

PART 1 - CHEMISTRY

Topic : Chemical kinetics

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** questions.

Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).

For each question, choose the option(s) corresponding to (all) the correct answer(s).

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

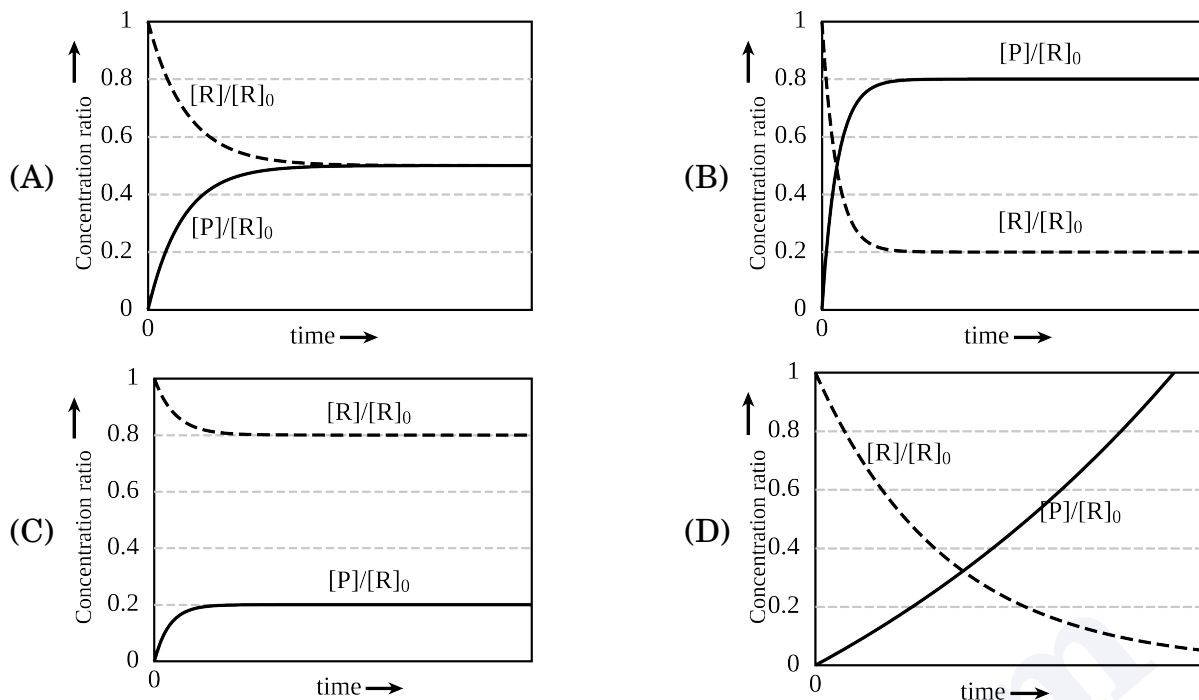
Negative Marks : -1 In all other cases.

For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

1. For a reversible reaction $R \rightleftharpoons P$, at constant temperature, both the forward and the backward reactions are first order elementary reactions with rate constants k_f and k_b , respectively. At time zero, the concentration of R is $[R]_0$ and the concentration of P is zero. At any given time, [R] and [P] are the concentrations of R and P, respectively. If $k_b = 4k_f$, the correct graphical representation of the reaction is

[JEE Advanced 2026 Paper 1]

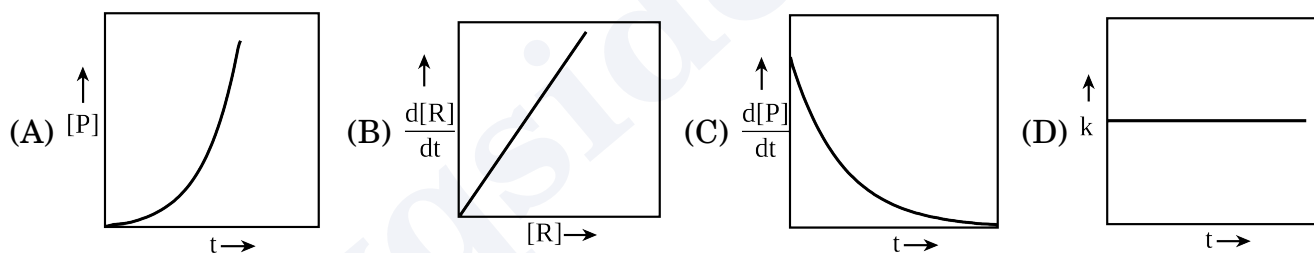
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2. For a first-order reaction $R \rightarrow P$ at a given temperature, k is the rate constant. For this reaction, at the given temperature, the concentrations of R and P at a time t are $[R]$ and $[P]$, respectively. The correct graphical representation(s) for this reaction is(are)

[JEE Advanced 2026 Paper 2]



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SECTION-B : (Maximum Marks : 12)

This section contains **THREE** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -0.30, 30.27, -127.30) in the place designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

3. Consider a reaction $A + R \longrightarrow \text{Product}$. The rate of this reaction is measured to be $k[A][R]$. At the start of the reaction, the concentration of R, $[R]_0$, is 10-times the concentration of A, $[A]_0$. The reaction can be considered to be a pseudo first order reaction with assumption that $k[R] = k'$ is constant. Due to this assumption, the relative error (in %) in the rate when this reaction is 40 % complete, is _____.

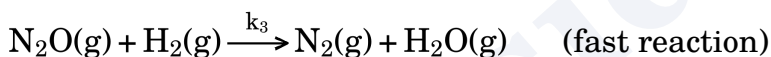
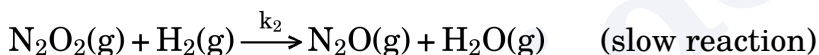
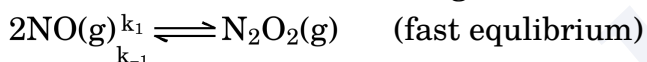
[k and k' represent corresponding rate constants]

[JEE Advanced 2025 Paper 2]

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4. Consider the following reaction,
 $2\text{H}_2(\text{g}) + 2\text{NO}(\text{g}) \longrightarrow \text{N}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
 which follows the mechanism given below:



The order of the reaction is _____.

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5. A sample initially contains only U-238 isotope of uranium. With time, some of the U-238 radioactively decays into Pb-206 while the rest of it remains undisintegrated. When the age of the sample is $P \times 10^8$ years, the ratio of mass of Pb-206 to that of U-238 in the sample is found to be 7. The value of P is _____.

[Given: Half-life of U-238 is 4.5×10^9 years; $\log_e 2 = 0.693$]

[JEE Advanced 2024 Paper 2]

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JEE ADVANCED CHEMICAL KINETICS — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION-A

[illegible]

SECTION-B

[illegible]