EXAM-DAY · 90-MIN REVISION CARD

Chemical Kinetics

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

Average rate = $-\Delta[A]/\Delta t = +\Delta[C]/\Delta t$

For aA + bB → cC + dD: rate = $-(1/a)d[A]/dt = +(1/c)d[C]/dt$

Rate law: rate = k[A]^x[B]^y; order = x + y

Zero order: $[A] = [A]_0 - kt$; $t_{½} = [A]_0/(2k)$; k units = mol L^{-1} s^{-1}

First order: $\ln[A] = \ln[A]_0 - kt$; $k = (2.303/t)\cdot\log([A]_0/[A])$; $t_{½} = 0.693/k$

Arrhenius: k = A·e^(–Ea/RT); ln k = ln A – Ea/(RT)

Two-temperature: $\ln(k_2/k_1) = (Ea/R)(1/T_1 - 1/T_2) = (Ea/R)\cdot(T_2-T_1)/(T_1T_2)$

Catalyst lowers Ea; ΔH and K unchanged; R = 8.314 J K^{-1} mol^{-1}

TOP 5 PYQ PATTERNS

1 Pseudo-first-order numerical: given t and [A]/[A]0, find k or vice versa
3 marks · 90% of years
Use $t = (2.303/k)\cdot\log([A]_0/[A])$; if asked $t_{½}$, use 0.693/k. Always state units.

2 Arrhenius — find Ea from two rate constants at two temperatures
3 marks · 70% of years
$\ln(k_2/k_1) = (Ea/R)(T_2-T_1)/(T_1T_2)$. Use R = 8.314. Convert final answer to kJ.

3 Order vs molecularity (2-3 differences + example)
2 marks · 75% of years
Tabulate three differences; give one example each — close with 'order is experimental, molecularity is theoretical'.

4 Half-life derivation for zero / first order
2 marks · 60% of years
Start from integrated rate law, substitute $[A] = [A]_0/2$, solve. State dependence on $[A]_0$.

5 Energy profile + effect of catalyst (graph)
2 marks · 55% of years
Two curves on one axis (uncatalysed solid, catalysed dashed). Mark Ea, Ea(cat), ΔH. State catalyst does NOT change ΔH or K.

90-MIN REVISION FLOW

0–15 min
Re-read rate expression rules + order vs molecularity differences. Make a 2-column comparison from memory.

15–35 min
Solve 3 PYQ pseudo-first-order numericals using $t = (2.303/k)\cdot\log([A]_0/[A])$. Time-box each at 6 min.

35–55 min
Practice 2 Arrhenius problems with Ea calculation. Verify R = 8.314 is used correctly.

55–70 min
Draw energy-profile diagrams (catalysed vs uncatalysed) from memory; label Ea, Ea(cat), ΔH.

70–85 min
Run the 15-Q drill MCQ set; mark only ✓/× — review wrong answers.

85–90 min
Last skim of cheat-sheet formulas; sleep with $t_{½} = 0.693/k$ as the mantra.

Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning.
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