Rewarding Learning

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]	5
2	**(a)**	boils [1] taken in [1]	[2]	
	(b)	sublimation	[1]	
	(c)	compressible	[1]	
	(d)	increases	[1]	5
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
4	**(a)**	Na	[1]	
	(b)	nitrogen monoxide	[1]	
	(c)	sodium hydrogencarbonate	[1]	
	(d)	$CuCl_2$	[1]	
	(e)	$H_2O(g)$	[1]	5
5		Any **three** of: low density/flexible/unreactive/low cost idea of waterproof (3 × [1])	[3]	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] — AVAILABLE MARKS: 5

7 A pop [1]
B limewater [1], carbon dioxide [1] [2]
C oxygen [1] [4] — AVAILABLE MARKS: 4

8 **(a)** **(i)** solute [1]

(ii) solvent [1]

(iii) saturated [1]

(b) **(i)** it increases [1]

(ii) it decreases [1] — AVAILABLE MARKS: 5

9 **(a)** zinc, lead, copper, silver
Allow [1] if order correct but reversed [2]

(b) displacement (**allow** redox) [1] — AVAILABLE MARKS: 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 noise
Mark 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] — AVAILABLE MARKS: 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]	3
12	**(a)**	reaction complete/constant mass		[1]	
	(b)	carbon dioxide		[1]	
	(c)	calcium chloride [1], water [1]		[2]	4
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 higher HCl concentration/speeds up using magnesium powder/speeds up addition of catalyst/speeds up	[1] [1] [1] [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]) do **not** accept just health or contains calcium ions		[2]	20

						AVAILABLE MARKS
14	**(a)**	chlorine:	reactive **and** green or yellow-green	[1]		
		nitrogen:	colourless **and** no (poisonous)	[1]		
		helium:	lighter **and** unreactive	[1]	[3]	
	(b)	*Appearance:*	Grey/yellow [1] solid (mixture) [1] **or** grey solid (iron) [1] or yellow powder/solid (sulphur) [1]			
		Safety precaution:	Wear safety goggles/carry out in fume cupboard [1]			
		Description:	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]			
		Product:	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	[1]		
			odourless/colourless	[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)	$Cl_2 + \mathbf{2}KI \rightarrow I_2 + \mathbf{2}KCl$		[1]	
		(iv)	bromine		[1]	20

AVAILABLE MARKS

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] 20

Total **110**