

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C4 - TEST 1

CHEMICAL CHANGES

Beginner

Mark schemes

| | | | |
|----------------------|--|--|------------|
| 1. | (a) (i) water | | |
| | <i>accept H₂O</i> | | |
| | <i>accept correct ringed answer in box</i> | | 1 |
| | (ii) neutralisation | | |
| | <i>accept underlining or any indication, eg tick</i> | | 1 |
| (b) sodium hydroxide | | | 1 |
| | sulphuric acid | | |
| | <i>apply list principle total</i> | | 1 |
| | | | [4] |
| 2. | (a) lead oxide + carbon = lead + carbon dioxide (A symbol equation was accepted if correct) | | 1 |
| | (b) oxygen removed (or addition of electrons) | | 1 |
| | | | [2] |
| 3. | (a) (i) H ⁺ | | 1 |
| | (ii) OH ⁻ | | 1 |
| | (iii) lower than | | 1 |
| | (b) with HCl: | | |
| | UI goes red / pink | | |
| | <i>allow a comparison eg redder than ethanoic acid</i> | | 1 |

has a pH 0 ,1 ,2 or 3

allow a comparison eg has pH less than ethanoic acid.

*do **not** accept an incorrect pH.*

or

with ethanoic acid:

UI goes orange / yellow (1)

allow a comparison with HCl

has a pH 4 / or above (but less than 7) (1)

allow a comparison with HCl

1

(c) completely

1

(d) (i) conical flask

1

(ii) titration

1

(iii) repeat

allow compare with another students results

or

take average

1

[9]

4.

(a) 4.9 (cm³)

1

(b) $\frac{2.2 + 2.0 + 2.2}{3}$

1

2.1

an answer of 2.1(3333...0 scores 2 marks

1

(c) (concentration) 60 (g / dm³)

and

(volume) 3.2 (cm³)

1

would not be on the line of best fit

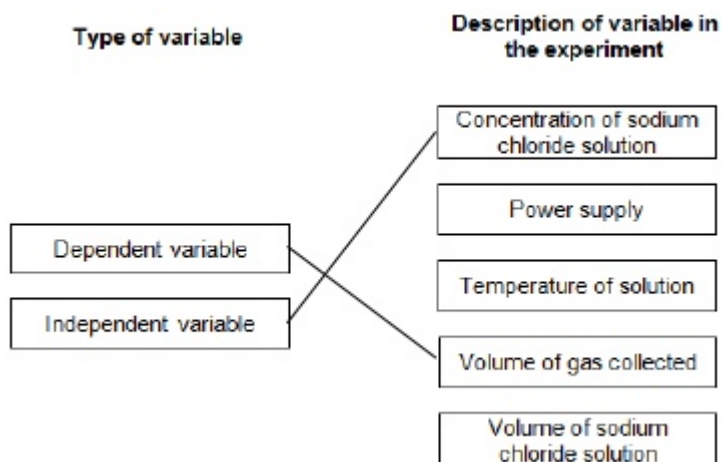
allow does not fit the pattern

1

(d) as the concentration of sodium chloride solution increases, the volume of gas collected increases

1

(e)



1
1

(f) (as) opposite charges attract

1

(and sodium ions) are positive

1

(g) cannot move

1

(h) chlorine

1

hydrogen

1

[13]

5.

(a) cannot move

1

(b) (i) a positive charge

1

(ii) atoms

1

[3]

6.

(a) (carbon =) 1

1

(oxygen =) 3

1

(b) (i) heated

1

(ii) carbon dioxide 1

(c) (i) combustion 1

(ii) carbon is more reactive than zinc 1

(iii) zinc boils (in the furnace / below 1300°C)
ignore melting point / changes of state 1

lead does not boil / (only) melts in the furnace / boils above 1300°C
*if no other mark awarded allow zinc has a lower boiling point or
lead has a higher boiling point
or they / zinc and lead have different boiling points for 1 mark*

1

[8]

7.

(a) (i) was well qualified 1

(ii) check the results of the experiment 1

(b) (i) cannot move 1

(ii) melt it / make it a liquid
*allow heat it
allow dissolve (in water) / make a solution* 1

(iii) they are positive
allow opposites attract or opposite charges 1

(iv) atoms 1

[6]

8.

(a) (i) ionic 1

(ii) elements 1

- (b) (i) chlorine (gas)
allow Cl₂ / Cl / Cl²
allow chloride 1
- (ii) hydrogen (gas)
allow H / H₂ / H² 1
- (iii) sodium hydroxide (solution)
allow NaOH
allow sodium solution 1

[5]

9.

- (a) water / H₂O / hydrogen oxide 1
- (b) eg H (atom) loses an electron to form H⁺
or only a proton left 1
- (c) is partially ionised in water 1
- (d) (i) eg same concentration / quantity of Mg
accept: volume of acid / ribbon for both / same time
accept: volume of gas measured under the same conditions 1
- (ii) C A D B 1
- (e) (i) OH⁻ 1
- (ii) acidic 1

[7]

10.

- (a) (i) copper / Cu 1
- (ii) 50(p) 1
- (iii) 25 1
- (iv) tin 1

(b) (i) any **one** from:

- high cost of copper
allow metal is expensive
- less copper available **or** (copper ores exhausted / **only** low-grade ores available)
allow copper is non-renewable
- high demand for copper
- high percentage (%) of copper in the coin
- inflation (of cost)

1

(ii) any **one** from:

- stronger / harder
ignore rust
- cost of copper **or** copper is more expensive to extract **or** steel is cheap
allow cheaper (to make)
- less copper available
- **or**
(copper ores exhausted / **only** low-grade ores available)
- high demand for copper
- less copper is needed

1

[6]

11.**Level 3 (5–6 marks):**

A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant scientific techniques, procedures and safety precautions. The steps in the method are logically ordered with the dependent and control variables correctly identified. The method would lead to the production of valid results.

Level 2 (3–4 marks):

The bulk of a method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant scientific techniques, procedures and safety precautions. The method may not be in a completely logical sequence and may be missing some detail.

Level 1 (1–2 marks):

Simple statements are made which demonstrate some understanding of some of the relevant scientific techniques, procedures and safety precautions. The response may lack a logical structure and would not lead to the production of valid results.

0 marks:

No relevant content

Indicative content

Named chemicals

- copper oxide
- sulfuric acid
- copper sulfate

Correct use of apparatus

- stirring rod
- spatula
- beaker
- filter funnel and filter paper
- evaporating basin
- Bunsen burner
- tripod and gauze
- bench mat
- conical flask

Method

- add (excess) copper oxide to sulfuric acid
- heat the mixture
- filter the mixture
- method to evaporate some of the water from the filtrate eg using a water bath or evaporating to half volume
- leave solution (to cool and) to form crystals
- remove and dry crystals

Safety

- wearing of safety glasses / goggles
- care with use of sulfuric acid as corrosive
- warming not boiling mixture of copper oxide and sulfuric acid
- hold beaker containing warm mixture with tongs whilst filtering