



**General Certificate of Secondary Education
2012**

Science: Double Award (Non-Modular)

**Paper 2
Foundation Tier**

[G8402]

TUESDAY 12 JUNE, MORNING

**MARK
SCHEME**

		AVAILABLE MARKS
1	(a) hazard	[1]
	(b) Any two of: warn of danger/eye-catching/internationally understood (2 × [1])	[2]
	(c) (i) D	[1]
	(ii) corrosive or equivalent not irritant not harmful	[1]
2	(a) boils [1] taken in [1]	[2]
	(b) sublimation	[1]
	(c) compressible	[1]
	(d) increases	[1]
3	(a) (excellent) conductor of electricity	[1]
	(b) cheaper or stronger	[1]
	(c) Any two of: idea that aluminium has low density/(very) good conductor (of electricity)/ idea of not reacting ignore reference to cost not idea of not rusting (2 × [1])	[2]
4	(a) Na	[1]
	(b) nitrogen monoxide	[1]
	(c) sodium hydrogencarbonate	[1]
	(d) CuCl ₂	[1]
	(e) H ₂ O(g)	[1]
5	Any three of: low density/flexible/unreactive/low cost idea of waterproof (3 × [1])	[3]

6

Symbol	Number of electrons	Number of neutrons	Number of protons	Mass number	Electron arrangement
sodium	11	12	11 [1]	23	2,8,1
nitrogen	7 [1]	7	7	14 [1]	2,5
phosphorus	15	16	15	31 [1]	2,8,5 [1]

[5]

5

7

A pop

[1]

B limewater [1], carbon dioxide [1]

[2]

C oxygen

[1] [4]

4

8

(a) (i) solute

[1]

(ii) solvent

[1]

(iii) saturated

[1]

(b) (i) it increases

[1]

(ii) it decreases

[1]

5

9

(a) zinc, lead, copper, silver

Allow [1] if order correct but reversed

[2]

(b) displacement (allow redox)

[1]

3

10

(a) Any **three** from:calcium sinks **or** sinks and rises

bubbles/gas evolved/fizzing/gas given off

idea of reaction getting faster **not** reaction is fast **not** reaction is slow

idea of solution going cloudy

allow alkaline solution

calcium gets smaller/dissolves/disappears

idea of heat given out/exothermic

(any idea of catching fire or flame is **wrong**)**Ignore** reference to hissing or noiseMark idea of moving across the surface of the water as **wrong****Accept** moves **in** the water and **not** just moves

(3 × [1])

[3]

(b) calcium hydroxide/limewater

[1]

4

		AVAILABLE MARKS
11	(a) white or grey not dark grey – dependent on idea of solid product [1] ash/powder/solid [1]	[2]
	(b) idea that oxygen has been added/gained allow loss of electrons do not allow idea of burning in oxygen, not loss of hydrogen	[1]
12	(a) reaction complete/constant mass	[1]
	(b) carbon dioxide	[1]
	(c) calcium chloride [1], water [1]	[2]
13	(a) (i) 1. combustion Accept oxidation	[1]
	2. photosynthesis	[1]
	3. neutralisation	[1]
	4. reduction	[1]
	(ii) 2	[1]
	(b) (i) water/steam	[1]
	(ii) blue [1] to white [1]	[2]
	(c) (i) lower temperature/slows down	[1]
	higher HCl concentration/speeds up	[1]
	using magnesium powder/speeds up	[1]
	addition of catalyst/speeds up	[1]
	(ii) gas syringe/appropriate graduated apparatus	[1]
	(iii) idea of bubbles stopping or magnesium all used up/magnesium has disappeared	[1]
	(d) (i) C	[1]
	(ii) A	[1]
	(iii) A	[1]
	(iv) idea of a fair test	[1]
	(e) Any two of: good for teeth and bones/good for brewing/nice taste/ tanning leather/prevent heart disease (2 × [1])	[2]
	do not accept just health or contains calcium ions	[2]
		20

14 (a)	chlorine:	reactive and green or yellow-green	[1]	
	nitrogen:	colourless and no (poisonous)	[1]	
	helium:	lighter and unreactive	[1]	[3]
(b)	<i>Appearance:</i>	Grey/yellow [1] solid (mixture) [1] or grey solid (iron) [1] or yellow powder/solid (sulphur) [1]		
	<i>Safety precaution:</i>	Wear safety goggles/carry out in fume cupboard [1]		
	<i>Description:</i>	Mixture glows when heated [1] Pungent smell [1]/bad/choking/rotten eggs smell: not strong smell allow burns with blue flame [1] allow idea of sulphur melting [1] Continues to glow when removed from heat [1] Grey/black solid forms [1]		
	<i>Product:</i>	Iron sulphide/iron(II) sulphide [1] FeS [1] (7 × [1]) allow up to [6] for appearance, safety At least one product mark needed for [7]		[7]
		Quality of written communication		[1]
(c) (i)		toxic/poisonous gas/stops oxygen getting to body odourless/colourless	[1] [1]	[2]
	(ii)	idea of needing good supply air/oxygen/for complete combustion or other correct, e.g. prevents leaks of carbon monoxide/poisonous gas or preventing incomplete combustion not idea of formation of carbon monoxide		[1]
	(iii)	idea of global warming/greenhouse effect		[1]
(d) (i)		chlorine is poisonous		[1]
	(ii)	colourless [1] to brown/yellow-brown/orange-brown/red-brown [1]		[2]
	(iii)	$\text{Cl}_2 + 2\text{KI} \rightarrow \text{I}_2 + 2\text{KCl}$		[1]
	(iv)	bromine		[1]

AVAILABLE
MARKS

20

- 15 (a) (i) Any **three** of:
 he left spaces
 elements arranged in order of atomic mass **not** mass or mass number
 idea that it had a relatively small number of elements
 elements were arranged in Groups
 elements were arranged in Periods
 metals were separated from non-metals
or other correct, e.g. hydrogen in Group I
 Maximum (3 × [1]) [3]

- (ii) Any **three** of:
 elements arranged in order of increasing atomic number
 more elements/more periods
 no spaces
 idea of some elements having their position changed
 (as long as incorrect answer is not given)
 noble gases included
Accept idea of actinides **Accept** lanthanides
 transition metals between Group II and Group III **or** in a block
or other correct, e.g. hydrogen not in Group I
 Maximum (3 × [1]) [3]

(b)

Element	Group	Period	Electronic structure
potassium	I [1]	4	2,8,8,1 [1]
magnesium	II	3 [1]	2,8,2 [1]
sulphur [1]	VI or 6 [1]	3	2,8,6

[6]

- (c) (i) all have same number of electrons in their outer shells/all have one electron in their outer shell [1]
- (ii) reactivity increases [1]
- (iii) iodine [1]
- (iv) decreases [1] then increases [1] then decreases for argon [1] [3]
 Allow [1] for decreases but **not** for increase alone
- (d) (i) magnesium hydroxide **or** magnesium oxide **or** magnesium carbonate [1]
- (ii) sulphuric acid [1]

Total

20

110