QUICK DRILL · CBSE CLASS 12

Chemical Kinetics

Chemistry · Chapter 3 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1 / 0	⩾ 12/15

OBJECTIVES
Reinforce the four core topics of Chemical Kinetics via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS
Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1–15 · 20 MIN

Q1. For the reaction 2A → B, if the rate of disappearance of A is 0.04 mol L^{-1} s^{-1}, the rate of formation of B is:

(A) 0.02 mol L^{-1} s^{-1}
(B) 0.04 mol L^{-1} s^{-1}
(C) 0.08 mol L^{-1} s^{-1}
(D) 0.01 mol L^{-1} s^{-1}

PYQ 2018 · Delhi · 1m · ? 45s

Q2. The unit of rate constant for a zero-order reaction is:

(A) s^{-1}
(B) L mol^{-1} s^{-1}
(C) mol L^{-1} s^{-1}
(D) L^2 mol^{-2} s^{-1}

PYQ 2019 · Outside Delhi · 1m · ? 30s

Q3. Which of the following is TRUE about the order of a reaction?

(A) It is always a whole number
(B) It is sum of stoichiometric coefficients
(C) It is determined experimentally
(D) It is equal to molecularity

PYQ 2020 · Delhi · 1m · ? 40s

Q4. For a first-order reaction with k = 0.0693 min^{-1}, what is the half-life?

(A) 1 min
(B) 10 min
(C) 5 min
(D) 100 min

PYQ 2019 · Delhi · 1m · ? 30s

Q5. Molecularity of a reaction:

(A) Can be zero
(B) Can be fractional
(C) Is always a positive integer
(D) Is determined experimentally

PYQ 2018 · Outside Delhi · 1m · ? 35s

Q6. A catalyst speeds a reaction by:

(A) Increasing kinetic energy of molecules
(B) Increasing temperature
(C) Lowering activation energy
(D) Increasing the value of K

PYQ 2021 · Compartment · 1m · ? 30s

Q7. For a first-order reaction, plotting ln[A] vs t gives:

(A) A horizontal line
(B) A straight line with slope +k
(C) A straight line with slope –k
(D) A parabola

PYQ 2022 · Delhi · 1m · ? 35s

Q8. If 75% of a first-order reaction is completed in 60 min, the rate constant is approximately:

(A) 0.0115 min^{-1}
(B) 0.023 min^{-1}
(C) 0.0462 min^{-1}
(D) 0.0693 min^{-1}

PYQ 2023 · Delhi · 1m · ? 60s

Q9. The Arrhenius equation is:

(A) k = A·e^(–RT/Ea)
(B) k = A·e^(–Ea/RT)
(C) k = A·e^(Ea/RT)
(D) k = A·e^(Ea·R·T)

PYQ 2019 · Outside Delhi · 1m · ? 25s

Q10. For a zero-order reaction with k = 0.05 mol L^{-1} min^{-1} and $[A]_0$ = 1 mol/L, t½ is:

(A) 10 min
(B) 20 min
(C) 5 min
(D) 0.693 min

PYQ 2022 · Outside Delhi · 1m · ? 40s

Q11. A reaction is pseudo-first-order when:

(A) Order and molecularity are both 1
(B) Only one reactant; first-order observed
(C) One reactant is in large excess and appears constant
(D) Catalyst is present

PYQ 2019 · Delhi · 1m · ? 35s

Q12. If the rate constant of a reaction doubles when temperature rises from 300 K to 310 K, then Ea (using R = 8.314) is approximately:

(A) 26 kJ/mol
(B) 53 kJ/mol
(C) 100 kJ/mol
(D) 150 kJ/mol

PYQ 2023 · Outside Delhi · 1m · ? 75s

Q13. For the reaction $H_2 + Br_2 \rightarrow 2HBr$, the experimental rate law is rate = k[H_2][Br_2]^(1/2). The overall order is:

(A) 1
(B) 1.5
(C) 2
(D) 3

PYQ 2020 · Outside Delhi · 1m · ? 30s

Q14. Which factor does NOT affect the rate constant k?

(A) Temperature
(B) Catalyst
(C) Concentration of reactant
(D) Activation energy

PYQ 2024 · Delhi · 1m · ? 35s

Q15. Half-life of a first-order reaction is 20 min. What fraction remains after 60 min?

(A) 1/2
(B) 1/4
(C) 1/8
(D) 1/16

PYQ 2024 · Outside Delhi · 1m · ? 30s

ANSWER KEY & EXPLANATIONS

Q 1–15 · MARK YOUR SCORE

Q1. Answer: A

rate = –(1/2)d[A]/dt = +d[B]/dt ⇒ d[B]/dt = 0.04/2 = 0.02 mol L^{-1} s^{-1}.

Q2. Answer: C

Zero order: rate = k$[A]^0$ = k. Since rate has units mol L^{-1} s^{-1}, k must also have those units.

Q3. Answer: C

Order is determined from the experimental rate law. Stoichiometric coefficients give molecularity only for elementary reactions.

Q4. Answer: B

t½ = 0.693/k = 0.693/0.0693 = 10 min.

Q5. Answer: C

Molecularity is the count of colliding species in an elementary step — always 1, 2, or rarely 3. It cannot be zero, fractional, or negative.

Q6. Answer: C

Catalyst provides an alternate path with lower Ea. It does NOT change T, K, or ΔH.

Q7. Answer: C

Integrated first-order law: ln[A] = $\ln[A]_0$ – kt. Slope is –k, intercept is $\ln[A]_0$.

Q8. Answer: B

75% complete ⇒ [A] = 0.25$[A]_0$. k = (2.303/60)·log(1/0.25) = (2.303/60)·log 4 = 0.0384 × 0.602 = 0.0231 min^{-1}.

Q9. Answer: B

Standard Arrhenius form: k = A·e^(–Ea/RT). The exponent is negative — higher Ea means smaller k.

Q10. Answer: A

Zero order: $t_{1/2} = [A]_0/(2k) = 1/(2 \times 0.05) = 10$ min.

Q11. Answer: C

When [B] >> [A], its concentration is effectively constant and merges into k′ — the reaction APPEARS first-order though it is bimolecular.

Q12. Answer: B

$\ln 2 = (Ea/R)(10/93000) \Rightarrow Ea = 0.693 \times 8.314 \times 9300 = 53{,}600$ J/mol ≈ 53.6 kJ/mol.

Q13. Answer: B

Order = sum of exponents = 1 + 1/2 = 1.5. Fractional orders are common for non-elementary reactions.

Q14. Answer: C

k depends ONLY on T, catalyst (changes Ea), and Ea/A. Concentration affects rate via the rate law but NOT k itself.

Q15. Answer: C

60 min = 3 half-lives. After each $t_{1/2}$, half remains: 1 → 1/2 → 1/4 → 1/8.