

A-Level Chemistry

Name: _____ Score: _____

1. The rate equation of a reaction:
 - ☐ is read straight off the balanced equation
 - ☐ is always second order
 - ☐ never includes a rate constant
 - ☐ can only be found by experiment, not from the balanced equation
2. A reaction whose half-life stays the same as it proceeds is:
 - ☐ not happening
 - ☐ second order
 - ☐ first order
 - ☐ zero order
3. The rate-determining step is:
 - ☐ the slowest step, which controls the overall rate
 - ☐ always the first step
 - ☐ the fastest step
 - ☐ the step with no intermediate
4. A heterogeneous catalyst:
 - ☐ is in a different physical state from the reactants and works by adsorption and desorption
 - ☐ changes the enthalpy change
 - ☐ is used up permanently
 - ☐ is in the same state as the reactants
5. If doubling $[A]$ doubles the rate, the order with respect to A is:
 - ☐ 1 (first order)
 - ☐ 3
 - ☐ 0 (zero order)
 - ☐ 2 (second order)
6. A first-order reaction has a half-life of 100 s. What is k ? ($k = 0.693/t^{1/2}$)

7. The slowest step of a reaction mechanism is the rate-_____ step.

8. A heterogeneous catalyst is in the same physical state as the reactants.

☐ True ☐ False

9. The power to which a reactant's concentration is raised in the rate equation is its _____.

10. A constant half-life can be used to identify a first-order reaction.

☐ True ☐ False

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1. **can only be found by experiment, not from the balanced equation**

Orders must be measured experimentally; they cannot be deduced from the stoichiometric equation.

2. **first order**

A constant half-life (independent of concentration) is the signature of a first-order reaction.

3. **the slowest step, which controls the overall rate**

The slowest step is the bottleneck, so it determines the overall rate.

4. **is in a different physical state from the reactants and works by adsorption and desorption**

Heterogeneous = different state (e.g. solid + gases); reactants adsorb, react, then products desorb.

5. **1 (first order)**

Rate $\propto [A]^1$, so doubling $[A]$ doubles the rate – first order.

6. **0.00693**

$k = 0.693 / 100 = 0.00693$ (per second).

7. **determining**

Only species up to and including it appear in the rate equation.

8. **False**

False. A heterogeneous catalyst is in a different state, e.g. a solid catalyst with gaseous reactants. A homogeneous catalyst is in the same state.

9. **order**

The orders are found experimentally.

10. **True**

Only first-order reactions have a half-life that is independent of the concentration.