Parishram (2025)

Physical Chemistry

Chemical Kinetics

DPP: 1

Q1 For a gaseous reaction, the rate of reaction may be expressed in the units:
(A) atm
(B) atm s
(C) $\mathrm{atm/s}$
(D) $\mathrm{atm/s^2}$

Q2 Which of the following will react at the highest rate?
(A) 1 mol. of A & $1\ \mathrm{mol.}$ of B in a $1\ \mathrm{L}$ vessel
(B) 2 mol. of A & $2\ \mathrm{mol.}$ of B in a $2\ \mathrm{L}$ vessel
(C) 3 mol. of A & 3 mol. of B in a $3\ \mathrm{L}$ vessel
(D) All would react at the same rate

Q3 Which of the following does not affect the rate of reaction?
(A) Amount of the reactant taken
(B) Physical state of the reactant
(C) $\Delta \mathrm{H}$ of reaction
(D) Size of vessel

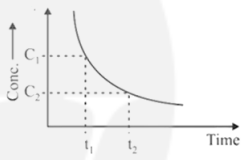
Q4 The unit of rate constant and rate of reaction are same for
(A) First order (B) Zero order
(C) Second order (D) Third order

Q5 A gaseous reaction, $\mathrm{A_2(\ g) \rightarrow B(g) + \frac{1}{2}C(g)}$, shows increase in pressure from $100\ \mathrm{mm}$ to $120\ \mathrm{mm}$ in 5 minutes. The rate of disappearance of $\mathrm{A_2}$ is
(A) $4\ \mathrm{mm\ min\ m^{-1}}$
(B) $8\ \mathrm{mm\ min^{-1}}$
(C) $16\ \mathrm{mm\ min^{-1}}$
(D) $2\ \mathrm{mm\ min^{-1}}$

Q6 In a reaction, $2\mathrm{X} + \mathrm{Y} \rightarrow \mathrm{X_2Y}$, the X disappears at
(A) Half the rate as that of disappearance of Y
(B) The same rate as that of disappearance of Y
(C) The same rate as that of appearance of X_2Y
(D) Twice the rate as that of appearance of $\mathrm{X_2Y}$

Q7 For the reaction $\mathrm{N_2 + 3H_2 \rightarrow 2NH_3}$, the rate of change of concentration for hydrogen is $-0.3 \times 10^{-4}\mathrm{Ms^{-1}}$. The rate of change of concentration of ammonia is:
(A) -0.2×10^{4}
(B) 0.2×10^{-4}
(C) 0.1×10^{-4}
(D) 0.3×10^{-4}

Q8 The graph plotted between concentration versus time



(A) It gives rate of disappearance of reactant
(B) Rate $= -\frac{[C_2 - C_1]}{t_2 - t_1}$
(C) Both (A) & (B)
(D) It predicts the order of reaction

Q9 The rate constant for the forward and backward reactions of hydrolysis of ester are 1.1×10^{-2} and $1.5 \times 10^{-3}\ \mathrm{min^{-1}}$ respectively. The equilibrium constant of the reaction is
(A) 7.33 (B) 0.733
(C) 73.3 (D) 733

Q10 For the given reaction:
$\mathrm{N_2 + 3H_2 \rightarrow 2NH_3}$
Rate of formation of ammonia is $2 \times 10^{-4}\ \mathrm{mol.\ L^{-1}\ s^{-1}}$ then find rate of disappearance of hydrogen?
(A) $3 \times 10^{-4}\ \mathrm{mol.\ L^{-1}\ s^{-1}}$
(B) $2 \times 10^{-4}\ \mathrm{mol.\ L^{-1}\ s^{-1}}$
(C) $4 \times 10^{-4}\ \mathrm{mol.\ L^{-1}\ s^{-1}}$

(D) 6×10^{-4} mol. L^{-1} s^{-1}

Answer Key

Q1	(C)	Q6	(D)
Q2	(D)	Q7	(B)
Q3	(C)	Q8	(C)
Q4	(B)	Q9	(A)
Q5	(B)	Q10	(A)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Text Solution:

For a zero-order reaction, $Rate = K[A]^0$ $Hence$, $Rate = K$

The rate constant has units of concentration per unit time (M/s), and the rate of reaction also has units of concentration per unit time (M/s).

Video Solution:

Q5 Video Solution:

Q6 Video Solution:

Q7 Text Solution:

$$-\frac{1}{3}\frac{d[H_2]}{dt} = +\frac{1}{2}\frac{d[NH_3]}{dt}$$

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Video Solution:

Q8 Video Solution:

Q9 Video Solution:

Q10 Video Solution: