

# MARK SCHEME

# GCSE

## CHEMISTRY

## AQA - TRIPLE SCIENCE

---

C6 - TEST 1

RATE OF REACTION

Beginner

## Mark schemes

- 1.** (a)  $36 \text{ cm}^3$  1
- (b) all points correct  
 $\pm \frac{1}{2}$  small square 2  
allow 1 mark if 6 or 7 of the points are correct
- 2 best fit lines drawn  
must not deviate towards anomalous point 2  
allow 1 mark if 1 line correct
- (c) The bung was not pushed in firmly enough. 1  
The measuring cylinder was not completely over the delivery tube. 1
- (d) as mass of lithium carbonate increases volume of gas produced increases 1  
linear / (directly) proportional 1
- (e) A gas / carbon dioxide is produced.  
allow because the air in the tube expands 1
- (f) any **one** from: 1  
• Potassium carbonate does not decompose to produce carbon dioxide / a gas.  
• Potassium carbonate does not decompose at the temperature of the Bunsen burner **or** the Bunsen burner is not hot enough to decompose potassium carbonate.  
• When potassium carbonate decomposes a gas is not formed. 1
- [11]**
- 2.** (a) (i) the temperature at start  
ignore reference to bubbles / heat 1  
the temperature at end  
(measure) the temperature rise / change = 2 marks  
(measure) the temperature 1 mark 1
- (ii) temperature would increase  
allow it gets hot(ter) / warm(er) or heat given off  
allow energy released / transferred 1

- (b) any **one** from:
- volume of acid  
*allow amount*  
*allow liquid*
  - temperature of acid
  - size of magnesium ribbon  
*allow volume / mass / amount*
  - surface area of magnesium  
*ignore size of test tube and reference to water*
- 1

(c) (i) (Test tube) B

1

- (ii) produces bubbles faster  
*accept more bubbles*
- or**  
faster rate of reaction  
*allow most reactive*
- 1

(d) The particles move faster

1

The particles collide more often

1

**[8]**

**3.**

- (a) increases
- 1
- (b) the reaction is reversible
- 1
- (c) A liquid
- 1
- (d) recycled / reused (owtte)  
*accept returned to pump / start*
- 1

**[4]**

**4.**

- (a) gases
- 1
- white
- 1

solid

1

ammonium chloride

1

(b) reversible

*allow phonetic spelling*

*allow goes both / two / either way(s)*

1

[5]

5.

(a) =

1

ammonia

*allow NH<sub>3</sub>*

1

(b) increases

1

quickly at first *then slows*

*ignore levels off*

*allow rate of increase slows for first two marking points*

1

*at any number in range from 160 – 220 (atmospheres)*

*allow any number in range 60 – 66 (%)*

1

(c) (nitrogen and hydrogen) recycled

*allow (nitrogen and hydrogen) reused*

1

(d) (i) *jobs lost*

*accept mines closed or local economy damaged*

1

(ii) any **one** from:

- *nitrates / fertilisers cost less*
- *more crops / food can be grown*
- *food costs less*
- *nitrates / fertilisers more widely available*

1

[8]

6.

(a) 22

1

(b) (i) exothermic

1

(ii) C 1

gives out most heat energy

*accept has largest temperature change / increase*

*allow has highest (final) temperature **or** hottest*

1

(c) (i) increases 1

(ii) blue  
*ignore pale / dark etc* 1

(iii) reversible (reaction)  
*allow goes both ways **or** two / either way* 1

(iv) anhydrous copper sulfate 1

**[8]**

**7.**

(a) (i) 10 1

(ii) OH<sup>-</sup> 1

(b) (i) air 1

(ii) particles move faster 1

particles collide more often 1

(iii) catalyst(s) 1

(c) liquid 1

**[7]**

**8.**

(a) (i) nitrogen: air 1

hydrogen: natural gas 1

- (ii) as a catalyst 1
- so the reaction speeds up  
*allow lowers activation energy or so a lower temperature can be used* 1
- (iii) cooled 1
- ammonia condenses / liquefies  
*allow nitrogen **and** hydrogen remain in the gaseous state* 1
- (iv) recycled 1
- allow reused or returned to the reactor* 1
- (b) reversible arrows 1
- hydrogen **and** ammonia 1

[9]

9.

- (a) sulfur dioxide 1
- accept SO<sub>2</sub>* 1
- (b) (i) curved line of best fit between the 4 non-anomalous points 1
- (ii) temperature was lower (than 40 °C)  
*accept student missed the moment when the cross disappeared*  
*accept smaller volume of acid or acid more dilute* 1
- (iii) 0.005 **or** 1/200 2
- correct answer with or without working gains 2 marks*  
*if answer incorrect, allow 1 mark for 0.32 / 64*
- (iv) The particles move faster. 1
- The particles collide with more energy. 1
- (v) activation 1

[8]

**10.**

(a) (i) oxygen, sulfur trioxide  
*both needed for mark*

1

(ii) compound

1

(b) increases

*accept (goes) higher / (goes) up / (is) faster / (are) more frequent*

1

(c) activation

1

(d) catalyst **or** increase temperature

1

**[5]**