

Question 14 (Answer: B)

- $n(\text{O}_2) = 0.160/24.0 = 6.67 \times 10^{-3} \text{ mol}$.
- $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$, so twice as much peroxide decomposed: $1.33 \times 10^{-2} \text{ mol}$.
- $\text{Rate} = 1.33 \times 10^{-2}/300 = 4.44 \times 10^{-5} \text{ mol s}^{-1}$; A omits the factor of 2.

1(a)	I	Five experiments completed AND Table to show Volume of FA 1 , Volume of water, Time and Rate
	II	Correct units for all data Volume: / cm^3 OR (cm^3) OR in cm^3 OR cm^3 by each volume Time: / s OR (s) OR in s OR s by each time Rate: / s^{-1} OR (s^{-1}) OR in s^{-1} OR s^{-1} by each rate
	III	All times recorded to nearest second AND Volumes of FA 1 and water both given 2 d.p. ending with 0 or 5
	IV	Three additional experiments with volume FA 1 $\geq 15.00 \text{ cm}^3$, $< 40.00 \text{ cm}^3$ and no volume closer than 5.00 cm^3 to another volume. AND Volumes of water chosen so that total volume = 40.00 cm^3 for additional experiments.
	V	Correctly calculates rate for all experiments and shown to 2 – 4 s.f.
	VI	Award if all times recorded increase with decreasing volume of FA 1 .
		Examiner corrects time for $V_{\text{FA1}} = 40.00 \text{ cm}^3$ and $V_{\text{FA1}} = 20.00 \text{ cm}^3$ to the nearest s then calculates t_{20} / t_{40} to 2 d.p.
	VII	Award if candidate's ratio is within the range 1.80 to 2.30.
	VIII	Award if candidate's ratio is within the range 1.90 to 2.20.
1(b)(i)	I	Unambiguous labelled axes with rate on the y-axis and volume of FA 1 on the x-axis OR correct units AND suitable linear scales starting at (0,0).
	II	Points plotted correctly.
	III	Line of best fit drawn, straight line or smooth curve, that ignores anomalous results identified by the candidate.
1(b)(ii)	M1	Correct line(s) drawn AND Rate correctly read within half a small square. M2 $1000 / \text{rate}$ AND correctly calculates answer to 2 – 4 s.f.
1(c)	M1	Correct line of best fit M2 (Rate and volume of FA 1 are) not directly proportional as the (straight) line / data / results does not / do not pass through the origin / (0,0) OR M1 unavailable for line of best fit through the origin. M2 (Rate and volume of FA 1 are) directly proportional as the (straight) line / data / results pass through the origin / (0,0)