

PART 1 - CHEMISTRY

Topic : Chemical kinetics

SECTION-A : (Maximum Marks : 8)

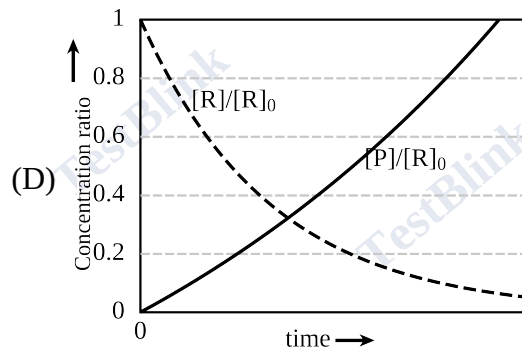
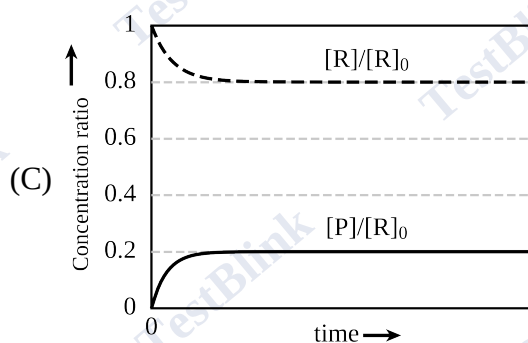
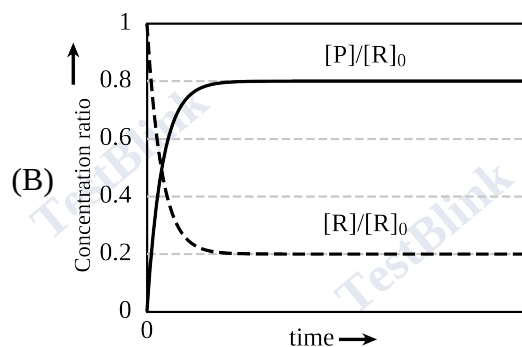
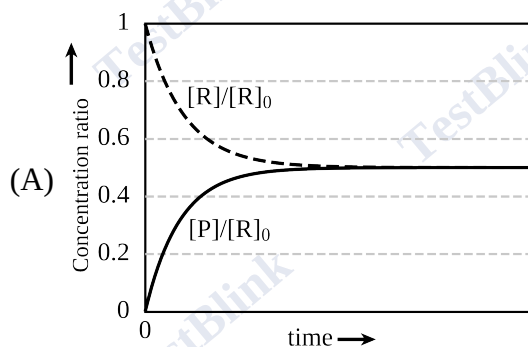
- This section contains **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be 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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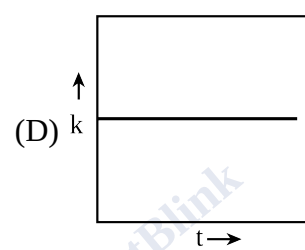
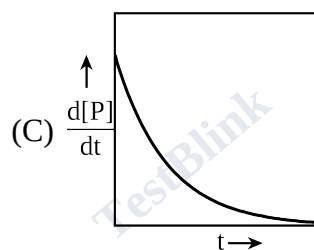
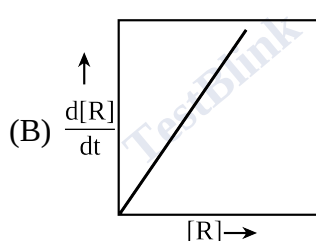
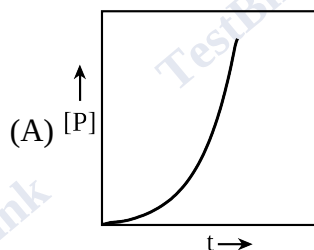


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2. For a first-order reaction $R \rightarrow P$ at a given temperature, k is the rate constant. For this reaction, at the given temperature, the concentrations of R and P at a time t are $[R]$ and $[P]$, respectively. The correct graphical representation(s) 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:
 $2\text{NO}(\text{g}) \xrightleftharpoons[k_{-1}]{k_1} \text{N}_2\text{O}_2(\text{g})$ (fast equilibrium)
 $\text{N}_2\text{O}_2(\text{g}) + \text{H}_2(\text{g}) \xrightarrow{k_2} \text{N}_2\text{O}(\text{g}) + \text{H}_2\text{O}(\text{g})$ (slow reaction)
 $\text{N}_2\text{O}(\text{g}) + \text{H}_2(\text{g}) \xrightarrow{k_3} \text{N}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$ (fast reaction)
 The order of the reaction is _____.

[JEE Advanced 2024 Paper 1]

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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]