New Specification

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Double Award Science: Chemistry

Unit C1

Higher Tier

[GSD22]

MONDAY 21 MAY 2012, MORNING

MARK SCHEME

1 (a) (i) 17 20 17 [3]

AVAILABLE MARKS

(ii) Isotopes are atoms of the same element/atoms with the same atomic number/atoms with the same number of protons [1]
different mass number/number of neutrons [1] [2]

(b) (i)

Element	Atomic number	Electronic configuration	Group of Periodic Table
A	17	**2,8,7**	7
B	5	2,3	**3**
C	**15**	2,8,5	5
D	6	**2,4**	4

[4]

(ii) Magnesium [1] 10

2 **(a)** Lithium [1]

(b) Melting point decreases (as the size of the atoms increases) [1]

(c) Indicative content

- Potassium stored in oil } storage in the laboratory

- Idea that when freshly cut it is shiny
- Idea that as it is left in the air the freshly cut surface becomes dull } appearance

- Idea that before adding it to water dry the oil from the surface using a paper towel
- Idea of using small pieces/cut into small pieces } Preparative steps

- Handle with tongs
- Wear (safety) glasses/goggles
- Use (safety) screen } Safety

(award a max of 2 marks for safety)

Response	Mark
Candidates must use appropriate specialist terms throughout (at least 5 pts from the indicative content) to describe a minimum of 3 of the following; how potassium is stored in the laboratory, appearance, safety precautions and the preparative steps that need to be taken before potassium is added to water. They use good quality spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates must use some appropriate specialist terms throughout (3–4 pts from the indicative content) to describe a minimum of 2 of the following; how potassium is stored in the laboratory, appearance, safety precautions and the preparative steps that need to be taken before potassium is added to water. They use satisfactory spelling, punctuation and grammar and the form and style are of a high 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 no use of specialist terms.	[1]–[2]
Candidates make no reference to the points above and offer no other suitable response.	[0]

[6]

(d) **(i)** Idea that rubidium is too reactive/(too) dangerous [1]

(ii) 1 (electron in the outer shell) [1]

AVAILABLE MARKS

10

				AVAILABLE MARKS
3	**(a)**	Solubility decreases (as the temperature increases)	[1]	
	(b)	22 g/100 g water	[1]	
	(c)	22 °C (accept 22–24 °C)	[1]	
	(d)	9 °C (accept 9–9.8 °C)	[1]	
	(e)	Cerium(III) sulfate	[1]	
	(f)	solubility at 60 °C = 41 solubility at 20 °C = 20 [1] (accept 19) mass of crystallised solid from 100 g = 41 − 20 = 21 [1] mass of crystallised solid from 500 g = 21 × 5 [1] = 105 [1]	[4]	9
4	**(a)**	idea of acid reacting with an alkali/base [1] to produce water [1]	[2]	
	(b)	Black	[1]	
	(c)	Blue	[1]	
	(d)	H^+	[1]	5
5	**(a)**	**(i)** Draw electronic configurations magnesium 2,8,2 [1] chlorine 2,8,7 [1]	[2]	
		(ii) Magnesium loses 2 electrons [1] chlorine gains 1 electron [1]	[2]	
		(iii) 2	[1]	
		(iv) Electrostatic forces/attraction between opposite charges	[1]	
	(b)	Two atoms (chemically) combined/two atoms in a molecule/two atoms covalently bonded	[1]	
	(c)	**(i)** Correct sharing [1] correct number of outer electrons [1] dependant on first mark dot and cross diagram [1]	[3]	
		(ii) Correctly labelled lone pairs	[1]	
	(d)	**(i)** D	[1]	
		(ii) B	[1]	13

			AVAILABLE MARKS
6	**(a)**	A regular arrangement [1] of positive ions/atoms [1] surrounded by a sea of delocalised electrons [1] [3]	
	(b)	The sea of delocalised electrons can move [1] and carry the charge [1] [2]	
	(c)	The (positive) ions/atoms can slip over one another (without disrupting the bond) [1]	6
7	**(a)**	Idea of presence of ions [1] idea of moving particles [1] idea of moving particles carrying the charge [1] e.g. the ions are free to move and carry the charge [3]	
	(b)	Is a (good) conductor of electricity [1] will not react/is inert [1] [2]	
	(c) **(i)**	$2Cl^- - 2e^- \rightarrow Cl_2$ / $2Cl^- \rightarrow Cl_2 + 2e^-$ [2]	
	(ii)	Anode [1]	
	(iii)	Bubbles [1] of green [1] gas distinctive odour of swimming pools [1] *any 2* [2]	10
8	**(a)**	All of the halogens gain one electron [1]	
	(b) **(i)**	Chlorine bromine iodine [2]	
	(ii)	Chlorine displaces bromine/bromine is formed [1] [1]	
	(iii)	$2KBr + Cl_2 \rightarrow 2KCl + Br_2$ [3]	7
		Total	**70**