

Mark schemes

Q1.

- (a) (i) any **one** from
- iron
 - copper
- accept calcium*
- 1 (L5)**
- (ii) any **one** from
- sulphur
 - chlorine
- accept 'oxygen' or 'carbon'*
- 1 (L5)**
- (iii) any **two** from
- calcium carbonate
 - calcium oxide
 - carbon dioxide
 - iron sulphide
- accept 'copper chloride'*
answers may be in either order
***both** answers are required for the mark*
- 1 (L6)**
- (b) any **one** from
- the iron reacted **or** combined with sulphur
accept 'the iron gained sulphur'
***or** 'sulphur was added to the iron'*
accept 'the iron has joined with the sulphur'
*do **not** accept 'iron has mixed with the sulphur'*
*do **not** accept 'sulphur or iron added a new layer'*
 - the sulphur had mass
accept 'the sulphur weighed 0.8 g'
- 1 (L6)**
- (c) copper chloride
- 1 (L6)**

Q2.

- (a) any **one** from
- there is a colour change
*accept 'it goes green **or** orange'
'the colour' is insufficient*
 - a new metal is formed
accept 'the iron filings change colour'
- 1 (L5)**
- (b) (i) copper
accept 'Cu'
- 1 (L5)**
- (ii) iron sulphate
accept 'FeSO₄'
- 1 (L6)**
- (iii) • no ✓
any **one** from
- iron is more reactive than copper
accept 'iron is higher on the reactivity series'
 - copper is less reactive than iron
*accept 'copper does not displace iron'
both an indication that the reaction does not happen
and the explanation are required for the mark*
- 1 (L6)**
- (c) • calcium ✓
potassium ✓
*if more than two boxes are ticked, award no mark
both answers are required for the mark*
- 1 (L6)**

[5]**Q3.**

- (a) any **one** from
- the mixture glowed
accept 'the temperature increased'
 - there was a colour change
 - a black solid formed
 - a new substance has been formed
*accept 'a compound **or** iron sulphide was formed'
accept 'there is no longer any sulphur **or** yellow
or iron **or** grey'*
- 1 (L6)**

- (b) • *iron*: metallic element
accept 'metal'
- *sulphur*: non-metallic element
accept 'non-metal'
- *iron sulphide*: compound
if all three answers are correct, award two marks
if two answers are correct, award one mark
- 2 (L5)
- (c) • *sulphur*: no
- *iron*: yes
both answers are required for the mark
- 1 (L5)
- (d) (i) • zinc sulphide
do **not** accept 'zinc sulphate'
- 1 (L6)
- (ii) • sulphur dioxide
accept 'sulphur oxide' **or** 'sulphur trioxide'
- 1 (L6)
- [6]

Q4.

- (a) (i) $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4$
- 1
- (ii) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
one mark is for the formula Na_2SO_4
one mark is for the formula H_2O
one mark is for balancing the equation
- 3
- (b) 3
- 1
- [5]

Q5.

- (a) • X-axis: mass of magnesium (g)
- Y-axis: mass of magnesium oxide (g)
both labels are required for the mark
units are required for the mark
pupils can gain credit for correct responses to other parts if the axes are wrongly labelled **or** magnesium is on the Y-axis and magnesium oxide is on the X-axis
- 1 (L7)
- reasonable scales
accept a scale of 1 g or 2 g per 5 small squares
scale need not begin at zero
- 1 (L7)

- reasonably accurate plotting of all points
all points plotted to ± 1 small square 1 (L7)
 - a line of best fit drawn 1 (L7)
- (b) (i) E 1 (L7)
- (ii) any **one** from
- ignore it in drawing the line of best fit
accept 'ignore it'
 - they could predict the figure from the line of best fit
accept 'they could use the graph line'
 - they should repeat the reading
accept 'check it'
*pupils can gain credit for a response which suggests they should predict the correct value from the pattern
or ignore the anomalous results or repeat the reading* 1 (L7)
- (c) a number from 11 to 13
*accept a value consistent with the line of best fit
the unit is not required for the mark* 1 (L6)
- (d) any **one** from
- the greater the mass of magnesium burned the greater the mass of oxide formed
 - the magnesium and oxygen react in fixed proportions
 - the mass of magnesium oxide formed is proportional to the mass of magnesium burned
 - the greater the mass of magnesium the greater the mass of oxygen that combines with it 1 (L6)

[8]

Q6.

- (a) the three columns on the left hand side
accept 'the first three columns' or 'on the left' 1 (L7)
- (b) Na 1 (L7)
- Cl 1 (L7)

(c) magnesium sulphide
*do not accept 'magnesium sulphite'
or 'magnesium sulphate'*

1 (L7)

(d) any **one** from

- hydrogen
- nitrogen
- oxygen
- fluorine
- chlorine

do not accept symbols

1 (L7)

[5]

Q7.

(a) oxygen

1 (L6)

(b) (i) sulphuric acid
do not accept 'oxide'

1 (L6)

(ii) use a burning splint which lights the hydrogen **or** makes it go pop
*accept 'it goes pop when lit'
do not accept 'use a glowing splint'*

1 (L6)

(iii) **the mark is for concentrating the solution, or for a process which leads to crystallisation occurring**

any **one** from

- warm it **or** heat it gently
do not accept 'heat it'
- leave it to stand
accept 'leave by the window'
- let the water evaporate
- make it more concentrated
do not accept 'heat it until all the water has gone' or 'heat until dry'

1 (L6)

[4]

Q8.

(a) (i) *magnesium* + hydrochloric acid → 1 (L7)

→ magnesium chloride + hydrogen
do not accept 'hydrogen chloride'
do not accept formulae

1 (L7)

(ii) magnesium is more reactive than hydrogen **and** copper is less reactive than hydrogen

accept 'magnesium is more reactive than copper'
accept 'copper is less reactive than magnesium'
accept 'magnesium is higher than copper in the reactivity series'
accept 'copper is lower in the reactivity series'

1 (L7)

(b) sulphuric

1 (L7)

(c)

formula	name
<i>CuSO₄</i>	copper sulphate
<i>MgCl₂</i>	magnesium chloride

2 (L7)

[6]