



Rewarding Learning

**General Certificate of Secondary Education
2012–2013**

Science: Single Award

Unit 2 (Chemistry)

Higher Tier

[GSS22]

TUESDAY 13 NOVEMBER 2012

9.15 am–10.30 am

**MARK
SCHEME**

			AVAILABLE MARKS	
1	(a) (i)	Magnesium	[1]	8
	(ii)	Copper	[1]	
	(iii)	Any two of:		
		● Fast/vigorous reaction		
		● Magnesium dissolves/disappears		
		● Heat given out/exothermic/temperature rise/gets warmer		
		● Blue colour of copper sulfate disappears/fades/solution becomes colourless		
		● Brown/pink solid/copper metal forms		
		● Other suitable	Total [2]	
	(b)	Iron [1] + Magnesium sulfate [1] either order	Total [2]	
2	(c) (i)	CuSO_4	[1]	6
	(ii)	MgCl_2	[1]	
	(a)	Aluminium	[1]	
	(b)	Metallic character decreases across the period/changes from metal to non-metal.	[1]	
	(c)	Chlorine/Argon	[1]	
	(d)	Sodium	[1]	
	(e)	2.8.4	[1]	
	(f)	NaCl	[1]	
3	(a)	A: Nucleus	[1]	10
		B: Proton	[1]	
		C: Electron	[1]	
	(b)	2.7 correct number of shells [1] correct electronic arrangement [1]	[2]	
	(c)	The number of protons in an element/atom	[1]	
	(d) (i)	40	[1]	
		(ii) Sodium	[1]	
		(iii) Z/Oxygen	[1]	
		(iv) W/Helium	[1]	

4 Indicative Content

AVAILABLE
MARKS

Flame Test

- Use a Flame test rod/inoculating loop
- Clean the rod by dipping into (concentrated) acid or heating in Bunsen Flame
- Dip the rod into the metal solution and place into Bunsen Flame, (record the colour change)/spray the solution into Flame
- Clean the rod and repeat for next solution
- Safety: use goggles and take care with Bunsen Flame

Results

- Sodium – Orange/Yellow Flame
- Potassium – Lilac Flame

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the experiment, in a logical sequence and using 6 or 7 of the above Flame test points and must also include a result. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates must use some appropriate specialist terms throughout to describe the procedure, using 3 to 5 of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe the procedure using only 1 or 2 of the above points however these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
D	Response not worthy of credit.	[0]

6

			AVAILABLE MARKS	
5	(a)	Carbon fibre reinforced plastic is not as heavy [1] Carbon fibre reinforced plastic is stronger [1] <i>Accept reverse arguments for steel</i>	} must be comparison [2]	6
	(b)	Kevlar [1] it is stronger [1]	[2]	
	(c)	Composite materials combine the properties of more than one material [1] to produce a more useful material [1]	[2]	
6	(a)	Tourism	[1]	11
	(b)	Any one of: ● Stronger Teeth/bones ● Helps prevent heart disease	[1]	
	(c)	$\text{Ca}(\text{HCO}_3)_2 \longrightarrow \underset{[1]}{\text{CaCO}_3} + \underset{[1]}{\text{H}_2\text{O}} + \underset{[1]}{\text{CO}_2}$	[3]	
	(d)	Calcium Chloride [1] Carbon Dioxide [1] <i>Any order</i>	[2]	
	(e)	(i) Both produced a large amount of lather [1] before and after boiling [1] (ii) S is temporary hard water [1] hardness removed after boiling [1]	[2] [2] [2]	
7	(a)	5 points plotted correctly [2], 3/4 points plotted correctly [1] Smooth curve [1], Dot-Dot (x) Ruler (x)	[3]	5
	(b)	150 [1] allow from graph		
	(c)	Repeat the experiment [1]		

8 Indicative Content

Theory

- Originally one continent called ('Pangaea')
- It broke up and formed other continents
- Two million years ago

Evidence

- Continents fitted together like a jigsaw
- Rock (pattern) in one continent extended into another continent
- Fossils found in different continents match up across the joint

Rejection

- Geologists believed that continents could not drift/no evidence at that time/fixed position

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the theory, in a logical sequence and using 6 or 7 of the above points. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
B	Candidates must use some appropriate specialist terms throughout to describe the theory, using 3 to 5 of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
C	Candidates describe the theory using only 1 or 2 of the above points however these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
D	Response not worthy of credit.	[0]

AVAILABLE
MARKS

6

			AVAILABLE MARKS
9	(a) $C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$ LHS [1] RHS [1] Balanced [1]	[3]	
	(b) Bubble Carbon Dioxide through Limewater [1] Limewater turns milky/cloudy [1] dependant	[2]	
	(c) (i) (Magnesium) gains oxygen	[1]	
	(ii) Magnesium loses electrons. [1] (<i>can be inferred</i>) Oxygen gains electrons. [1] (<i>can be inferred</i>) Reference made to two electrons [1] (The magnesium atom transfers 2 electrons to the oxygen atom [3])	[3]	9
10	(a) Using electricity [1] to break down/decompose a substance [1]	[2]	
	(b) Cathode	[1]	
	(c) $Al^{3+} + 3e^- \longrightarrow Al$ LHS [1] RHS [1] Correct balancing [1]	[3]	
	(d) Carbon/Graphite [1] it is unreactive/inert [1]	[2]	8
Total			75