

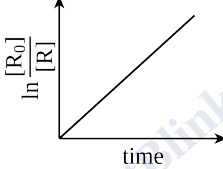
JEE MAIN CHEMICAL KINETICS — RATE LAW EXPRESSION, ORDER AND MOLECULARITY OF A REACTION — PYQS

Max. Marks: 20
Questions: 5

Section A (MCQ) — 5 questions

Q.1 Consider the reaction $aX \longrightarrow bY$, for which the rate constant at 30°C is $1 \times 10^{-3} \text{ mol}^{-1} \text{ L s}^{-1}$. Which of the following statements are true?

- A. When concentration of 'X' is increased to four times, the rate of reaction becomes 16 times.
- B. The reaction is a second order reaction.
- C. The half-life period is independent of the concentration of X.
- D. Decomposition of N_2O_5 is an example of the above reaction.

E.  vs time is valid for the above reaction.

Choose the **correct** answer from the options given below: [JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) A and B Only (2) A, B and C Only
(3) A, B, D and E Only (4) C and D Only

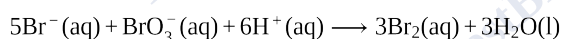
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Q.2 Observe the following reactions at $T(\text{K})$.

I. $A \longrightarrow \text{products}$.

II.



Both the reactions are started at 10.00 am. The rates of these reactions at 10.10 am are same. The value of $-\frac{\Delta[\text{Br}^-]}{\Delta t}$ at 10.10 am is $2 \times 10^{-4} \text{ mol L}^{-1} \text{ min}^{-1}$.

The concentration of A at 10.10 am is $10^{-2} \text{ mol L}^{-1}$. What is the first order rate constant (in min^{-1}) of reaction I?

- [JEE Main 2026 (Online) 23rd January Evening Shift]
(1) 4×10^{-3} (2) 2×10^{-3} (3) 10^{-3} (4) 10^{-2}

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Q.3 $A \longrightarrow \text{product}$ (First order reaction).

Three sets of experiments were performed for a reaction under similar experimental conditions:

Run 1 $\Rightarrow$

100 mL of 10 M solution of reactant A

Run 2

$\Rightarrow$

200 mL of 10 M solution of reactant A

Run 3

$\Rightarrow$

100 mL of 10 M solution of reactant A + 100 mL of H_2O added.

The correct variation of rate of reaction is

[JEE Main 2026 (Online) 22nd January Morning Shift]

(1) Run 1 = Run 2 = Run 3

(2) Run 3 < Run 1 < Run 2

(3) Run 1 < Run 2 < Run 3

(4) Run 3 < Run 1 = Run 2

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Q.4 Rate law for a reaction between A and B is given by $r = k[\text{A}]^n[\text{B}]^m$

If concentration of A is doubled and concentration of B is halved from their initial value, the ratio of new rate of reaction to the initial rate of reaction

$\left(\frac{r_2}{r_1}\right)$ is [JEE Main 2025 (Online) 4th April Morning Shift]

- (1) $(n-m)$ (2) $2^{(n-m)}$ (3) $\frac{1}{2^{m+n}}$ (4) $(m+n)$

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Q.5 Consider an elementary reaction



If the volume of reaction mixture is suddenly reduced to $\frac{1}{3}$ of its initial volume, the reaction rate will become 'x' times of the original reaction rate. The value of x is :

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 3 (2) 9 (3) $\frac{1}{3}$ (4) $\frac{1}{9}$

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ANSWER KEY

Ques.	1	2	3	4	5						
Ans.	1	1	4	2	2						