

Chemical Kinetics

NEET previous year questions · Chemistry

7 questions from the official papers: NEET 2026 (3), Re-NEET 2026 (2), NEET 2020 (2). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q54

Match List I (Order of reaction) with List II (Unit of rate constant):

List I	List II
P) Zero order	I) $\text{mol}^{-1} \text{L s}^{-1}$
Q) First order	II) $\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$
R) Second order	III) s^{-1}
S) Third order	IV) $\text{mol L}^{-1} \text{s}^{-1}$

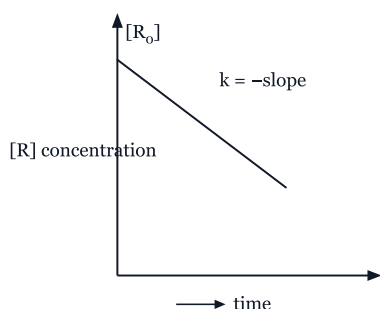
- (1) P-IV, Q-II, R-I, S-III (2) P-IV, Q-III, R-I, S-II
(3) P-IV, Q-III, R-II, S-I (4) P-I, Q-II, R-III, S-IV

Answer (2)

Sol. The unit of the rate constant of an n th-order reaction is $(\text{mol L}^{-1})^{1-n} \text{s}^{-1}$. For $n=0$ this is $\text{mol L}^{-1} \text{s}^{-1}$ (IV); $n=1$ gives s^{-1} (III); $n=2$ gives $\text{mol}^{-1} \text{L s}^{-1}$ (I); $n=3$ gives $\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$ (II). Hence P-IV, Q-III, R-I, S-II.

2. NEET 2026 · Q75

For a certain reaction $R \rightarrow \text{Product}$, the plot of concentration $[R]$ vs time has a negative slope as shown. The order of reaction is:

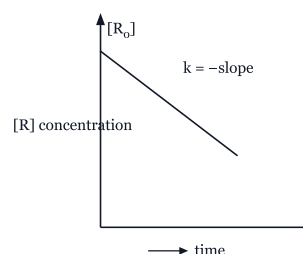


- (1) 0 (2) 1 (3) 2 (4) 2.5

Answer (1)

Sol. A straight-line plot of concentration $[R]$ against time corresponds to a zero-order reaction, for which $[R] = [R]_0 - kt$; the constant (linear) rate of

decrease means the rate is independent of concentration and equal to the rate constant k ($= -\text{slope}$). First- and higher-order reactions give curved concentration-time plots, not straight lines.



3. NEET 2026 · Q86

Given below is an expression for the rate constant of a first-order reaction occurring at a certain temperature, T (K): $\ln k = 14.34 - \frac{1.25 \times 10^4}{T}$. The energy of activation in kcal mol^{-1} for the reaction is: (Given: k in s^{-1} , $R = 1.987 \text{ cal mol}^{-1} \text{K}^{-1}$)

- (1) 24.84 (2) 14.34 (3) 18.63 (4) 12.42

Answer (1)

Sol. Comparing with the Arrhenius form $\ln k = \ln A - \frac{E_a}{RT}$, the slope term gives $\frac{E_a}{R} = 1.25 \times 10^4$. Thus $E_a = 1.25 \times 10^4 \times 1.987 \approx 24837 \text{ cal mol}^{-1} \approx 24.84 \text{ kcal mol}^{-1}$ (1).

4. Re-NEET 2026 · Q60

For the zero-order reaction $2A \rightarrow B$, the rate constant is $k = 1.0 \text{ mol L}^{-1} \text{min}^{-1}$. If the initial concentration of A is 2 M , then the time taken to complete 75% of the reaction will be

- (1) 1.5 min (2) 0.75 min
(3) 1.0 min (4) 2.0 min

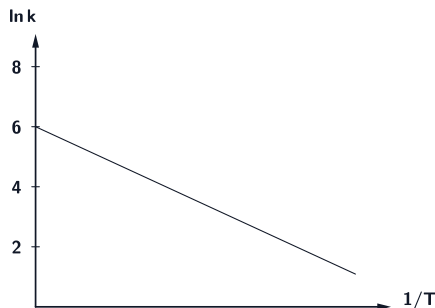
Answer (2)

Sol. The rate of REACTION is defined as $-\frac{1}{2} \frac{d[A]}{dt} = k$ because of the stoichiometric coefficient 2, so A itself disappears at $2k$ per minute. Integrating, $[A] =$

$[A]_0 - 2kt$. Completing 75% means 1.5 M of A has been consumed, so $1.5 = 2(1.0)t$ and $t = 0.75$ min. NCERT Class 12, Chemical Kinetics (integrated rate equation for zero order).

5. Re-NEET 2026 · Q64

For an elementary chemical reaction, the Arrhenius plot is given below.



If the energy of activation is 6.64 kJ mol^{-1} and $R = 8.3 \text{ J K}^{-1}\text{mol}^{-1}$, the temperature at which the rate constant becomes $e^2 \text{ min}^{-1}$, is

- (1) 125 K (2) 150 K (3) 200 K (4) 250 K

Answer (3)

Sol. In logarithmic form the Arrhenius equation is $\ln k = \ln A - \frac{E_a}{RT}$, a straight line of slope $-E_a/R$ whose intercept on the $\ln k$ axis is $\ln A$. The graph shows that intercept at 6, so $\ln A = 6$. Setting $\ln k = 2$ gives $2 = 6 - \frac{6640}{8.3T}$, hence $\frac{6640}{8.3T} = 4$ and $T = 200 \text{ K}$. NCERT Class 12, Chemical Kinetics (temperature dependence of rate).

Why the other options are wrong:

- Option (1): at 125 K, $\frac{6640}{8.3 \times 125} = 6.4$, so $\ln k = 6 - 6.4 = -0.4$, not 2
- Option (2): at 150 K, $\frac{6640}{8.3 \times 150} \approx 5.33$, so $\ln k \approx 0.67$, not 2
- Option (4): at 250 K, $\frac{6640}{8.3 \times 250} = 3.2$, so $\ln k = 2.8$, not 2

6. NEET 2020 · Q103

The rate constant for a first order reaction is $4.606 \times 10^{-3} \text{ s}^{-1}$. The time required to reduce 2.0 g of the reactant to 0.2 g is :

- (1) 200 s (2) 500 s (3) 1000 s (4) 100 s

Answer (2)

Sol. For a first-order reaction, $t = \frac{2.303}{k} \log \left(\frac{[A]_0}{[A]} \right)$.

Substituting, $t = \frac{2.303}{4.606 \times 10^{-3}} \log \left(\frac{2.0}{0.2} \right) = \frac{2.303}{4.606 \times 10^{-3}} \log 10 = \frac{2.303}{4.606 \times 10^{-3}} \times 1 = 500 \text{ s}$. Chapter: Chemical Kinetics.

7. NEET 2020 · Q127

An increase in the concentration of the reactants of a reaction leads to change in

- (1) heat of reaction (2) threshold energy
(3) collision frequency (4) activation energy

Answer (3)

Sol. An increase in the concentration of reactants leads to a higher collision frequency, as more particles are available to collide. This does not affect activation energy, heat of reaction, or threshold energy. Chapter: Chemical Kinetics.

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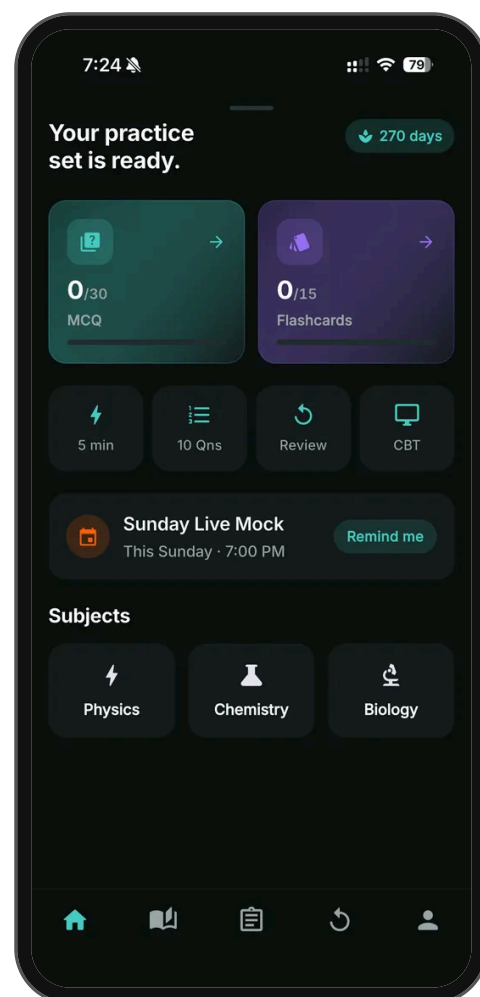
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