

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C6 - TEST 2

RATE OF REACTION

Beginner

Mark schemes

1.	(a) oxidising	1	
	(b) (i) oxygen <i>ignore any numbers</i>	1	
	(ii) (catalyst) speeds up a (chemical reaction) <i>accept changes the rate (of reaction)</i>	1	
			[3]
2.	use a more concentrated solution of sulfuric acid	1	
	grind the phosphate rock into a powder before adding the acid	1	
	increase the temperature of the sulfuric acid	1	
			[3]
3.	(a) reversible	1	
	(b) (from blue) to pink <i>do not accept incorrect initial colour</i>	1	
	(c) sensible answers such as: <ul style="list-style-type: none">• stop water reaching papers <i>accept stop entry of moisture / wet / dampness / condensation</i>• water (vapour) in air <i>ignore references to toxicity of cobalt chloride</i>	1	
			[3]
4.	(a) oxygen <i>Ignore any numbers accept hydrogen oxide / steam</i>	1	
	water	1	
	(b) catalyst	1	
			[3]

5.

(a) any **two** from:

- increases
owtte allow 'goes up'
- until reaches maximum / levels off
owtte
- quickly at first
owtte
- then more slowly / rate decreases
allow reaction finished
ignore rate increases

2

(b) use a more concentrated acid

list principle applies

use zinc powder

2

[4]

6.

(a) the glow stick is brighter (owtte)

*accept glow stick is less bright **at low temperatures** (owtte)*

ignore references to rate / particles

1

(b) gave out light for less time

accept use of figures from table for comparison

allow reference to speed / rate eg quicker / faster reaction

1

(c) the particles will collide more often

1

the particles will move faster

1

the particles will have more energy

1

(d) any **one** from:

repeat

allow more glow sticks

measure brightness eg use light meter

more temperatures **or** wider range

improve precision

1

[6]

7.

(a) sulfur dioxide

accept SO₂

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

correct answer with or without working gains 2 marks

if answer incorrect, allow 1 mark for 0.32 / 64

2

(iv) The particles move faster.

1

The particles collide with more energy.

1

(v) activation

1

[8]

8.

(a) conical flask

1

(b) stopclock / stopwatch

ignore 'timer'

allow any other timing method that can measure to nearest second

or better

1

(c) pipette

1

- (d) all four points plotted correctly
± ½ small square
allow 1 mark for three points 2
- smooth curved line 1
- (e) the cross was drawn with a thicker line 1
- (f) the particles are closer together 1
- the particles collide more often 1
- [9]**

9.

- (a) Bunsen (burner)
accept spirit burner do not credit candle 1
- (b) blue 1
- white
credit (1) if both colours correct but answers are reversed 1
- to cool the tube (B)
accept answers which anticipate part (d) e.g. 'to condense the water vapour' or gases or vapours 1
- (d) (i) water
do not credit 'condensation' 1
- (ii) (Water) vapour from the crystals (from tube A)
accept steam or steam from tube A 1
- condenses **or** cools
accept turns to (liquid) water 1
- (e) add water
- gets hot **or** hotter **or** warm **or** warmer turns into solution
dissolves
- or the temperature rises or there is an exothermic reaction*
accept steams or hisses ignore any reference to colour(s) 2

- (f) sulphuric acid
accept H₂SO₄ only if correct in every detail

1

[10]

10.

- (a) potato

1

effective, but manageable and safe

allow 1 for manganese dioxide is effective

1

- (b) 75 cm³

1

- (c) headings: time, volume

1

units: s or seconds, cm³

1

correct values for times, including 0

1

correct values for volumes

Time in seconds	Volume in cm ³
0	0
20	23
40	42
60	59
80	72
100	80
120	88

1

- (d) any **one** from:

- gas escaped
- leak
- slow to put on bung
- systematic error

1

- (e) any **two** from:

- concentration of peroxide
- volume of peroxide
- temperature
- mass of catalyst
- surface area of catalyst

2

[10]