

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C6 - TEST 1

RATE OF REACTION

Beginner

Mark schemes

- 1.** (a) white to blue
accept colourless to blue 1
- (b) reversible 1
- [2]
- 2.** (a) endothermic **and** because it takes in heat / energy
both for one mark 1
- (b) (i) reversible reaction (or explanation) 1
- (ii) add water
do not accept cooling or reverse the reaction 1
- [3]
- 3.** (i) measure volume / mass of gas produced 1
- in a certain time period
1 mark is for a sensible way of measuring the amount of product produced and 1 mark is for the idea of timing
- e.g. measure volume of gas produced at regular time intervals
or time taken to fill a test tube with the gas
or collect a certain volume of gas
(measuring the rate at which bubbles are produced e.g. number of bubbles in 30 seconds gains only 1 mark unless an enclosed system is used)
- or** measure decrease in mass of flask and contents at regular time intervals
or time taken for the mass to decrease by certain amount 1
- (ii) increases rate (owtte) 1
- (ii) change the concentration **or** add a catalyst **or** change the surface area
or lower the temperature
accept 'expose to sunlight' (owtte) or change the amount of water / powder / solution used
ignore 'stirring' 1
- [4]
- 4.** (a) gases 1

white	1
solid	1
ammonium chloride	1
(b) reversible	
<i>allow phonetic spelling</i>	
<i>allow goes both / two / either way(s)</i>	1

[5]

5.

(a) (i) oxygen, sulfur <u>tr</u> ioxide	
<i>both needed for mark</i>	1
(ii) compound	1
(b) increases	
<i>accept (goes) higher / (goes) up / (is) faster / (are) more frequent</i>	1
(c) activation	1
(d) catalyst or increase temperature	1

[5]

6.

(a) sodium chloride	1
(b) points correctly plotted	
<i>allow 1 mark if 4 correct</i>	2
correct line of best fit	
<i>do not accept straight line</i>	1
(c) 0.38–0.50	
<i>allow for 1 mark for working shown on graph</i>	2
(d) ≥ 5 seconds and < 8 seconds	1

[7]

7.	(a) (volume of gas =) 17 (cm ³) <i>allow values for volume between 16 and 18 (cm³)</i>	1
	= 1.7 <i>allow values between 1.6 and 1.8</i>	1
	<i>allow a correctly calculated answer from an incorrect volume reading for 1 mark</i> <i>allow age</i> <i>ignore any units</i> <i>an answer between 1.6 and 1.8 scores 2 marks</i>	
	(b) cm ³ /s	1
	(c) any two from: <ul style="list-style-type: none"> • no more gas is being produced <i>allow volume of gas remains the same / at 62 cm³</i> • the reaction has finished <i>allow no reaction</i> • one of the reactants has been used up • the rate of reaction is zero 	2
	(d) surface area of magnesium	1
	(e) steeper gradient (with magnesium powder) <i>line should start at the origin</i>	1
	levelling off at 62 cm ³ <i>allow a tolerance of ± half a small square</i>	1
		[8]
8.	(a) 22	1
	(b) (i) exothermic	1
	(ii) C	1
	gives out most heat energy <i>accept has largest temperature change / increase</i> <i>allow has highest (final) temperature or hottest</i>	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]

9.

- (a) water
accept H₂O or 5H₂O
2 must be below halfway 1
- (b) the cold water / ice / cubes (owtte)
accept 'cooled down' or references to cold 1
- (c) reversible reaction 1
- (d) (i) 0.87g 1
- (ii) the student made errors in weighing during
the experiments 1
- the student did not heat the copper sulfate for long enough in one of the experiments 1
- (e) white 1
- blue
allow 1 mark for blue to white 1

[8]

10.

- (a) lines from:
- independent to size of marble chips 1
 - control to volume of acid 1
- ignore arrowheads*
*do **not** accept if more than one line from one box*
- (b) calcium chloride
- carbon dioxide
*do **not** accept carbon oxide*
- water
*do **not** accept hydrogen oxide* 2
- all three needed for **2** marks*
*allow **1** mark if two correct*
- (c) stops loss of acid
- allow stops loss of water / liquid*
allow to ensure that only the gas escapes
*do **not** accept stops acid evaporating*
*do **not** accept stops gas / CO₂ / water vapour escaping* 1
- (d) 0.053
- allow 0.05*
allow 0.053333...
*do **not** accept 0.052*
ignore units 1
- (e) g/s 1
- (f) all points correctly plotted
- allow **1** mark for 5 points correctly plotted*
allow $\pm \frac{1}{2}$ a small square 2
- line of best fit
- should be a curve nearer to (10,0.8) than the anomaly (20, 0.6) and through all other points*
if plotting incorrect allow 1 mark for appropriate line of best fit through student's points 1
- (g) the eight small marble chips have a larger surface area, so more frequent collisions 1

[11]