



General Certificate of Secondary Education 2012–2013

Science: Single Award

Unit 2 (Chemistry)

Higher Tier

[GSS22]

TUESDAY 28 FEBRUARY 2012 11.00 am-12.15 pm

MARK SCHEME

(a)	(i)	3	[1]	AVAILABLE MARKS
	(ii)	lithium	[1]	
(b)	(i)	37.5 ± 0.5	[1]	
	(ii)	rubidium	[1]	
(c)	one	e/alkali metals	[1]	
(d)	as t refe	the atomic number increases, the melting point decreases erence to change in slope as atomic number increases	[1] [1]	
(e)	(i)	fluorine	[1]	
	(ii)	bromine	[1]	
	(iii)	increase, increase		
		decrease, decrease	[1]	10
(a)	(i)	18 + 113 [1] = 131 [1]	[2]	
	(ii)	hydrogencarbonate	[1]	
(b)	calo	cium hydrogencarbonate — → carbon + water dioxide	[3]	
(c)	doe	es not lather [1] forms scum or/with soap [1]	[2]	
(d)	Ind • • •	icative content Take a given volume of bottled water Add soap solution to get a permanent lather Record volume of soap solution Repeat procedure for tap water Water which requires most soap is hardest A correctly named piece of apparatus A controlled variable		
	a) b) c) d) e) b) c) d)	 a) (i) (ii) (i) (i) (i) (i) (i) (ii) (iii) (ii) (ii) (iii) (iii)	 a) (i) 3 (ii) lithium b) (i) 37.5 ± 0.5 (ii) rubidium c) one/alkali metals (d) as the atomic number increases, the melting point decreases reference to change in slope as atomic number increases (e) (i) fluorine (ii) bromine (iii) increase, increase or decrease (i) 18 + 113 [1] = 131 [1] (ii) hydrogencarbonate (b) calcium hydrogencarbonate — carbon + water dioxide (c) does not lather [1] forms scum or/with soap [1] (d) Indicative content Take a given volume of bottled water Add soap solution to get a permanent lather Record volume of soap solution Repeat procedure for tap water Water which requires most soap is hardest A controlled variable 	 a) (i) 3 [1] (ii) lithium [1] b) (i) 37.5 ± 0.5 [1] (ii) rubidium [1] c) one/alkali metals [1] d) as the atomic number increases, the melting point decreases [1] e) (i) fluorine [1] (ii) bromine [1] (iii) increase, increase or decrease [1] (ii) hydrogencarbonate [1] (i) hydrogencarbonate [1] (ii) hydrogencarbonate [1] (ii) cost out lather [1] forms scum or/with scap [1] (2) does not lather [1] forms scum or/with scap [1] (2) Indicative content [1] (3) Indicative content [1] (4) Indicative content [1] (5) Repeat procedure for tap water [2] (6) A correctly named piece of apparatus [3] (7) A controlled variable [3]

	Ban	d	Response	Mark		AVAILABLE MARKS
	A		Using 5–7 of the points shown in the indicative content, candidates describe fully an experiment to test the hardness of two water samples and compare them, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a good high standard.	5–6		
	В		Using 3–4 of the points shown in the indicative content candidates describe fully an experiment to test the hardness of two water samples and compare them, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4		
	С		Candidates make reference to 1–2 of the points shown in the indicative content using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made little use of the specialist terms.	1–2		
	D		Response not worthy of credit.	0		
			I	I	[6]	
	(e)	bett	er taste/stronger teeth and bones/reduce risk of heart	disease	[1]	15
3	(a)	(i)	3		[1]	
		(ii)	12		[1]	
		(iii)	2 + 3 + 12 = 17 Alternative answer: Accept graphite.		[1]	
	(b)	nega ano	atively, carbon, cathode, aluminium de, oxygen		[6]	9

(a)	(i)	low density, reasonable cost still a good conductor [1]	any 2 properties + 1 explanation	[3]	AVAILABLE MARKS
	(ii)	strong metal, low cost		[2]	
(b)	(i)	В			
	(ii)	С			
	(iii)	A		[3]	
(c)	the particles are reduced in size [1] to nano size [1]			[2]	
(d)	mat ligh	terial which can change propertie t/temperature [1]	s with surroundings [1]	[2]	12
	(a) (b) (c) (d)	 (a) (i) (ii) (b) (i) (ii) (iii) (c) the (d) mathematical light 	 (a) (i) low density, reasonable cost still a good conductor [1] (ii) strong metal, low cost (b) (i) B (ii) C (iii) A (c) the particles are reduced in size [1] to the particles are reduced	 (a) (i) low density, reasonable cost still a good conductor [1] (ii) strong metal, low cost (b) (i) B (ii) C (iii) A (c) the particles are reduced in size [1] to nano size [1] (d) material which can change properties with surroundings [1] light/temperature [1] 	 (a) (i) low density, reasonable cost any 2 properties still a good conductor [1] + 1 explanation [3] (ii) strong metal, low cost [2] (b) (i) B (ii) C (iii) A (c) the particles are reduced in size [1] to nano size [1] [2] (d) material which can change properties with surroundings [1] [2]

5	(a)	2, 8, 1 arrangement [1]	2, 8, 7 arrangement [1]
	(b) l	ndicative content	

- Transfer
- Correct director of transfer •
- Correct number of electrons transferred
- Correct charge on the sodium ion
- Correct charge on the chloride ion Correct idea of full outer shells
- •

Band	Response	Mark
A	Using 5–6 of the points shown in the indicative content, candidates describe fully how the atoms of sodium and chlorine join to form sodium chloride in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	5–6
В	BUsing 3–4 of the points shown in the indicative content candidates describe fully how the atoms of sodium and chlorine join to form sodium chloride in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.CCandidates make reference to 1–2 of the points shown in the indicative content using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made little use of the specialist terms.	
С		
D	Response not worthy of credit.	0
	·	[6]

5

8

7755.01 RMA

AVAILABLE MARKS

[2]

6	(a)	He counted the generations [1] He added them up to get to the present time [1]	[2]	AVAILABLE MARKS
	(b)	6000 years	[1]	
	(c)	remains of an animal or plant [1] preserved in rock [1]	[2]	
	(d)	radioactivity/use of radio isotopes/uranium or potassium/ presence of daughter nuclei/in rocks <i>any</i> 3	[3]	8
7	(a)	earth, fire, wind/air, water	[1]	
	(b)	law of octaves/every 8th element/was similar	[1]	
	(c)	(i) atomic mass order	[1]	
		(ii) for undiscovered elements	[1]	
	(d)	Idea of increasing atomic number/Proton number order [1] Idea of groups – Noble gases or transition metals [1] number of electrons in outer shell equal to group number [1]	[2]	6
8	(a)	(i) ethene	[1]	
		(ii) correct structure for propane	[1]	
		(iii) C ₄ H ₁₀ [1] C ₂ H ₄ [1]	[2]	
	(b)	$\begin{bmatrix} H & CI \\ I & I \\ C & -C \\ I & I \\ H & H \end{bmatrix} n$ single bond [1] brackets with correct ratio of atoms [1] correct position of "n" [1]	[3]	7
			Total	75