(H_2O)Cl_3]^- + Cl^-$
was measured as a function of concentrations of different species. It was observed that
$\frac{-d[PtCl_4^{2-}]}{dt} = 4.8 \times 10^{-5} [PtCl_4^{2-}] - 2.4 \times 10^{-3} [[Pt(H_2O)Cl_3]^-] [Cl^-]$
where square brackets are used to denote molar concentrations. The equilibrium constant $K_c = X$ (Nearest integer)
Value of $\frac{1}{X}$ is (question is modified.)

Numerical value type: the answer is a number.

Answer: 50. · Key from source paper

Q59 JEE Main 2021 · 27 Jul · Shift 1 Numerical

$PCl_5 \rightleftharpoons PCl_3 + Cl_2$ $K_c = 1.844$
3.0 moles of PCl_5 is introduced in a 1L closed reaction vessel at 380 K. The number of moles of PCl_5 at equilibrium is — $\times 10^{-3}$
(Round off to the Nearest Integer)

Numerical value type: the answer is a number.

Accepted answers: 1400 or 1396. · Key from source paper

Q60 JEE Main 2021 · 27 Jul · Shift 2 Numerical

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)

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q61 JEE Main 2021 · 25 Jul · Shift 1 Numerical

For the reaction
$A + B \rightleftharpoons 2C$
the value of equilibrium constant is 100 at 298 K. If the initial concentration of all the three species is 1 M each, then the equilibrium concentration of C is $x \times 10^{-1}$ M. The value of x is _____. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q62 JEE Main 2021 · 22 Jul · Shift 1 Numerical

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

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q63 JEE Main 2021 · 20 Jul · Shift 1 Numerical

$2\,SO_2(g) + O_2(g) \rightleftharpoons 2\,SO_3(g)$
In an equilibrium mixture, the partial pressures are $P_{SO_3} = 43$ kPa; $P_{O_2} = 530$ Pa and $P_{SO_2} = 45$ kPa. The equilibrium constant $K_P =$ _____ $\times 10^{-2}$. (Nearest integer)

Numerical value type: the answer is a number.

Answer: 172. · Key from source paper

Q64 JEE Main 2021 · 18 Mar · Shift 2 Numerical

The gas phase reaction
$2\,A(g) \rightleftharpoons A_2(g)$
at 400 K has $\Delta G^\circ = +25.2$ kJ mol^{-1}.
The equilibrium constant K_C for this reaction is _____ $\times 10^{-2}$. (Round off to the Nearest integer)
Use : $R = 8.3$ J mol^{-1} K^{-1}, $\ln 10 = 2.3 \log_{10} 2 = 0.30$, 1 atm = 1 bar
antilog $(-0.3) = 0.501$

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q65 JEE Main 2021 · 17 Mar · Shift 2 Numerical

Consider the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ The temperature at which $K_C = 20.4$ and $K_P = 600.1$, is _____ K. (Round off to the Nearest Integer). [Assume all gases are ideal and $R = 0.0831$ L bar K^{-1} mol^{-1}]

Numerical value type: the answer is a number.

Answer: 354. · Key from source paper

Q66 JEE Main 2021 · 26 Feb · Shift 1 Numerical

A homogeneous ideal gaseous reaction $AB_{2(g)} \rightleftharpoons A_{(g)} + 2\,B_{(g)}$ is carried out in a 25 litre flask at 27°C. The initial amount of AB_2 was 1 mole and the equilibrium pressure was 1.9 atm. The value of K_p is $x \times 10^{-2}$. The value of x is _____ (Integer answer) [R = 0.08206 dm^3 atm K^{-1} mol^{-1}]

Numerical value type: the answer is a number.

Answer: 73. · Key from source paper

Q67 JEE Main 2021 · 24 Feb · Shift 1 · Numerical

At 1990 K and 1 atm pressure, there are equal number of Cl_2 molecules and Cl atoms in the reaction mixture. The value of K_p for the reaction $Cl_{2g} \rightleftharpoons 2Cl_g$ under the above conditions is $x \times 10^{-1}$. The value of x is _____ (Rounded off to the nearest integer)

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q68 JEE Main 2020 · 6 Sep · Shift 1 · MCQ

The variation of equilibrium constant with temperature is given below :
Temperature Equilibrium Constant
$T_1 = 25^\circ C$ $K_1 = 10$
$T_2 = 100^\circ C$ $K_2 = 100$
The values of ΔH°, ΔG° at T_1 and ΔG° at T_2 (in $kJ\ mol^{-1}$) respectively, are close to [use $R = 8.314\ JK^{-1}\ mol^{-1}$]

(A) $28.4,\ -7.14$ and -5.71
(B) $0.64,\ -7.14$ and -5.71
(C) $28.4,\ -5.71$ and -14.29
(D) $0.64,\ -5.71$ and -14.29

Answer: (C) $28.4,\ -5.71$ and -14.29 · Checked by our team

Q69 JEE Main 2020 · 6 Sep · Shift 1 · MCQ

For the reaction
$Fe_2N(s) + \frac{3}{2}H_2(g) \rightleftharpoons 2Fe(s) + NH_3(g)$

(A) $K_c = K_p(RT)$
(B) $K_c = K_p(RT)^{-1/2}$
(C) $K_c = K_p(RT)^{1/2}$
(D) $K_c = K_p(RT)^{3/2}$

Answer: (C) $K_c = K_p(RT)^{1/2}$ · Key from source paper

Q70 JEE Main 2020 · 6 Sep · Shift 2 · MCQ

The value of K_c us 64 at 800 K for the reaction
$N_2(g) + 3H_2(g) \rightarrow 2\ NH_3\ (g)$
The value of K_c for the following reaction is :
$NH_3\ (g) \rightarrow \frac{1}{2}\ N_2\ (g) + \frac{3}{2}\ H_2\ (g)$

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(A) $1/64$
(B) 8
(C) $1/4$
(D) $1/8$

Answer: (D) $1/8$ · Key from source paper

Q71 JEE Main 2020 · 5 Sep · Shift 1 MCQ

Consider the following reaction:
$\mathrm{N_2O_4}(g) = 2\,\mathrm{NO_2}(g) : \Delta \mathrm{H}^0 = +58\mathrm{k}$
For each of the following cases (a, b), the direction in which the equilibrium shifts is:
(a) Temperature is decreased.
(b) Pressure is increased by adding $\mathrm{N_2}$ at constant T.

(A) (a) towards product, (b) towards reactant
(B) (a) towards reactant, (b) towards product
(C) (a) towards reactant, (b) no change
(D) (a) towards product, (b) no change

Answer: (C) (a) towards reactant, (b) no change · Key from source paper

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Q72 JEE Main 2020 · 5 Sep · Shift 2 Numerical

For a reaction $X + Y = 2Z$, 1.0 mol of X, 1.5 mol of Y and 0. 5 mol of Z were taken in a 1L vessel and allowed to react. At equilibrium, the concentration of Z was 1.0 $\mathrm{mol L^{-1}}$. the equilibrium constant of the reaction is _____ $\frac{x}{15}$. The value of x is _____

Numerical value type: the answer is a number.

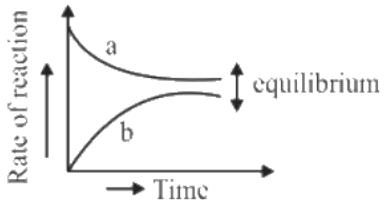
Answer: 16. · Key from source paper

Q73 JEE Main 2020 · 4 Sep · Shift 1 MCQ

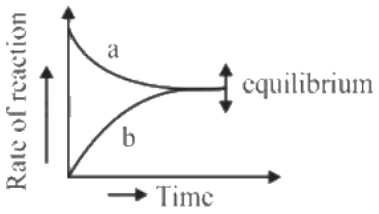
For the equilibrium $\mathrm{A} \rightleftharpoons \mathrm{B}$, the variation of the rate of the forward (a) and reverse (b) reaction with time is given by:
(see the figure above)

Q36. For the equilibrium $A \rightleftharpoons B$, the variation of the rate of the forward (a) and reverse (b) reaction with time is given by:

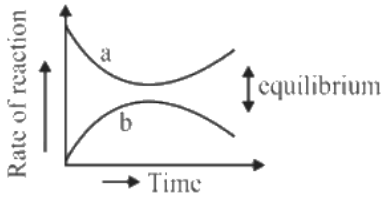
(1)



(2)



(3)



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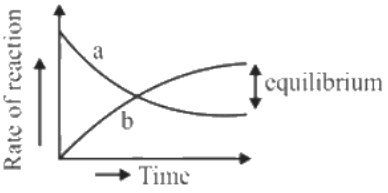

(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (B) · Key from source paper

Q74 JEE Main 2020 · 4 Sep · Shift 2 MCQ

If the equilibrium constant for $A \rightleftharpoons B + C$ is $K_{eq}^{(1)}$ and that of $B + C \rightleftharpoons P$ is $K_{eq}^{(2)}$, the equilibrium constant for $A \rightleftharpoons P$ is :

(A) $K_{eq}^{(1)} / K_{eq}^{(2)}$
(B) $K_{eq}^{(2)} - K_{eq}^{(1)}$
(C) $K_{eq}^{(1)} + K_{eq}^{(2)}$
(D) $K_{eq}^{(1)} K_{eq}^{(2)}$

Answer: (D) $K_{eq}^{(1)} K_{eq}^{(2)}$ · Key from source paper

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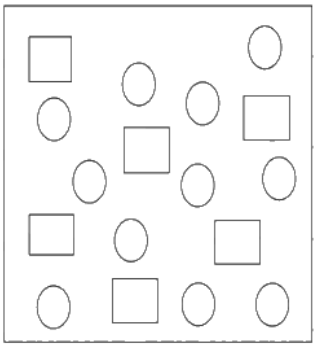
Q75 JEE Main 2020 · 9 Jan · Shift 2 MCQ

In the figure shown below reactant A (represented by square) is in equilibrium with product B (represented by circle). The equilibrium constant is (approx):

(see the figure above)

Q29. In the figure shown below reactant A (represented by square) is in equilibrium with product B (represented by circle). The equilibrium constant is (approx):



(1) 4
(2) 8
(3) 1
(4) 2

(A) 4
(B) 8
(C) 1
(D) 2

Answer: (D) 2 · Key from source paper

Q76 JEE Main 2019 · 12 Apr · Shift 2 MCQ

In which one of the following equilibria, $K_p \neq K_c$?

(A) $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$
(B) $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$
(C) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$
(D) $NO_2(g) + SO_2(g) \rightleftharpoons NO(g) + SO_3(g)$

Answer: (B) $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$ · Key from source paper

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Q77 JEE Main 2019 · 10 Apr · Shift 2 MCQ

For the reaction,
$2SO_2g + O_2g \rightleftharpoons 2SO_3g$,
$\Delta H = -57.2\ \text{kJ mol}^{-1}$ and $K_c = 1.7 \times 10^{16}$.
Which of the following statements is incorrect?

(A) The equilibrium constant is large suggestive of reaction going to completion and so, no catalyst is required.
(B) The equilibrium will shift in forward direction as the pressure increases.
(C) The equilibrium constant decreases as the temperature increases.
(D) The addition of inert gas at constant volume will not affect the equilibrium constant.

Answer: (A) The equilibrium constant is large suggestive of reaction going to completion and so, no catalyst is required. · Key from source paper

Q78 JEE Main 2019 · 8 Apr · Shift 2 MCQ

For the following reaction, equilibrium constant are given:
Ss + O_2g $\rightleftharpoons$ SO_2g; $K_1 = 10^{52}$
2Ss + 3O_2g $\rightleftharpoons$ 2SO_3g; $K_2 = 10^{129}$
The equilibrium constant for the reaction, 2SO_2g + O_2g $\rightleftharpoons$ 2SO_3g is:

(A) 10^{154}
(B) 10^{25}
(C) 10^{181}
(D) 10^{77}

Answer: (B) 10^{25} · Key from source paper

Q79 JEE Main 2019 · 12 Jan · Shift 1 MCQ

In a chemical reaction, $A + 2B \overset{K}{\rightleftharpoons} 2C + D$, 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 chemical reaction is:

(A) 1
(B) 4
(C) $\frac{1}{4}$
(D) 16

Answer: (B) 4 · Key from source paper

Q80 JEE Main 2019 · 12 Jan · Shift 1 MCQ

Two solids dissociate as follows:
$A\ (s) \rightleftharpoons B\ (g) + C\ (g);\ K_{P_1} = x\ atm^2$
$D\ (s) \rightleftharpoons C\ (g) + E\ (g);\ K_{P_2} = y\ atm^2$
The total pressure when both the solids dissociate simultaneously is:

(A) $\sqrt{x+y}$ atm
(B) $x^2 + y^2$ atm
(C) $(x+y)$ atm
(D) $2\left(\sqrt{x+y}\right)$ atm

Answer: (D) $2\left(\sqrt{x+y}\right)$ atm · Key from source paper

Q81 JEE Main 2019 · 11 Jan · Shift 1 MCQ

Consider the reaction N_2(g) + 3H_2(g) $\rightleftharpoons$ 2NH_3(g) The equilibrium constant of the above reaction is K_P. If pure ammonia is left to dissociate, the partial pressure of ammonia at equilibrium is given by (Assume that P_{NH_3} << P_{total} at equilibrium)

(A) $\frac{3^{3/2}\,K_P^{1/2}P^2}{16}$

(B) $\frac{K_P^{1/2P^2}}{16}$

(C) $\frac{K_P^{1/2P^2}}{4}$

(D) $\frac{3^{3/2}\,K_P^{1/2}P^2}{4}$

Answer: (A) $\frac{3^{3/2}\,K_P^{1/2}P^2}{16}$ · Key from source paper

Q82 JEE Main 2019 · 10 Jan · Shift 1 MCQ

What are the values of $\frac{K_p}{K_c}$ for the following reactions at 300 K respectively?
(At 300 K, RT = 24.62 dm^2 atm mol^{-1})
N_2 (g) + O_2 (g) $\rightleftharpoons$ 2 NO (g)
N_2O_4 (g) $\rightleftharpoons$ 2 NO (g)
N_2 (g) + $3H_2$ (g) $\rightleftharpoons$ 2 NH_3 (g)

(A) 24.63 dm^3 atm mol^{-1}, 606.0 dm^6 atm^2 mol^{-2}, 1.65 $\times 10^{-3}$ dm^{-6} atm^{-2} mol^2

(B) 1 ,24.62 dm^6 atm^3 mol^{-1}, 606.0 dm^6 atm^2 mol^{-2}

(C) 1 ,24.62 dm^3 atm mol^{-1}, 1.65 $\times 10^{-3}$ dm^{-6} atm^{-2} mol^2

(D) 1 , 4.1 $\times 10^{-2}$ dm^{-3} atm^{-1} mol, 606 dm^6 atm^2 mol^{-2}

Answer: (C) 1 ,24.62 dm^3 atm mol^{-1}, 1.65 $\times 10^{-3}$ dm^{-6} atm^{-2} mol^2 · Key from source paper

Q83 JEE Main 2019 · 10 Jan · Shift 2 MCQ

5.1 g NH_4SH is introduced in 3.0 L evacuated flask at 327^oC . 30% of the solid NH_4SH is decomposed to NH_3 and H_2S as gases. The K_P of the reaction at 327^oC is
(R = 0.082 L atm $mol^{-1}K^{-1}$, Molar mass of S = 32 g mol^{-1}, Molar mass of N = 14 g mol^{-1})

(A) $0.242\ atm^2$

(B) $0.242 \times 10^{-4}\ atm^2$

(C) $1 \times 10^{-4}\ atm^2$

(D) $4.9 \times 10^{-3}\ atm^2$

Answer: (A) $0.242\ atm^2$ · Key from source paper

Q84 JEE Main 2019 · 9 Jan · Shift 2 MCQ

Consider the following reversible chemical reactions:
$A_2(g) + B_2(g) \overset{k_1}{\rightleftharpoons} 2AB(g)$ .....(1)
$6AB(g) \overset{k_2}{\rightleftharpoons} 3A_2(g) + 3B_2(g)$ .....(2)
The relation between K_1 and K_2 is:

(A) $K_2 = K_1^{-3}$
(B) $K_1 K_2 = \frac{1}{3}$
(C) $K_2 = K_1^3$
(D) $K_1 K_2 = 3$

Answer: (A) $K_2 = K_1^{-3}$ · Key from source paper

Q85 JEE Main 2018 · 16 Apr · Online MCQ

At 320 K, a gas A_2 is 20 % dissociated to $A(g)$. The standard Gibbs free energy change at 320 K and 1 atm in $J\ mol^{-1}$ is approximately: ($R = 8.314\ JK^{-1}\ mol^{-1}$; $\ln 2 = 0.693$; $\ln 3 = 1.098$)

(A) 1844
(B) 2068
(C) 4281
(D) 4763

Answer: (D) 4763 · Key from source paper

Q86 JEE Main 2018 · 16 Apr · Online MCQ

The gas phase reaction $2\,NO_2(g) \rightarrow N_2O_4\ (g)$ is an exothermic reaction. The decomposition of N_2O_4 , in equilibrium mixture of NO_2 (g) and N_2O_4 (g) can be increased by:

(A) Addition of an inert gas at constant pressure
(B) Lowering the temperature
(C) Increasing the pressure
(D) Addition of an inert gas at constant volume

Answer: (A) Addition of an inert gas at constant pressure · Key from source paper

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Q87 JEE Main 2018 · 15 Apr · Shift 1 MCQ

In which of the following reactions, an increase in the volume of the container will favour the formation of products?

(A) $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO\ (g) + 6H_2O(l)$
(B) $2NO_2(g) \rightleftharpoons 2NO(g) + O_2\ (g)$
(C) $3O_2 \rightleftharpoons 2O_3(g)$
(D) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

Answer: (B) $2NO_2(g) \rightleftharpoons 2NO(g) + O_2\ (g)$ · Key from source paper

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Q88 JEE Main 2018 · 15 Apr · Shift 2 MCQ

At a certain temperature in a 5L vessel, 2 moles of carbon monoxide and 3 moles of chlorine were allowed to reach equilibrium according to the reaction, $CO + Cl_2 \rightleftharpoons COCl_2$. At equilibrium, if one

mole of CO is present then equilibrium constant (K_c) for the reaction is:

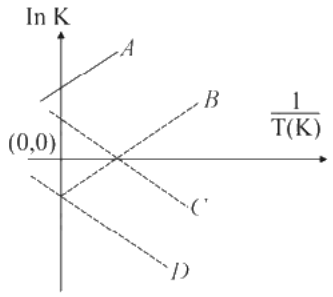
(A) 2.5
(B) 4
(C) 2
(D) 3

Answer: (A) 2.5 · Key from source paper

Q89 JEE Main 2018 · 8 Apr · Offline MCQ

Which of the following lines correctly show the temperature dependence of equilibrium constant K, for an exothermic reaction?
(see the figure above)

Q36. Which of the following lines correctly show the temperature dependence of equilibrium constant K, for an exothermic reaction?



(1) A & D
(2) A & B
(3) B & C
(4) C & D

(A) A & D
(B) A & B
(C) B & C
(D) C & D

Answer: (B) A & B · Key from source paper

Q90 JEE Main 2017 · 9 Apr · Online MCQ

The following reaction occurs in the Blast Furnace where iron ore is reduced to iron metal:
$\mathrm{Fe_2O_3(s) + 3CO(g) \rightleftharpoons 2Fe\,(l) + 3CO_2(g)}$
Using the Le Chatelier's principle, predict which one of the following will not disturb the equilibrium?

(A) Addition of $\mathrm{CO_2}$
(B) Removal of $\mathrm{CO_2}$
(C) Addition of $\mathrm{Fe_2O_3}$
(D) Removal of CO

Answer: (C) Addition of $\mathrm{Fe_2O_3}$ · Key from source paper

Q91 JEE Main 2016 · 10 Apr · Online MCQ

A solid XY kept in an evacuated sealed container undergoes decomposition to form a mixture of gases X and Y at temperature T.
The equilibrium pressure is 10 bar in this vessel. $\mathrm{K_p}$ for this reaction is?

(A) 25
(B) 100
(C) 10
(D) 5

Answer: (A) 25 · Key from source paper

Q92 JEE Main 2016 · 3 Apr · Offline MCQ

The equilibrium constant at 298 K for a reaction $\mathrm{A + B \rightleftharpoons C + D}$ is 100. If the initial concentration of all the four species were1 M each, then the equilibrium concentration of D (in mol $\mathrm{L^{-1}}$) will be:

(A) 1.818
(B) 1.182
(C) 0.182
(D) 0.818

Answer: (A) 1.818 · Key from source paper

Q93 JEE Main 2015 · 11 Apr · Online MCQ

The increase of pressure on ice $\rightleftharpoons$ water system at constant temperature will lead to:

(A) A decrease in the entropy of the system
(B) An increase in the Gibbs energy of the system
(C) A shift of the equilibrium in the forward direction
(D) No effect on the equilibrium

Answer: (C) A shift of the equilibrium in the forward direction · Key from source paper

Q94 JEE Main 2015 · 10 Apr · Online MCQ

Gaseous $\mathrm{N_2O_4}$ dissociates into gaseous $\mathrm{NO_2}$ according to the reaction $\mathrm{N_2O_4(g) \rightleftharpoons 2NO_2(g)}$
At 300 K and 1 atm pressure, the degree of dissociation of $\mathrm{N_2O_4}$ is 0.2. If one mole of $\mathrm{N_2O_4}$ gas is contained in a vessel, then the density of the equilibrium mixture is:

(A) 3.11 g/L
(B) 1.56 g/L
(C) 4.56 g/L
(D) 6.22 g/L

Answer: (A) 3.11 g/L · Key from source paper

Q95 JEE Main 2014 · 19 Apr · Online MCQ

For the decomposition of the compound, represented as
$NH_2COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g)$
the $K_p = 2.9 \times 10^{-5}\ atm^3$. If the reaction is started with 1 mole of the compound, the total pressure at equilibrium would be :

(A) $7.66 \times 10^{-2}\ atm$
(B) $38.8 \times 10^{-2}\ atm$
(C) $5.82 \times 10^{-2}\ atm$
(D) $1.94 \times 10^{-2}\ atm$

Answer: (C) $5.82 \times 10^{-2}\ atm$ · Key from source paper

Q96 JEE Main 2014 · 12 Apr · Online MCQ

What happens when an inert gas is added to an equilibrium keeping volume unchanged?

(A) More product will form
(B) Less product will form
(C) More reactant will form
(D) Equilibrium will remain unchanged

Answer: (D) Equilibrium will remain unchanged · Key from source paper

Q97 JEE Main 2014 · 11 Apr · Online MCQ

Consider the following equilibrium

$$AgCl\downarrow + 2NH_3 \rightleftharpoons [Ag(NH_3)_2]^+ + Cl^-$$

White precipitate of AgCl appears on adding which of the following?

(A) NH_3
(B) aqueous $NaCl$
(C) aqueous HNO_3
(D) aqueous NH_4Cl

Answer: (C) aqueous HNO_3 · Key from source paper

Q98 JEE Main 2014 · 9 Apr · Online MCQ

At a certain temperature, only 50% HI is dissociated into H_2 and I_2 at equilibrium. The equilibrium constant is :

(A) 0.5
(B) 4.0
(C) 1.0
(D) 0.25

Answer: (D) 0.25 · Key from source paper

Q99 JEE Main 2014 · 6 Apr · Offline MCQ

For the reaction $\mathrm{SO_2}(g) + \frac{1}{2}\mathrm{O_2}(g) \rightleftharpoons \mathrm{SO_3}(g)$, if $\mathrm{K_P} = \mathrm{K_C}(RT)^x$ where the symbols have usual meaning then the value of x is:
(assuming ideality)

(A) -1
(B) $-\frac{1}{2}$
(C) $\frac{1}{2}$
(D) 1

Answer: (B) $-\frac{1}{2}$ · Key from source paper

Q100 JEE Main 2013 · 25 Apr · Online MCQ

The ratio $\frac{K_p}{K_c}$ for the reaction $\mathrm{CO}(g) + \frac{1}{2}\mathrm{O_2}(g) \rightleftharpoons \mathrm{CO_2}(g)$ is:

(A) $\frac{1}{\sqrt{RT}}$
(B) $(RT)^{1/2}$
(C) RT
(D) 1

Answer: (A) $\frac{1}{\sqrt{RT}}$ · Key from source paper

Q101 JEE Main 2013 · 23 Apr · Online MCQ

(1) $\mathrm{N_2(g)} + 3\mathrm{H_2(g)} \rightleftharpoons 2\mathrm{NH_3(g)}, \mathrm{K_1}$ (2) $\mathrm{N_2(g)} + \mathrm{O_2(g)} \rightleftharpoons 2\mathrm{NO(g)}, \mathrm{K_2}$ (3) $\mathrm{H_2(g)} + \frac{1}{2}\mathrm{O_2(g)} \rightleftharpoons \mathrm{H_2O(g)}, \mathrm{K_3}$ The equation for the equilibrium constant of the reaction $2\mathrm{NH_3(g)} + \frac{5}{2}\mathrm{O_2(g)} \rightleftharpoons 2\mathrm{NO(g)} + 3\mathrm{H_2O(g)}$,
(K_4) in terms of $\mathrm{K_1}$, $\mathrm{K_2}$ and $\mathrm{K_3}$ is :

(A) $\frac{\mathrm{K_1 \cdot K_2}}{\mathrm{K_3}}$
(B) $\frac{\mathrm{K_1 \cdot K_3^2}}{\mathrm{K_2}}$
(C) $\mathrm{K_1\ K_2\ K_3}$
(D) $\frac{\mathrm{K_2 \cdot K_3^3}}{\mathrm{K_1}}$

Answer: (D) $\frac{\mathrm{K_2 \cdot K_3^3}}{\mathrm{K_1}}$ · Key from source paper

Q102 JEE Main 2013 · 9 Apr · Online MCQ

In reaction $\mathrm{A} + 2\,\mathrm{B} \rightleftharpoons 2\mathrm{C} + \mathrm{D}$, initial concentration of B was 1.5 times of [A], but at equilibrium the concentrations of A and B became equal. The equilibrium constant for the reaction is :

(A) 8
(B) 4
(C) 12
(D) 6

Answer: (B) 4 · Key from source paper

Q103 AIEEE 2012 · 26 May · Online MCQ

One mole of $\mathrm{O}_{2(\mathrm{g})}$ and two moles of $\mathrm{SO}_{2(\mathrm{g})}$ were heated in a closed vessel of one-litre capacity at 1098 K. At equilibrium 1.6 moles of $\mathrm{SO}_{3(\mathrm{g})}$ were found. The equilibrium constant K_c of the reaction would be

(A) 30
(B) 40
(C) 80
(D) 60

Answer: (C) 80 · Key from source paper

Q104 AIEEE 2012 · 19 May · Online MCQ

The value of K_p for the equilibrium reaction $\mathrm{N_2O_4}(g) \rightleftharpoons 2\mathrm{NO_2}(g)$ is 2 . The percentage dissociation of $\mathrm{N_2O_4}(g)$ at a pressure of 0.5 atm is

(A) 25
(B) 88
(C) 50
(D) 71

Answer: (D) 71 · Key from source paper

Q105 AIEEE 2012 · 12 May · Online MCQ

8 mol of $AB_3(\ g)$ are introduced into a $1.0\mathrm{dm}^3$ vessel. If it dissociates as $2AB_3(g) \rightleftharpoons A_2(g) + 3B_2(g)$. At equilibrium, 2 mol of A_2 are found to be present. The equilibrium constant of this reaction is

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(A) 2
(B) 3
(C) 27
(D) 36

Answer: (C) 27 · Key from source paper

Q106 AIEEE 2012 · 7 May · Online MCQ

K_1, K_2 and K_3 are the equilibrium constants of the following reactions (I), (II) and (III) respectively: (I) $N_2 + 2O_2 \rightleftharpoons 2NO_2$ (II) $2NO_2 \rightleftharpoons N_2 + 2O_2$ (III) $NO_2 \rightleftharpoons \frac{1}{2}N_2 + O_2$ The correct relation from the following is

(A) $K_1 = \frac{1}{K_2} = \frac{1}{K_3}$
(B) $K_1 = \frac{1}{K_2} = \frac{1}{(K_3)^2}$
(C) $K_1 = \sqrt{K_2} = K_3$
(D) $K_1 = \frac{1}{K_2} = K_3$

Answer: (B) $K_1 = \frac{1}{K_2} = \frac{1}{(K_3)^2}$ · Key from source paper

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Q107 AIEEE 2012 · Offline MCQ

The equilibrium constant (K_c) for the reaction $N_2(g) + O_2(g) \rightarrow 2NO(g)$ at temperature T is 4×10^{-4}. The value of K_c for the reaction, $NO(g) \rightarrow 1/2\ N_2(g) + 1/2\ O_2(g)$ at the same temperature is :

(A) 0.02
(B) 2.5×10^2
(C) 4×10^{-4}
(D) 50.0

Answer: (D) 50.0 · Key from source paper

Q108 AIEEE 2011 MCQ

A vessel at 1000 K contains CO_2 with a pressure of 0.5 atm. Some of the CO_2 is converted into CO on the addition of graphite. If the total pressure at equilibrium is 0.8 atm, the value of K is

(A) 3 atm
(B) 0.3 atm
(C) 0.18 atm
(D) 1.8 atm

Answer: (D) 1.8 atm · Key from source paper

Q109 AIEEE 2008 MCQ

The equilibrium constants K_{P_1} and K_{P_2} for the reactions $X \rightleftharpoons 2Y$ and $Z \rightleftharpoons P + Q$, respectively are in the ratio of $1:9$. If the degree of dissociation of X and Z be equal then the ratio of total pressure at these equilibria is

(A) $1:36$
(B) $1:1$
(C) $1:3$
(D) $1:9$

Answer: (A) $1:36$ · Key from source paper

Q110 AIEEE 2008 MCQ

For the following three reactions a, b and c, equilibrium constants are given: a. $\mathrm{CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)}$; $\mathrm{K_1}$ b. $\mathrm{CH_4(g) + H_2O(g) \rightleftharpoons CO(g) + 3H_2(g)}$; $\mathrm{K_2}$ c. $\mathrm{CH_4(g) + 2H_2O(g) \rightleftharpoons CO_2(g) + 4H_2(g)}$; $\mathrm{K_3}$ Which of the following relations is correct?

(A) $\mathrm{K_1\sqrt{K_2} = K_3}$
(B) $\mathrm{K_2\,K_3 = K_1}$
(C) $\mathrm{K_3 = K_1\,K_2}$
(D) $\mathrm{K_3 \cdot K_2^3 = K_1^2}$

Answer: (C) $\mathrm{K_3 = K_1\,K_2}$ · Key from source paper

Q111 AIEEE 2006 MCQ

Phosphorus pentachloride dissociates as follows, in a closed reaction vessel, $\mathrm{PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)}$ If total pressure at equilibrium of the reaction mixture is P and degree of dissociation of $\mathrm{PCl_5}$ is x, the partial pressure of $\mathrm{PCl_3}$ will be

(A) $\left(\frac{x}{x+1}\right)P$
(B) $\left(\frac{2x}{1-x}\right)P$
(C) $\left(\frac{x}{x-1}\right)P$
(D) $\left(\frac{x}{1-x}\right)P$

Answer: (A) $\left(\frac{x}{x+1}\right)P$ · Key from source paper

Q112 AIEEE 2006 MCQ

The equilibrium constant for the reaction
$\mathrm{SO_3(g) \rightleftharpoons SO_2(g) + \frac{1}{2}O_2(g)}$
is $K_c = 4.9 \times 10^{-2}$. The value of K_c for the reaction
$\mathrm{2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)}$
will be

(A) 416
(B) 2.40×10^{-3}
(C) 9.8×10^{-2}
(D) 4.9×10^{-2}

Answer: (A) 416 · Key from source paper

Q113 AIEEE 2005 MCQ

The exothermic formation of $\mathrm{ClF_3}$ is represented by the equation:
$\mathrm{Cl_{2(g)} + 3\,F_{2(g)} \rightleftharpoons 2ClF_{3(g)}};\ \Delta_r H = -329$ kJ
Which of the following will increase the quantity of $\mathrm{ClF_3}$ in an equilibrium mixture of $\mathrm{Cl_2}$, $\mathrm{F_2}$ and $\mathrm{ClF_3}$?

(A) Increasing the temperature
(B) Removing $\mathrm{Cl_2}$
(C) Increasing the volume of the container
(D) Adding $\mathrm{F_2}$

Answer: (D) Adding $\mathrm{F_2}$ · Key from source paper

Q114 AIEEE 2005 MCQ

For the reaction
$\mathrm{2NO_{2(g)} \rightleftharpoons 2NO_{(g)} + O_{2(g)}}$,
$(\mathrm{K_c = 1.8 \times 10^{-6}}$ at 184C)
$(\mathrm{R = 0.0831\ kJ/(mol.K)})$
When $\mathrm{K_p}$ and $\mathrm{K_c}$ are compared at $184^\circ\mathrm{C}$, it is found that

(A) $\mathrm{K_p}$ is greater than $\mathrm{K_c}$
(B) $\mathrm{K_p}$ is less than $\mathrm{K_c}$
(C) $\mathrm{K_p = K_c}$
(D) Whether $\mathrm{K_p}$ is greater than, less than or equal to $\mathrm{K_c}$ depends upon the total gas pressure

Answer: (A) $\mathrm{K_p}$ is greater than $\mathrm{K_c}$ · Key from source paper

Q115 AIEEE 2005 MCQ

A schematic plot of $\ln K_{eq}$ versus inverse of temperature for a reaction is shown below
(see the figure above)
The reaction must be

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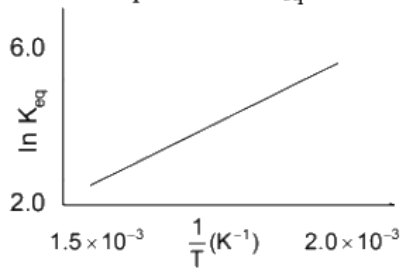
Q98. A schematic plot of ln K_{eq} versus inverse of temperature for a reaction is shown below



The reaction must be

(1) exothermic
(2) endothermic
(3) one with negligible enthalpy change
(4) highly spontaneous at ordinary temperature

(A) exothermic
(B) endothermic
(C) one with negligible enthalpy change
(D) highly spontaneous at ordinary temperature

Answer: (A) exothermic · Key from source paper

Q116 AIEEE 2005 MCQ

An amount of solid NH_4HS is placed in a flask already containing ammonia gas at a certain temperature and 0.50 atm. Pressure. Ammonium hydrogen sulphide decomposes to yield NH_3 and H_2S gases in the flask. When the decomposition reaction reaches equilibrium, the total pressure in the flask rises to 0.84 atm. The equilibrium constant for NH_4HS decomposition at this temperature is

(A) 0.30
(B) 0.18
(C) 0.17
(D) 0.11

Answer: (D) 0.11 · Key from source paper

Q117 AIEEE 2004 MCQ

What is the equilibrium expression for the reaction $P_{4(s)} + 5O_{2(g)} \rightleftharpoons P_4O_{10(s)}$?

(A) $Kc = [P_4O_{10}]/[P_4][O_2]^5$
(B) $Kc = 1/[O_2]^5$
(C) $Kc = [O_2]^5$
(D) $Kc = [P_4O_{10}]/5\,[P_4]\,[O_2]$

Answer: (B) $Kc = 1/[O_2]^5$ · Key from source paper

Q118 AIEEE 2004 MCQ

For the reaction, $CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$ the $\frac{K_p}{K_c}$ is equal to

(A) $\frac{1}{RT}$
(B) 1.0
(C) $\sqrt{RT}$
(D) RT

Answer: (A) $\frac{1}{RT}$ · Key from source paper

Q119 AIEEE 2004 MCQ

The equilibrium constant for the reaction $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ at temperature T is 4×10^{-4}. The value of Kc for the reaction $NO(g) \rightleftharpoons \frac{1}{2} N_2(g) + \frac{1}{2} O_2(g)$ at the same temperature is

(A) 2.5×10^2
(B) 0.02
(C) 4×10^{-4}
(D) 50

Answer: (D) 50 · Key from source paper

Q120 AIEEE 2003 MCQ

For the reaction equilibrium $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ the concentrations of N_2O_4 and NO_2 at equilibrium are 4.8×10^{-2} and 1.2×10^{-2} mol L^{-1} respectively. The value of K_c for the reaction is

(A) 3×10^{-1} mol L^{-1}
(B) 3×10^{-3} mol L^{-1}
(C) 3×10^{3} mol L^{-1}
(D) 3.3×10^{2} mol L^{-1}

Answer: (B) 3×10^{-3} mol L^{-1} · Key from source paper

Q121 AIEEE 2003 MCQ

Consider the reaction equilibrium $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$; $\Delta H^0 = -198$ kJ. On the basis of Le Chatelier's principle, the condition favourable for the forward reaction is

(A) increasing temperature as well as pressure
(B) lowering the temperature and increasing the pressure
(C) any value of temperature and pressure
(D) lowering of temperature as well as pressure

Answer: (B) lowering the temperature and increasing the pressure · Key from source paper

Q122 AIEEE 2002 MCQ

Change in volume of the system does not alter the number of moles in which of the following equilibria ?

(A) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
(B) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(C) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
(D) $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$

Answer: (A) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ · Key from source paper

Q123 AIEEE 2002 MCQ

In which of the following reactions, increase in the volume at constant temperature does not affect the number of moles at equilibrium

(A) $2NH_3 \rightarrow N_2 + 3H_2$
(B) $C(g) + (1/2)O_2(g) \rightarrow CO(g)$
(C) $H_2(g) + O_2(g) \rightarrow H_2O_2(g)$
(D) none of these

Answer: (D) none of these · Key from source paper

Q124 AIEEE 2002 MCQ

For the reaction $CO(g) + (1/2)O_2(g) = CO_2(g)$, K_p/K_c is

(A) RT
(B) $(RT)^{-1}$
(C) $(RT)^{-1/2}$
(D) $(RT)^{1/2}$

Answer: (C) $(RT)^{-1/2}$ · Key from source paper

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