



General Certificate of Secondary Education  
2012–2013

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## Double Award Science: Chemistry

Unit C1

Foundation Tier

**[GSD21]**

**TUESDAY 13 NOVEMBER 2012**

**9.15 am–10.15 am**

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## MARK SCHEME

							AVAILABLE MARKS													
1	(a)	Idea that the symbol is used to convey the same information no matter where in the world you are/the symbol is not used to mean one thing in one country and have an alternative meaning in another country/ one meaning is not conveyed by several different symbols in different countries.					[1]													
	(b)	idea of eyecatching/ idea of being able to understand it even if you cannot read/ idea of warning of danger any two NOT idea of internationally used					[2] 3													
2	(a)	mixture elements metal					[3]													
	(b)	Idea that they each contain <b>one</b> type of atom/they cannot be broken down into anything simpler (by chemical means)					[1]													
	(c)	Any suitable property of a metal for example good conductor of electricity/good conductor of heat/malleable/ductile also accept in this case hard/high melting point/shiny/sonorous any two allow strong					[2]													
	(d)	<table border="1"> <thead> <tr> <th>Name of element</th><th>Mass number</th><th>Atomic number</th><th>Number of protons</th><th>Number of neutrons</th><th>Number of electrons</th><th></th></tr> </thead> <tbody> <tr> <td></td><td></td><td>26 [1]</td><td></td><td>30 [1]</td><td>26 [1]</td><td>[3]</td></tr> </tbody> </table>	Name of element	Mass number	Atomic number	Number of protons	Number of neutrons	Number of electrons				26 [1]		30 [1]	26 [1]	[3]				9
Name of element	Mass number	Atomic number	Number of protons	Number of neutrons	Number of electrons															
		26 [1]		30 [1]	26 [1]	[3]														
3	(a)	1 carbon atom					[1]													
	(b)	A shared pair of electrons					[1]													
	(c)	Use universal indicator [1] compare to a colour chart [1] or use a pH meter [1] idea of reading/recording/observing pH [1]					[2]													
	(d)	A = conical flask B = delivery tube C = gas jar					[3]													
	(e)	(Bubble through) lime water [1] lime water changes from colourless [1] to milky [1]					[3]													
	(f)	Idea that it does not turn into a liquid					[1] 11													
4	(a)	A = melting B = condensing					[2]													
	(b)	Heat the solid zinc [1] to a temperature of 420 °C [1] NOT melt NOT burn zinc					[2]													
	(c)	temperature liquid gas					[3] 7													

5	Response	Mark	AVAILABLE MARKS
	Candidates must use 6–10 of the terms in the indicative content to describe fully the chemical reaction between sulfur and iron filings in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]	
	Candidates use 3–5 of the terms in the indicative content to describe the chemical reaction between sulfur and iron in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]	
	Candidates make reference to 1–2 of the terms in the indicative content using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made no use of specialist terms.	[1]–[2]	

## Indicative content

- Idea that mixture is solid
- Sulfur is yellow
- Iron is grey or similar
- Mixture can be separated using a magnet
- Idea that iron is magnetic
- Place a mixture of iron filings and sulfur into a boiling tube **OR** correct safety feature (goggles or fume cupboard)
- Heat gently in a Bunsen flame
- Mixture will glow bright red/glow will pass through the mixture
- The mixture will continue to glow after heating is stopped
- Compound is grey(-black) in colour

[6]

6

6 (a) (i) The law of Octaves [1]

(ii) Newlands did not use all of the elements that were known at that time/he placed two elements into one space in his list  
Accept idea that he grouped elements which were not alike, or other correct, e.g. idea that pattern did not work for all the elements [1]

(b) Mendeleev used all of the elements/he left gaps for undiscovered elements/he predicted the properties of undiscovered elements/he swapped elements from atomic mass order if the chemistry did not fit, e.g. I and Te or other correct, e.g. placing elements with similar properties in vertical columns (groups) any two × [1] [2]

(c) Idea must be clear which version of The Periodic Table the candidate is referring to. The modern Periodic Table is set out in atomic number order [1]/the transition metals occupy a separate area [1]/the noble gases [1]/lanthanides **OR** actinides [1] or other correct **NOT** just “there are transition metals” [2]

		AVAILABLE MARKS
	(d) (i) Cl (ii) Na and K both needed (iii) Silicon identification of element [1] correct name [1] (Si = [1])	[1] [1] [2]
		10
7	(a) Candidates draw the electronic configuration Na 2,8,1 and O 2,6 on the diagrams provided  (b) oxygen gains electrons [1] 2 electrons [1]  (c) +1/1+/Na <sup>+1</sup> /Na <sup>+</sup> NOT positive  (d) 2  (e) Na <sub>2</sub> O  (f) electrostatic forces/attraction between opposite charges  (g) Any two of: hard/brittle/non-conductor of electricity/soluble (in water)/crystalline/high melting point/conducts electricity when liquid or in solution or other correct (2 × [1])	[2] [2] [1] [1] [1] [1] [2]
		10
8	(a) copper ethanoate  (b) neutralisation  (c) CuO + H <sub>2</sub> SO <sub>4</sub> → CuSO <sub>4</sub> + H <sub>2</sub> O  (d) (black) solid disappears dissolves [1] blue solution forms [1]  (e) nitric acid  (f) valid comparison sulfuric acid is a stronger acid than ethanoic acid idea that <b>one</b> acid is stronger than the other [1] or idea that sulfuric acid is strong/ethanoic acid is weak [1]	[1] [1] [2] [2] [1] [2] [2]
		9
9	(a) Candidates draw a <b>labelled</b> diagram [1] clear circuit with a battery [1] suitable vessel with liquid in it [1] electrodes [1] Bunsen burner heat source [1] Labelled circuit which works [4] 4 points [3] 3 points [2] 1 or 2 points [1]  (b) Idea of ions which move	[4] [1]
		5
		70