

MARK SCHEME

GCSE

CHEMISTRY

AQA - TRIPLE SCIENCE

C4 - TEST 2

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.	(i)	potassium hydroxide		
			<i>accept correct formulae</i>	1
		water		1
	(ii)	fertiliser		1
(iii)	H ⁺			
			<i>accept hydrogen but not H</i>	1
				[4]
3.	(a) (i)	to remove or separate copper oxide		
			<i>accept to remove or separate unreacted or excess base</i>	
			<i>accept to remove or separate insoluble solids</i>	1
	(ii)	heat (the solution)		
			<i>accept heat the water</i>	
			<i>accept evaporate the water</i>	
			rapid cooling/cool to lower temperature	
			<i>accept boil the water or solution</i>	
			not increase surface area, put in draught	
			not increase the temperature	1

- (iii) aqueous
accept in water
accept solution
not soluble in water

1

- (b) add water/liquid/solution

1

colour changes to blue

1

[5]

4.

- (a) (i) hydroxide

1

- (ii) blue

1

- (b) (i) pipette

1

- (ii) burette

1

- (iii) changes colour

1

- (c) repeat

allow check results with another group or student

1

[6]

5.

- (a) electricity

allow an electric current

1

- (b) (i) chlorine/ Cl_2

do not accept chloride

1

- (ii) (zinc ions are) positive

ignore to gain electrons

1

and (opposite charges) attract

1

- (iii) reduction

1

- (c) (i) in alloy:
accept converse
 different sized atoms/particles
or
 no layers/rows
accept layers distorted 1
- so cannot slide 1
- (ii) shape memory (alloys)
accept smart 1

[8]

6.

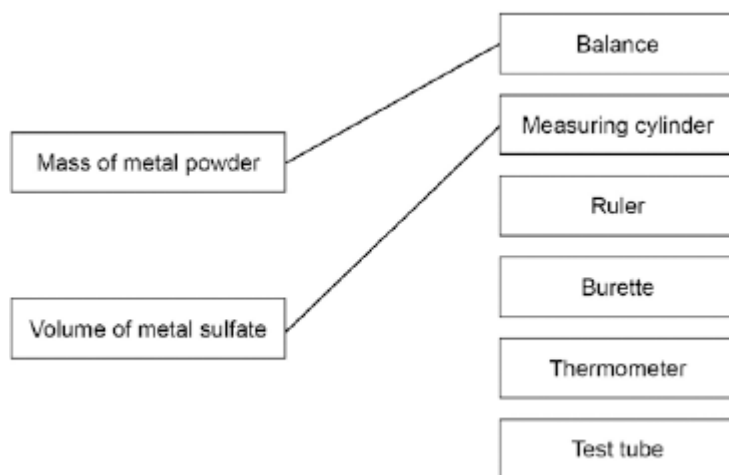
- (a) (an alloy) that can return to its original shape (after being deformed / bent / twisted)
accept (on heating / cooling) it returns to its shape 1
- (b) any **two** from:
- brass / it is a mixture
accept brass / it is not pure
 - zinc changes structure / disrupts patterns or layers
 - copper metal atoms / layers able to slide over each other
accept zinc prevents atoms / layers sliding over each other 2
- (c) (i) oxygen / O₂ / O 1
- (ii) lead remains (in furnace) because of its high boiling point 1
- zinc boils / evaporates (out of furnace) because of its low boiling point 1 if neither mark awarded then allow 1 mark for different boiling points
ignore references to melting points 1

[6]

7.

- (a) Whether there was a reaction or not 1
- (b) brown / orange / dark deposit on zinc
or
 blue solution turns colourless / paler 1

(c) **Variable** **Measuring instrument**



more than one line drawn from a variable negates the mark

2

(d) (Most reactive) **Magnesium**
Zinc
 (Least reactive) **Copper**
must all be correct

1

(e) would not be safe **or**
 too reactive
allow too dangerous

1

(f) Gold

1

(g) $2\text{Fe}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Fe} + 3\text{CO}_2$
allow multiples

1

(h) carbon

1

(i) Loss of oxygen

1

[10]

8.

(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]

9.

- (a) (i) Positive impact
- any **one** from:
- provides employment **or**
 - improves local economy
 - improved transport - new roads are built, new rail links
 - after use the quarry could provide recreation facilities
- 1
- Negative impact
- any **one** from:
- destruction of animal habitats
 - fewer plants and trees to absorb carbon dioxide
 - visual pollution **or** noise pollution **or** atmospheric / air pollution
allow dust pollution
 - more traffic
 - uses non-renewable resources
allow pollutants from burning diesel
- 1
- (ii) economical 1
- (b) carbon / coke burns (in oxygen / air)
accept carbon / coke reacts with oxygen / air 1

- (c) (i) iron oxide (reactant)
must be words 1
- carbon dioxide (product) 1
- (ii) reduction 1
- (d) (i) oxygen reacts with carbon 1
- or**
- oxygen and carbon produce carbon dioxide / carbon monoxide
- carbon dioxide / carbon monoxide is a gas
- or**
- the carbon is removed as a gas 1
- (ii) much harder 1
- (e) Advantage:
less carbon dioxide is produced 1
- Disadvantage:
there are different types of steel which must be sorted 1
- 10.** (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

[12]

- (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]

11.

- (a) atoms

1

- (b) mixture

1

metal

1

structure

1

smart

1

- (c) (i) any **two** from:

- saves raw materials / iron ore
- saves energy / fuels
accept cheaper / saves money
- make new / useful items
- make money / it is economic
- reduces pollution
allow less harmful for the environment
- decreases cost of steel cans
- reduces carbon dioxide emissions
- decreases waste materials / use of landfill

2

(ii) any **one** from:

- provide information / education of the need to recycle
- legislate against / charge for waste
- reward / pay people to recycle
accept fine people for not recycling
- put labels on the cans
- provide recycling bags / bins / areas

1

[8]

12.

(a) 0 – 6

1

(b) more accurate

1

(c) burette

1

(d) sodium hydroxide / potassium hydroxide / ammonia / any other soluble Group I or II hydroxide

1

(e) (i) named indicator / litmus / U.I. / methyl orange / methyl red / phenolphthalein

1

(iii) colour at end point

1

[6]