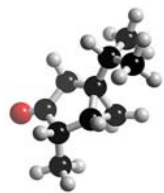


KINETICS CALCULATIONS 2

Name



In each of the following questions, use the initial rate data to find:

- the rate equation
- the rate constant k (including its units) at the experiment's temperature

1) A reacts with B to form C. $A + B \rightarrow C$

Experiment	Initial [A] (mol dm ⁻³)	Initial [B] (mol dm ⁻³)	Initial rate (mol dm ⁻³ s ⁻¹)
1	1	1	2
2	1	2	8
3	2	2	16

2) D reacts with E to form various products. $D + E \rightarrow \text{products}$

Experiment	Initial [D] (mol dm ⁻³)	Initial [E] (mol dm ⁻³)	Initial rate (mol dm ⁻³ s ⁻¹)
4	1	1	0.20
5	2	1	0.20
6	4	4	0.80

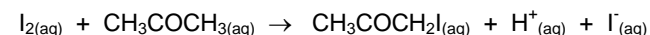
3) P reacts with Q to form various products. $P_{(g)} + Q_{(g)} \rightarrow \text{products}$

Experiment	Initial [P] (mol dm ⁻³)	Initial [Q] (mol dm ⁻³)	Initial rate (mol dm ⁻³ s ⁻¹)
7	0.1	0.1	0.00200
8	0.2	0.1	0.00398
9	0.3	0.1	0.00603
10	0.4	0.2	0.01598

4) HI dissociates to form hydrogen and iodine: $2 \text{HI}_{(g)} \rightarrow \text{H}_{2(g)} + \text{I}_{2(g)}$

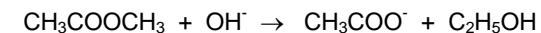
Experiment	11	12	13	14
Initial [HI] (mol dm ⁻³)	1.64	3.28	4.92	6.56
Initial rate (mol dm ⁻³ s ⁻¹)	0.41	1.64	3.69	6.56

5) The reaction between iodine and propanone is catalysed by H⁺_(aq) ions.



Experiment	Initial [H ⁺] (mol dm ⁻³)	[CH ₃ COCH ₃] (mol dm ⁻³)	Initial [I ₂] (mol dm ⁻³)	Initial rate (mol dm ⁻³ s ⁻¹)
15	0.5	6	0.02	9.0×10^{-5}
16	0.5	8	0.04	1.2×10^{-4}
17	1.0	6	0.02	1.8×10^{-4}
18	1.0	8	0.02	2.4×10^{-4}

6) Ethyl ethanoate is hydrolysed in alkaline solution. You will not be able to calculate k in this question.



Experiment	Initial moles of CH ₃ COOCH ₃	Initial moles of OH ⁻	total volume (dm ³)	relative initial rates
19	0.02	0.02	1	1
20	0.04	0.02	1	2
21	0.04	0.03	0.5	12