MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C4 - TEST 2

CHEMICAL CHANGES

Beginner

Mark schemes

1. (a) 3

1

(b) 5

1

(c) water

1

(d) opposite charges attract

1

(e) silver is less reactive than hydrogen

1

(f) oxygen

1

(g) universal indicator

allow other indicators

1

blue / purple

1

[8]

2. nitric acid

1

potassium hydroxide

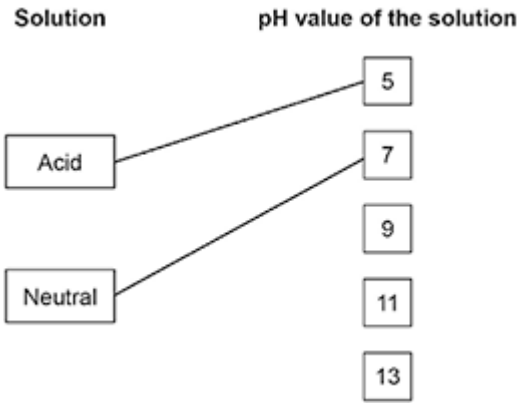
1

water

1

[3]

3. (a)



extra lines from solution negate the mark

2

(b) H^+

1

(c) 3

1

(d) Neutralisation

1

(e) sodium sulfate

1

(f) Add indicator to sodium hydroxide solution

allow add indicator to sulfuric acid

1

Add sulfuric acid (gradually)

allow add sodium hydroxide solution (gradually)

1

allow pH probe

until indicator just changes (colour)

or until universal indicator turns green or shows pH7

1

[9]

4.

(a) cannot move

1

(b) water

1

(c) (i) a positive charge

1

(ii) atoms

1

[4]

5. (a) bromine

1

ions

1

atoms

1

(b) correct scale on y axis

1

points correctly plotted using the scale

± ½ *small square*

1

best-fit line drawn

1

(c) value for oxygen divided by corresponding time

1

× 60

1

= 0.05 (cm^3 / s)

*allow 0.05 with no working shown for **3** marks*

1

[9]

6. (a) (i) allow a number between 2.5 and 3 (inclusive)

*accept just under 3 **or** about 3*

1

(ii) alkaline **or** alkali

1

(iii) 25

ignore any reference to units

1

(b) (i) a circle round KOH or 2 KOH

1

(ii) K_2SO_4

do not credit potassium sulphate

1

[5]

7. (a) (i) sulfuric

1

(ii) 1

1

(iii) to speed up the reaction

1

(b) because copper oxide in excess

allow copper oxide unreacted

or

because acid all used up / neutralised

1

(c) evaporation

allow heating

allow cooling

allow leave (to evaporate)

*do **not** accept freezing*

or

crystallisation

1

(d) Some copper sulfate may have been lost during the experiment

1

[6]

8. (a) H^+

1

(b) nitric (acid) **or** HNO_3

1

zinc (oxide) or ZnO

1

this order only

(c) dissolved in water

1

(d) any value from 0 to less than 8

1

(e) **Level 2:** The method would lead to the production of a valid outcome. Key steps are identified and logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- add universal indicator **or** wide range indicator

indicator turns blue / purple / violet (because pH = 14)
or has highest pH or is an alkali
so A is sodium hydroxide

indicator turns red (because pH = 2)
or has lowest pH **or** is an acid
so B is phosphorus oxide

indicator turns green (because pH = 7)
or neutral
so C is silicon dioxide

- add solid to water

A and B dissolve; C does not
so C is silicon dioxide

[9]

9. (a) (i) (19.5 + 18.5 + 19.0) / 3

*allow (23.0 + 19.5 + 18.5 + 19.0) / 4 for **1** mark*

2

(ii) R P Q

*allow Q P R for **1** mark*

2

(b) any **two** from:
- repeat more times
- calculate a mean
- measure to one decimal place.

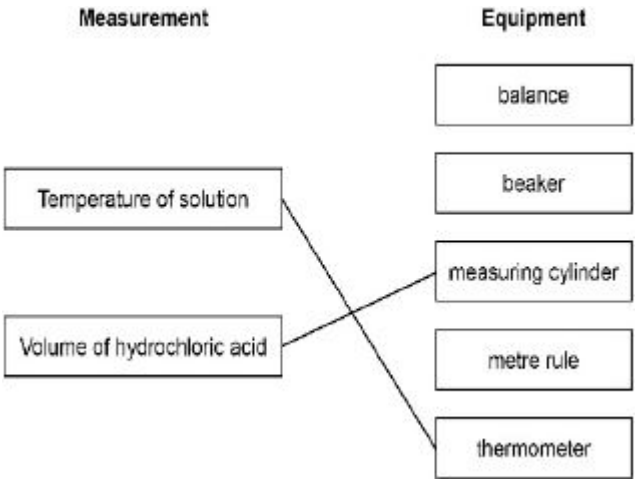
2

(c) both students get similar results / similar pattern

1

[7]

10. (a)



1
1

(b) $(\text{mean} =) \frac{6.1 + 6.1 + 6.4}{3}$

1

= 6.2 (°C)

*allow an answer of 6.6 (°C) for **1** mark*

1

*an answer of 6.2 (°C) scores **2** marks*

(c) use a lid on the polystyrene cup

1

(d) sodium chloride

allow NaCl

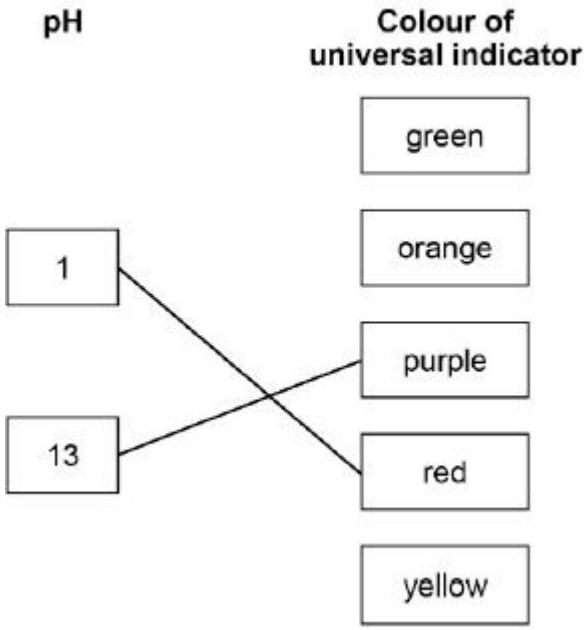
1

water

allow H_2O

1

(e)



1
1

[9]