

New
Specification



Rewarding Learning

**General Certificate of Secondary Education
2011–2012**

Double Award Science: Chemistry

Unit C1

Higher Tier

[GSD22]

WEDNESDAY 9 NOVEMBER 2011

9.15 am–10.15 am

**MARK
SCHEME**

			AVAILABLE MARKS	
1	(a)	atomic mass order	[1]	6
	(b)	(i) noble gases	[1]	
		(ii) not yet discovered	[1]	
	(c)	Any one from the following elements named Cu, Zn, Mn, Mg, Cr, V, Ti, Fe, Co, Ni	[1]	
	(d)	atomic number order	[1]	
	(e)	(John) Newlands	[1]	
2	(a)	14	[1]	5
	(b)	25 (cm ³)	[1]	
	(c)	It cannot give a pH value/idea that litmus paper can only indicate if liquid is an acid or an alkali	[1]	
	(d)	NaCl + H ₂ O	[2]	
3	(a)	(i) The fertiliser contains copper sulfate (which is blue)	[1]	6
		(ii) Idea that solid contains water of crystallisation	[1]	
	(b)	(i) sulfuric acid accept completely correct formula H ₂ SO ₄	[1]	
		(ii) Neutralisation	[1]	
	(c)	(i) CuSO ₄	[1]	
		(ii) Candidates circle Fe ₂ (SO ₄) ₃	[1]	

4 (a) The solubility of a solid in water is the maximum mass [1]
of solid which will dissolve in [1]
100 g of water [1]
at a given temperature [1] [4]

(b) (i) Idea of as the temperature of the water increases the solubility
increases [1]

(ii) $55 \text{ (g/100gH}_2\text{O)} \pm 1$ [1]

(iii)

Solution			Saturated/ unsaturated
Mass of CuSO ₄ (g)	Mass of water (g)	Temperature °C	
45	100	60	saturated
15	50	20	saturated
125	500	40	unsaturated

[3]

(iv) Solubility at 56°C 38 g/100 g H₂O [1]
Solubility at 22°C 20 g/100 g H₂O [1]
 $38 - 20$ [1] = 18 (g/100 g H₂O) [1] [4]

13

5 (a) Candidates draw diagrams to show the electronic structures

(i) Na 2, 8, 1 [1]

(ii) Cl 2, 8, 7 [1]

(b) Indicative content

- Transfer
- Correct direction of transfer
- Correct number of electrons transferred
- Correct electronic structure for sodium ion
- Correct charge on either ion
- Correct electronic structure for chloride ion
- Reference to how the ions are held together [6]

Response	Mark
Candidates must use appropriate specialist terms throughout to describe fully using 5–7 of the points shown in the indicative content how the atoms of sodium and chlorine bond 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
Candidates using 3–4 of the points shown in the indicative content partially describe how the atoms of sodium and chlorine bond 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.	3–4
Candidates make reference to 1–2 of the main points shown above using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made little use of specialist terms.	1–2
Candidates make no reference to the main points below and offer no other suitable response. Response not worthy of credit.	0

(c) Any **two** from

Hard/brittle/does not conduct electricity as a solid/soluble (in water)/
conducts electricity when molten or dissolved in water [2]

AVAILABLE
MARKS

10

			AVAILABLE MARKS
6	(a) (i)	dot and cross diagram [1]	
		correct sharing [1]	
		correct no. of electrons (dependent on correct sharing) [1]	[3]
	(ii)	correctly labelled lone pairs	[1]
(b)	(i)	two atoms in a molecule	[1]
	(ii)	[correctly drawn dot-cross triple bond] [2]	
		[6 electrons] [1]	
		in 3 pairs [1]	
	correct number of electrons [1] (dependent on correct sharing)	[3]	
			8
7	(a)	C [1] conducts in liquid state but not in solid state [1] (2nd mark conditional on first)	[2]
	(b)	D	[1]
	(c)	E	[1]
	(d)	Substance A [1] (2nd mark conditional on first) diamond [1]	[2]
			6
8	(a)	mobile/delocalised electrons [1] can carry current [1]	[2]
	(b)	Not strong	[1]
	(c)	atoms, ions slide over each other	[1]
			4

9 (a) Indicative content

- Use fume cupboard because toxic gas is produced
- (Need to melt lithium chloride) so that ions are free to move/so that compound can conduct electricity
- Greenish–yellow gas – (chlorine)
- formed at anode
- Idea of Silvery beads of metal (lithium)
- formed at cathode

[6]

Response	Mark
Candidates must use appropriate specialist terms throughout to describe, in a logical sequence, the electrolysis of lithium chloride using 5–6 of the points shown in the indicative content. They use good spelling, punctuation and grammar and the form and style are of a high standard.	5–6
Candidates use some appropriate specialist terms to describe partially, in a logical sequence, the electrolysis of lithium chloride using 3–4 of the points shown in the indicative content. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
Candidates make reference to 1–2 of the main points shown above using limited spelling, punctuation and grammar. The form and style is of a limited standard and they have made little use of specialist terms.	1–2
Response not worthy of credit.	0



(c) Any **two** from

- use cryolite to lower the temperature for melting the aluminium ore (formation of) crust on electrolyte (reduces heat loss)
- use a cost effective (cheap) source of electricity

[2]

(d) Any **two** from

- idea site near a cheap source of electricity (hydroelectric)
- idea site must be serviced by good transport links
- idea site must be serviced by a good water supply (for washing, cooling, steam generation)
- site must have suitable waste disposal facilities
- site must be in an area with access to a skilled workforce

[2]

Total

AVAILABLE
MARKS

12

70