

(Measuring rates (practicals))

Q1.(2018)

$$83 \text{ (cm}^3\text{)}$$

Q2.a) (2018)

$$\frac{(46 + 47 + 49)}{3}$$

$$= 47 \text{ (cm}^3\text{) (2 sf)}$$

Q2.b) (2018)

all points plotted correctly
(inc 0,0)

Q3.a)(2018)

$$\frac{80}{50}$$

$$= 1.6 \text{ (cm}^3\text{/s)}$$

Q3.b)(2018)

rate is greatest at start

(then) rate decreases

reaction stops

Q3.c)(2018)

there are more particle collisions
each second

there are more particles in the
same volume

Q3.d)(2018)

(gas is) not carbon dioxide

Q3.e)(2018)

hydrogen

pop sound

Q4.(2020)

measuring cylinder

Q5.a)(2021)

(diagram)

gas syringe

or

inverted measuring cylinder over
water

Q5.b)(2021)

(error)

(delivery) tube is in (sulfuric)
acid

(problem)

(sulfuric) acid will travel up tube

or

no hydrogen / gas will be
collected

Q5.c)(2021)

line of best fit

must include 0, 0

Q5.d)(2021)

(volume of gas =) 45 (cm³)

(rate =) $\frac{45}{60}$

= 0.75

cm³/s

Q5.e)(2021)

the line of best fit for higher concentration would have a steeper slope

Q6.a)(2022)



Q6.b)(2022)

(s)

Q6.c)(2022)

a cross on a piece of paper

Q6.d)(2022)

the rate of reaction decreased

Q6.e)(2022)

one of the reactants was used up

Q6.f)(2022)

initially the line of best fit would be steeper

Q6.g)(2022)

fewer reactant particles have the
activation energy

the reactant particles move
more slowly

Q7.a)(2023)

to reduce the escape of gas

Q7.b)(2023)

$$\begin{aligned} &(\text{mean rate} =) \\ &\frac{0.78 + 0.81 + 0.81}{3} \end{aligned}$$

$$0.80 \text{ (cm}^3\text{/s)}$$

$$0.80 = \frac{20}{\text{mean time taken}}$$

$$(\text{mean time taken} =) \frac{20}{0.80}$$

$$= 25 \text{ (s)}$$

alternative approach:

$$0.78 = \frac{20}{\text{time}}$$

or

$$0.81 = \frac{20}{\text{time}} \text{ (1)}$$

$$(\text{trial 1 time} = \frac{20}{0.78} =) 25.6 \text{ (1)}$$

$$\begin{aligned} &(\text{trial 2 and 4 time} = \\ &\frac{20}{0.81} =) 24.7 \text{ (1)} \end{aligned}$$

$$\begin{aligned} &(\text{mean time} =) \\ &\frac{25.6 + (2 \times 24.7)}{3} \text{ (1)} \end{aligned}$$

$$= 25 \text{ (s) (1)}$$

Q7.c)(2023)

use a lower temperature

use sulfuric acid of a lower concentration

Q7.d)(2023)

(test)

burning / lit splint

(result)

burns with a (squeaky) pop sound

Q8.a)(2024)

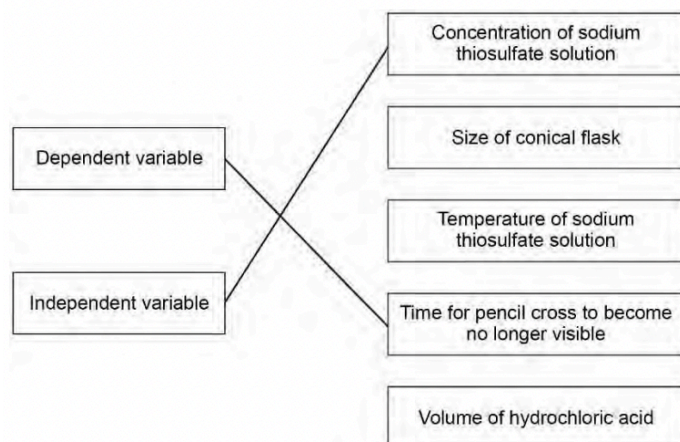
volume (of reactants) is 90 cm^3

(so conical) flask will overflow

Q8.b)(2024)

measuring cylinder

Q8.c)(2024)



Q8.d)(2024)

the time taken will increase

Q8.e)(2024)

32 g/dm³

Q8.f)(2024)

the particles are closer together

the particles collide more
frequently

Q8.g)(2024)

decreases

increases