



General Certificate of Secondary Education
2011

Science: Double Award (Non-Modular)

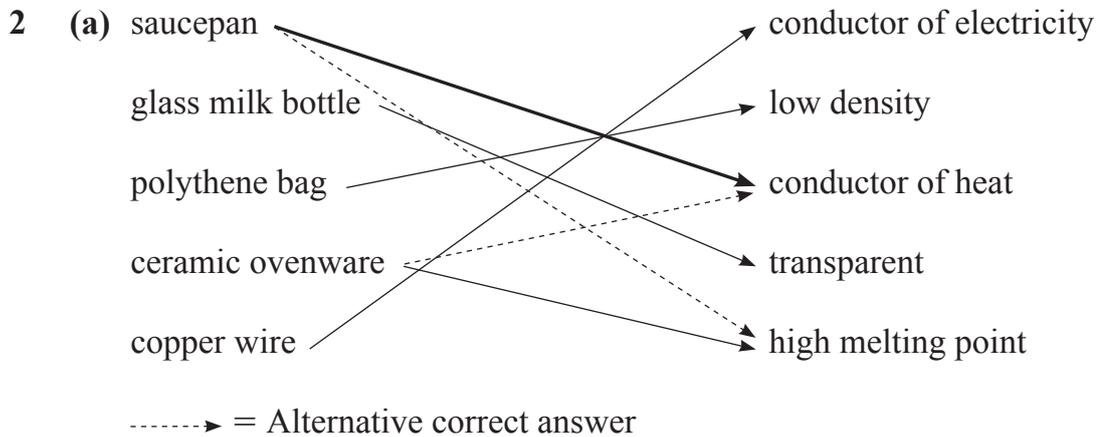
Paper 2
Foundation Tier

[G8402]

FRIDAY 27 MAY, MORNING

**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]

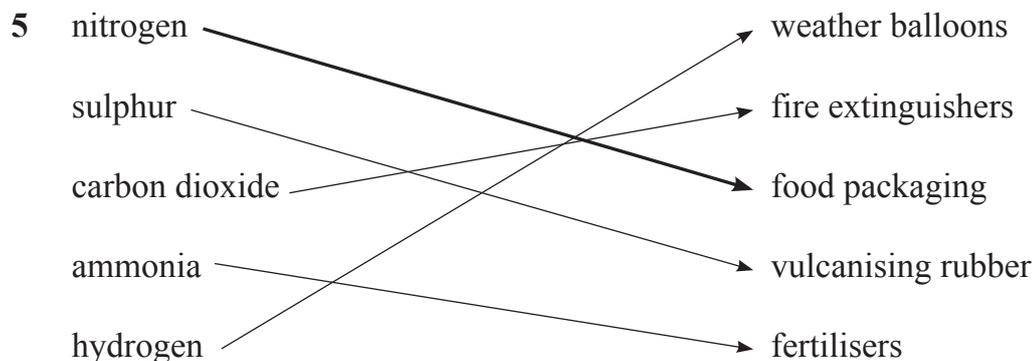
- 3 dissolve [1] soluble [1]
 increases [1]
 decreases [1]
 solution [1] [5]

4

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

[4]

AVAILABLE MARKS
4
5
5
4



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

- | | | AVAILABLE MARKS |
|---|--|-----------------|
| 6 | (a) P | [1] |
| | (b) carbon monoxide | [1] |
| | (c) calcium sulphite | [1] |
| | (d) $\text{Fe}(\text{OH})_3$ | [1] |
| | | 4 |
| 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] |
| | | 4 |
| 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] |
| | | 5 |
| 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] |
| | | 5 |

- 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 NOT wears away/erodes [1] forming carbon dioxide [1]	[3]
(b) (i)	alkali metals NOT alkaline	[1]
(ii)	Any four of: bubbles/effervescence/fizzing NOT 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]
Total		20
		110