Mark schemes

Q1.

(a) volume (of reactants) is 90 cm^3

allow volume (of reactants) is greater than 50 cm^3

1

(so conical) flask will overflow

allow (so) solutions will not fit (in conical flask)

1

(b) measuring cylinder

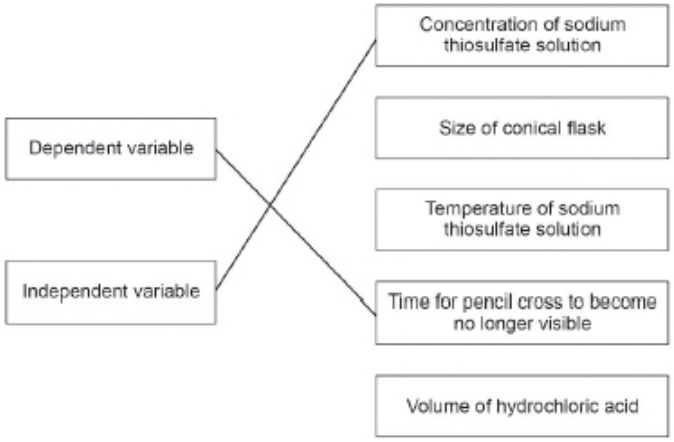
allow (volumetric / graduated)

pipette

allow burette

1

(c)



allow **1** mark if dependent variable and independent variable are identified the wrong way round

1

do **not** accept more than **one** line drawn from a box on the left

1

(d) the time taken will increase

1

(e) 32 g/dm^3

1

(f) the particles are closer together

1

the particles collide more frequently

1

(g) decreases

1

increases

1

[11]

Q2.

(a) to reduce the escape of gas

1

(b) (mean rate =)

$$\frac{0.78 + 0.81 + 0.81}{3}$$

1

0.80 (cm^3/s)

1

allow

$$\frac{0.78 + 0.81 + 0.68 + 0.81}{4}$$

*= 0.77 (cm^3/ s) for **1** mark*

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

allow correct use of incorrectly determined mean rate

1

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

1

= 25 (s)

1

alternative approach:

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

or

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

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

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

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

= 25 (s) (1)

allow correct use of incorrectly determined value(s) for time

allow $\frac{25.6 + 29.4 + (2 \times 24.7)}{4}$

= 26.1 (s)

*for **1** mark*

(c) use a lower temperature

1

use sulfuric acid of a lower concentration

1

(d) (test)
burning / lit splint

allow flame

*do **not** accept glowing splint*

1

(result)
burns with a (squeaky) pop sound

allow pops

1

MP2 is dependent upon MP1 being awarded

[10]

Q3.

(a) $Na_2S_2O_3 + 2\ HCl \rightarrow$ **2** $NaCl + H_2O + SO_2 + S$

allow multiples

1

(b) (s)

1

(c) a cross on a piece of paper

1

(d) the rate of reaction decreased

1

(e) one of the reactants was used up

1

(f) initially the line of best fit would be steeper

1

(g) fewer reactant particles have the activation energy

1

the reactant particles move more slowly

1

[8]