



**General Certificate of Secondary Education  
2011**

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**Science: Chemistry**

**Paper 2  
Foundation Tier**

**[G1402]**

**TUESDAY 7 JUNE, AFTERNOON**

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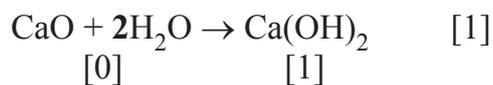
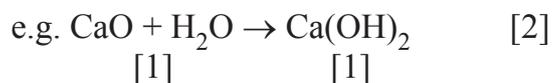
**MARK  
SCHEME**

## Guidelines for marking equations

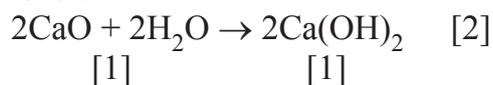
### Equations where the stoichiometry is 1 gain [2] maximum

[1] for correct formula of reactant/s

[1] for correct formula of product/s



However:

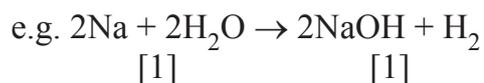


### Equations where the stoichiometry is more than 1 gain [3]

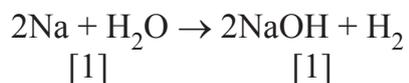
[1] for correct formula of reactant/s

[1] for correct formula of product/s

[1] for correct balancing



+ [1] for balancing = [3]



No balancing mark = [2]

1 (a) (i) two atoms. [1]

(ii) hydrogen/oxygen/any halogen. [1]

(iii) oxygen/any noble gas. [1]

(iv)

<b>Name</b>	nitrogen
<b>State at room temperature and pressure</b>	gas [1]
<b>Colour</b>	colourless [1]
<b>Odour</b>	odourless/no odour [1]

[3]

(v) unreactive/inert [1]

(b)

<b>Name</b>	Ammonia
<b>State at room temperature and pressure</b>	gas [1]
<b>Colour</b>	colourless [1]
<b>Odour</b>	pungent/smelly [1]
<b>pH of aqueous ammonia</b>	9–11 [1]

[4]

(c) (i) white [1] smoke/fumes/solid/cloud [1] [2]

(ii) corrosive [1]

(iii) gloves/lab coat/fume cupboard/apron [1]

(d) nitrogen = method 1 [1]  
 ammonia = method 3 [1]  
 hydrogen chloride = method 2 [1] [3]

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18

- 2 (a) (i) solid dissolved/solute [1]  
in a liquid/solvent [1] [2]
- (ii) a few well spaced particles [1]
- (iii) decreases [1]
- (iv) increases [1]
- (b) (i) flammable [1]
- (ii) explosion risk [1]

(c) (i)

Element	Melting point (°C)	Boiling point (°C)	State at room temperature (20°C)
silicon	1410	2355	solid [1]
oxygen	-219	-183	gas [1]
sodium	98	890	solid [1]
bromine	-7	59	liquid [1]

[4]

- (ii) substance which cannot be broken down into anything simpler [1]  
by chemical means [1]  
(substance made up of only one type of atom [2]) [2]

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(d) (i) B

[1]

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(ii) 660 [1] °C

[1]

(iii) liquid [1] to gas [1]  
solid [1] to gas [1]  
gas [1] to liquid [1]

[6]

21

3 (a) (i) A = anode [1]  
B = cathode [1]  
C = evaporating basin/crucible [1]  
D = gauze/pipeclay triangle [1]  
E = tripod [1]

[5]

(ii) bulb/ammeter

[1]

(iii) decomposition [1]  
using (a direct current of) electricity [1]

[2]

(iv) ions

[1]

(v)

Electrode	Observations	Name of Product
A	red-brown [1] pungent [1] gas [1] <b>max [2]</b>	bromine [1]
B	silvery grey bead	lead [1]

[4]

(vi) bromine/lead fumes are toxic

[1]

			AVAILABLE MARKS
(b) (i)	F	impure copper [1]	[2]
	G	pure copper [1]	
(ii)		copper sulphate/copper chloride/copper nitrate	[1]
(iii)		ductile	[1]
4 (a) (i)		add universal indicator/pH paper [1] compare to colour chart [1] or use pH meter [1] read off value [1]	[2]
(ii)	weak acid	lemon juice [1]	[3]
	strong alkali	sodium hydroxide [1]	
	neutral	water [1]	
(iii)		H <sup>+</sup>	[1]
(iv)		hydroxide	[1]
(v)		sodium sulphate	[1]
(vi)		$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$	[3]
(b) (i)		lead nitrate [1] any soluble iodide, e.g. sodium iodide, potassium iodide etc. [1] [2]	[2]
(ii)		marks are awarded for labelled and <i>recognisable</i> pieces of <i>assembled</i> apparatus labels: filter funnel [1] filter paper [1] conical flask/suitable container [1]	[3]
(iii)		low temperature oven/desiccator	[1]
(iv)	lead(II) ion	Pb <sup>2+</sup> [1]	[2]
	iodide ion	I <sup>-</sup> [1]	
(v)		PbCl <sub>2</sub> /PbSO <sub>4</sub> /PbO/PbBr <sub>2</sub>	[1]

18

20

5 (a) (i)

<b>Reactants</b>	<b>Name</b>	<b>Nitrogen [1]</b>	Sulphur	<b>Carbon [1]</b>
	<b>Formula</b>	N <sub>2</sub>	S	C

**Combustion**

<b>Products</b>	<b>Name</b>	Nitrogen dioxide	<b>Sulphur dioxide [1]</b>	Carbon dioxide
	<b>Formula</b>	NO <sub>2</sub> [1]	SO <sub>2</sub>	CO <sub>2</sub> [1]

[5]

- (ii) fuels and oxygen [1]  
 reacting [1]  
 releasing heat [1]  
 forming oxides [1]

max [3]

(iii) carbon

[1]

(iv) water

[1]

- (v) dead plants/animals [1]  
 millions of years [1]  
 heat (and) pressure [1]

[3]

**Quality of written communication**

[2]

(b) (i) substance containing only [1] carbon and hydrogen [1]

[2]

(ii)

<b>Material</b>	<b>solid</b>	<b>liquid</b>	<b>gas</b>
Polystyrene	✓ [1]		
Petrol		✓ [1]	
Polythene	✓ [1]		
Methane			✓ [1]
Candle wax	✓ [1]		

[5]

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		AVAILABLE MARKS
(iii)	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	[3]
(iv)	carbon monoxide	[1]
<b>6</b>	(a) gives out heat	[1]
(b)	(i) A combustion	[1]
	B neutralisation	[1]
(ii)	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$	[3]
(c)	(i) $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$	[3]
	(ii) Mg continues to burn [1] white light [1] white [1] solid [1] black specks [1]	max [3]
(d)	(i) magnesium gains oxygen [1] gain of oxygen is oxidation [1]	[2]
	(ii) copper oxide loses oxygen [1] loss of oxygen is reduction [1]	[2]
(iii)	black	[1]
<b>Total</b>		<b>120</b>