



*Rewarding Learning*

**General Certificate of Secondary Education  
2011**

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**Science: Double Award (Non-Modular)**

Paper 2  
Foundation Tier

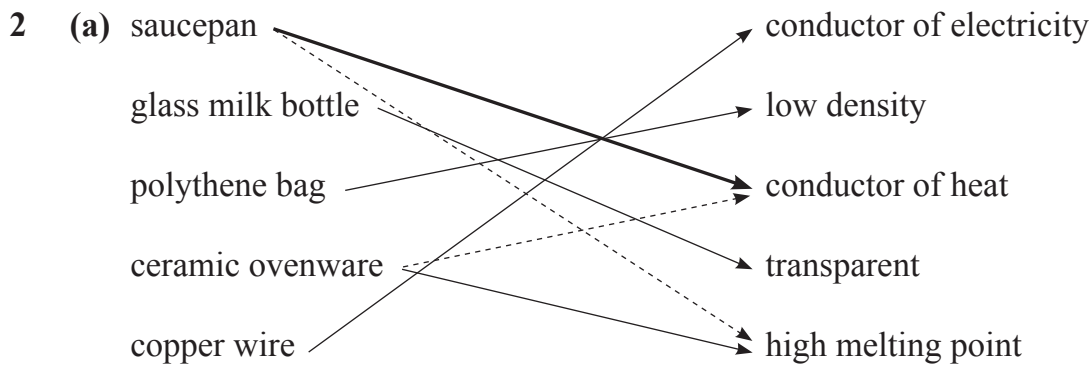
**[G8402]**

**FRIDAY 27 MAY, MORNING**

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**MARK  
SCHEME**

- 1 (a) (i) C [1]  
(ii) A [1]  
(iii) Any two of:  
eye catching/internationally recognised/idea that some people  
cannot read (2 × [1]) [2]



4 correct [3]    2 or 3 correct [2]    1 correct [1]    [3]

(b) light [1] flexible [1]    [2]

- 3 dissolve [1]    soluble [1]  
increases [1]  
decreases [1]  
solution [1]    [5]

4

Substance	Element	Mixture	Compound
rust			✓
magnesium	✓[1]		
copper carbonate			✓[1]
sea water		✓[1]	
helium	✓[1]		

[4]

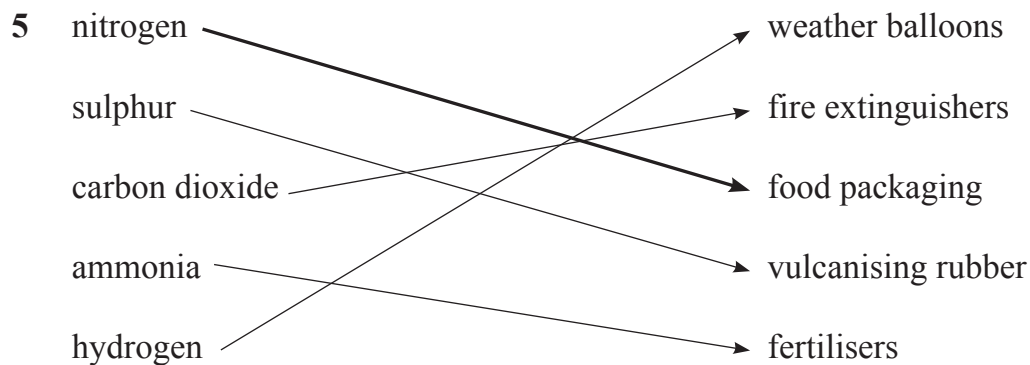
AVAILABLE  
MARKS

4

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4



4 correct [3]    2 or 3 correct [2]    1 correct [1]

6 (a) P [1]

(b) carbon monoxide [1]

(c) calcium sulphite [1]

(d)  $\text{Fe}(\text{OH})_3$  [1]

7 (a) heat it **NOT** warm it **NOT** burn [1]

(b) use lime water [1] turns milky [1] **NOT** idea of extinguishing a lit taper [2]

(c) lighter [1]

8 (a) Any three of:  
natural gas/LPG/petrol/diesel/paraffin/candle wax/peat/lignite/coal/  
coke/oil or other correct (3 × [1]) [3]

(b) carbon dioxide [1] water [1] [2]

9 (a) idea of particles [1] which move/diffuse [1] [2]

(b) idea that they go into the air [1] [1]

(c) idea that salt particles have separated/broken down [1] and idea that they moved between the water particles [1] [2]

AVAILABLE  
MARKS

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- 10** Tests could be linked to:  
 conductor of heat  
 conductor of electricity  
 malleable  
 ductile  
 shiny  
 sonorous  
 effect on water  
 i.e. an acceptable test is one which can have a “result” with a metal  
**NOT** sodium or potassium

Test	Result if metal	Result if non-metal
Acceptable test	Acceptable result	Acceptable result
$2 \times [1]$	$2 \times [1]$	$2 \times [1]$
e.g. hit with hammer	ringing sound	no ringing sound

[6]

6

- 11 (a)** Any two of:  
 same Group (in Periodic Table)/2 outer electrons/valency of 2  
 accept all are metals  
 Accept any correct metal properties ( $2 \times [1]$ )

[2]

- (b)** **(i)** halogen(s)  
**(ii)** astatine  
**(iii)** fluorine

[3]

5

- 12 (a)** correct 2,8,2 representation for magnesium [1]  
 correct 2,7 representation for fluorine [1]

[2]

- (b)** loss of 2 electrons by magnesium [1]  
 gain of 1 electron by fluorine [1]  
 idea that 2 fluorine atoms are needed (for each magnesium) [1]  
 reference to loss or gain of atoms loses 1 mark/sharing electrons  
 negates first 2 marks

[3]

5

- 13 (a) (i) C [1]
- (ii) D [1]
- (iii) A [1]
- (b) Any three of:  
 heat (the acid)/stir or shake/break up zinc/use more concentrated acid  
 (3 × [1]) accept add catalyst (copper sulphate) [3]
- (c) (i) true [1]
- (ii) false [1]
- (iii) true [1]
- (iv) not possible to work out [1]

(d)

Symbol	Number of protons	Number of neutrons	Number of electrons	Mass number	Electron arrangement
Na	11 [1]	12	11	23	2,8,1
Ca	20	20	20	40 [1]	2,8,8,2
Al	13	14 [1]	13	27	2,8,3 [1]
O	8	8	8 [1]	16	2,6

[5]

AVAILABLE  
MARKS

15

- 14 (a) (i)** Any two of: colourless/odourless/low density/insoluble in water or other correct ( $2 \times [1]$ ) no marks relating to mp or bp [2]
- (ii)** meteorological balloons/rocket engines/(clean) fuel or other correct e.g. Haber Process or Hydrogenation of fats [1]
- (iii)**  $\text{CuO} + \text{H}_2 [1] \rightarrow \text{Cu} + \text{H}_2\text{O} [1]$  [2]
- (b) (i)** sulphur dioxide [1]
- (ii)** 3 [1]
- (iii)** kills fish/corrodes or damages stonework or buildings (NOT erodes)/destroys or damages or kills vegetation/leaches nutrients from the soil or other correct e.g. corrodes metal [1]
- (iv)** idea of scrubbers/filters/use low sulphur fuels/desulphonation **NOT** use of alternative energy sources [1]
- (c)** advantages (allow up to four of): use of lignite as a fuel/providing jobs/cheap (fuel)/helping local economy/allow improved transport links/or other correct  
 disadvantages (allow up to four of): loss of habitat/eyesore/noise pollution/dust pollution/using up natural resource or other correct (max  $6 \times [1]$ )  
 QWC mark for clear articulation – NOT just list [1] [7]
- (d) (i)** fertilisers/slurry [1]
- (ii)** fertilisers/detergents [1]
- (iii)** soluble or dissolved  
 allow bacteria/germs/microbes [1]
- (iv)** idea of killing bacteria/germs NOT cleaning  
 accept sterilises [1]

AVAILABLE  
MARKS

20

			AVAILABLE MARKS
15 (a) (i)	carbon/graphite	[1]	
(ii)	anode – oxygen, cathode – aluminium both needed	[1]	
(iii)	anode [1] idea that it reacts with oxygen <b>NOT</b> wears away/ erodes [1] forming carbon dioxide [1]	[3]	
(b) (i)	alkali metals <b>NOT</b> alkaline	[1]	
(ii)	Any four of: bubbles/effervescence/fizzing <b>NOT</b> just “gas” hissing or similar sound metal floating/on surface forming a ball/melting or similar metal getting smaller/disappearing/dissolving moving around idea of catching fire/sparks/yellow-orange flame exothermic reaction idea of alkaline solution remaining/turns purple with pH indicator idea of very vigorous reaction (4 × [1])	[4]	
(iii)	idea of reactivity of sodium	[1]	
(iv)	sodium + water → sodium hydroxide [1] + hydrogen [1]	[2]	
(v)	slower or similar [1] lithium is less reactive [1] correct reference to position in Group 1 [1] Any 2 points of 3	[2]	
(c) (i)	calcium hydroxide slaked lime	[1]	
(ii)	$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ [1] [1]	[2]	
(iii)	Any two of: hard/brittle/crystalline/does not conduct electricity when solid (2 × [1]) allow idea of solubility allow conducts when molten	[2]	20
<b>Total</b>			<b>110</b>