



*Rewarding Learning*

**General Certificate of Secondary Education  
2011**

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**Science: Chemistry**

**Paper 1  
Foundation Tier**

**[G1401]**

**FRIDAY 27 MAY, MORNING**

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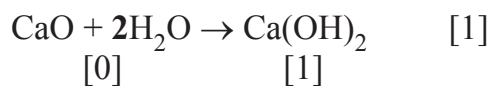
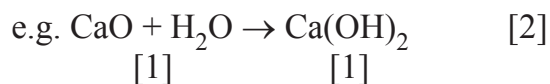
**MARK  
SCHEME**

## Guidelines for marking equations

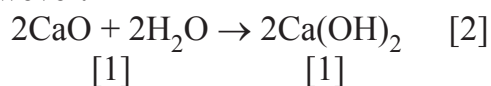
### Equations where the stoichiometry is 1 gain [2] maximum

[1] for correct formula of reactant/s

[1] for correct formula of product/s



However:

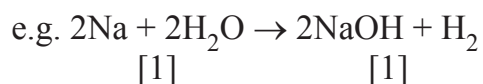


### Equations where the stoichiometry is more than 1 gain [3]

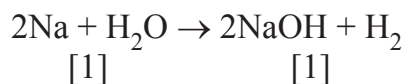
[1] for correct formula of reactant/s

[1] for correct formula of product/s

[1] for correct balancing



+ [1] for balancing = [3]



No balancing mark = [2]

- 1 (a) Helium [1] 0/8/VIII [1]  
 Magnesium [1] 2/II [1]  
 Nitrogen [1] 5/V [1] or Argon [1] 0/8/VIII [1]  
 Chlorine [1] 7/VII [1]  
 Apply CM for group of incorrect element [8]

(b) (i)

Group number	Name of group	Number of electrons in the outer shell of an atom
1	alkali metals [1]	1 [1]
7/VII [1]	the halogens	7 [1]
8/0/VIII [1]	noble gases [1]	8

[6]

- (ii) bromine/Br/Br<sub>2</sub> [1]

(c)

Element	Metal	Non-metal
Sodium	✓ [1]	
Bromine		✓ [1]
Phosphorus		✓ [1]

[3]

- (d) oxides [1]  
 basic [1] [2]

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- 2 (a) (i) Label on left = nucleus [1]  
Label on right = shell [1] [2]
- (ii) equal number [1]  
of *protons and electrons* [1] [2]
- (iii) idea of full outer shell (of electrons) [1]

(iv)

Relative mass	Relative charge	Name of subatomic particle
1 [1]	0	neutron [1]
$\frac{1}{1840}$	-1	electron [1]
1	+1 [1]	proton [1]

[5]

- (b) (i) chlorine atom 2, 8, 7 [1]  
particle A 2, 8 [1]  
particle B 2, 8, 8 [1] [3]
- (ii) particle A = sodium ion [1]  
particle B = chloride ion [1] [2]
- (iii) particle A = Na<sup>+</sup> [1]  
particle B = Cl<sup>-</sup> [1] [2]
- (iv) attraction [1] of oppositely charged [1] ions  
or electrostatic [1] attraction [1] [2]
- (v) magnesium oxide/calcium chloride/sodium iodide  
**any one** [1]

AVAILABLE  
MARKS

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3 (a)

Name of metal	Symbol
Sodium	Na [1]
lead [1]	Pb

[2]

(b)

Metal	Physical property	Related use of metal
Silver	Shiny	Jewellery
Copper	Conducts heat	saucepans [1]
Aluminium	low density/ conducts electricity [1]	Overhead power cables

[2]



[3]

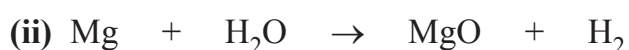
- (d) (i) magnesium in a boiling tube or suitable container  
mineral wool soaked in water  
heat

} max [2]  
for all  
3 labels

delivery tube [1] for connection

collection vessel [1]  
collection over water [1] } [2] for collection

[5]



[2]

(iii) zinc/aluminium/iron

[1]

- (e) (i) bubbles/gas given off [1]  
heat released [1]  
colourless solution forms [1]  
magnesium disappears [1]

max [3]

(ii) compound: magnesium chloride [1]  
element: hydrogen [1]

[2]

AVAILABLE  
MARKS

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- 4 (a) (i) water which does not lather readily with soap [2]  
 water which does not lather with soap [1] [2]
- (ii) caves/stalactites/stalagmites/limestone pavements  
 any **two** [2]
- (iii) add soap [1]  
 shake [1]  
 no (immediate) lather/scum forms/a lot of soap needed to form a  
 lather/correct comparison [1] [3]
- Quality of Written Communication** [2]
- (iv) wastes soap/limescale/furring inside (hot water) pipes [1]
- (b) (i) calcium nitrate/calcium chloride/calcium sulphate [1]
- (ii) dissolves [1]  
 solution [1]  
 solute [1]  
 solvent [1] [4]
- (iii) good for teeth and bones/tastes better/reduces heart disease/tanning  
 leather [1]
- (c) (i) boiling [1]
- (ii) washing soda/(hydrated) sodium carbonate [1]

AVAILABLE  
MARKS

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			AVAILABLE MARKS
5	(a) Carbon [1] 12 [1]	[2]	
	(b) (i) Galena $207 + 32 = 239$	[1]	
	(ii) Haematite $2(56) + 3(16) = 160$	[1]	
	(c) (i) atoms of the same element/same number of protons/same atomic number [1] different mass numbers/different number of neutrons [1]	[2]	
	(ii) 34	[1]	
	(d) (i) $X_2O_3 = 102$ $2\bar{X} = 102 - 3(16) = 54$ [1] $X = \frac{54}{2} = 27$ [1]	[2]	
	(ii) Aluminium	[1]	
	(e) (i) $2CuO + C \rightarrow 2Cu + CO_2$	[1]	
	(ii) $TiCl_4 + 4Na \rightarrow Ti + 4NaCl$	[1]	12
		<b>Total</b>	<b>90</b>