



*Rewarding Learning*

General Certificate of Secondary Education  
2016–2017

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**Double Award Science:  
Chemistry**

Unit C1

Foundation Tier

[GSD21]

THURSDAY 18 MAY 2017, MORNING

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**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

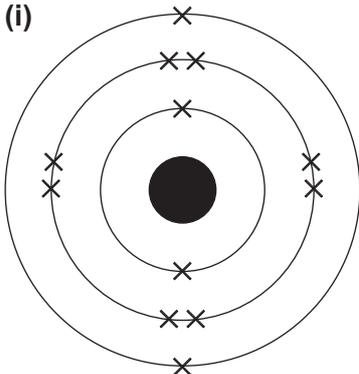
It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

			AVAILABLE MARKS		
1	(a) (i)	carbon [1] chlorine [1] sulfur [1] Any 2 × [1] any order	[2]	11	
	(ii)	1 copper [1] 2 iron [1] 3 magnesium [1]	[3]		
	(iii)	Fe	[1]		
	(b)	substance [1] atom [1]	[2]		
	(c) (i)	compound	[1]		
	(ii)	malleable [1] ductile [1] (if three boxes ticked deduct 1 from max mark)	[2]		
2	(a)	octaves [1] Newlands [1] mass [1]	[3]		8
	(b)	lighted splint [1] (squeaky) pop [1]	[2]		
	(c)	idea of having similar properties (chemical or physical) <b>or</b> all gases <b>or</b> all have valency of 1 <b>or</b> all diatomic	[1]		
	(d) (i)	O ( <b>not</b> O <sub>2</sub> <b>not</b> oxygen)	[1]		
	(ii)	hydrogen <b>or</b> helium (Accept H <b>or</b> He <b>not</b> H <sub>2</sub> )	[1]		
3	(a) (i)	electron correctly labelled [1] neutron correctly labelled [1]	[2]	5	
	(ii)	2	[1]		
	(b) (i)	idea that it must be (kept) molten <b>or</b> to ensure that <b>ions</b> are free to move	[1]		
	(ii)	bromine	[1]		

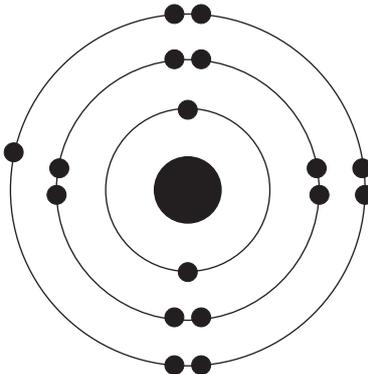
- 4 (a) (i) 2 [1]
- (ii) ethanoic acid [1]
- (iii) mol / dm<sup>3</sup> [1]
- (b) (i) (g) or g [1]
- (ii) magnesium + sulfuric  
carbonate acid  
[1] [1] [2]
- (iii) (carbon dioxide) turns limewater [1] milky/cloudy [1] [2]
- (c) (i)  $\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$   
LHS [1] RHS [1] [2]  
If wrongly balanced maximum is [1]
- (ii) colourless [1]

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- 5 (a) (i)
- 

magnesium atom  
[1]



chlorine atom  
[1]
- [2]
- (ii) magnesium (atom) loses 2 electrons [1] allow becomes 2, 8  
chlorine (atom) gains one electron [1] allow becomes 2, 8, 8 [2]
- (iii) (strong) electrostatic attraction/forces  
**or**  
(strong) attraction between oppositely charged ions [1]  
ignore reference to ionic bonding
- (b) (i) correct sharing [1]  
correct outer electrons [1]  
dot and cross [1] [3]
- (ii) covalent [1]
- (iii) two atoms in a molecule or two atoms (covalently/chemically) bonded together [1]  
ignore reference to the same element  
Not two **elements** bonded together  
Not **just** "two atoms"

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## 6 Indicative content

Safety precautions:

- Goggles
- Tongs/tweezers
- Small piece of metal
- Safety screen
- Use a large volume of water/water **trough**

Maximum number of safety points 3

Similarities:

- Floats/moves on surface
- Dissolves/disappears/gets smaller/solution formed
- Gives off gas/bubbles /fizzing
- Heat produced
- Forms a **colourless** (solution)

Maximum number of similarities 3

Differences:

- Potassium melts/forms a ball/lithium does not
- Potassium catches fire/burns with lilac flame/lithium does not ignite
- Potassium reacts faster than lithium

Maximum number of differences 3

Response	Mark
Candidates use <b>7–9</b> of the points above to describe the reactions of lithium and potassium. They use appropriate specialist terms and the spelling, punctuation and grammar and form and style are of a good standard.	[5]–[6]
Candidates use <b>4–6</b> of the points above to describe the reactions of potassium and lithium. They use appropriate specialist terms and the spelling, punctuation and grammar and form and style are of a satisfactory standard.	[3]–[4]
Candidates make reference to <b>2–3</b> of the points above using limited spelling, punctuation and grammar and the form and style are of limited standard and they have made no use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

6

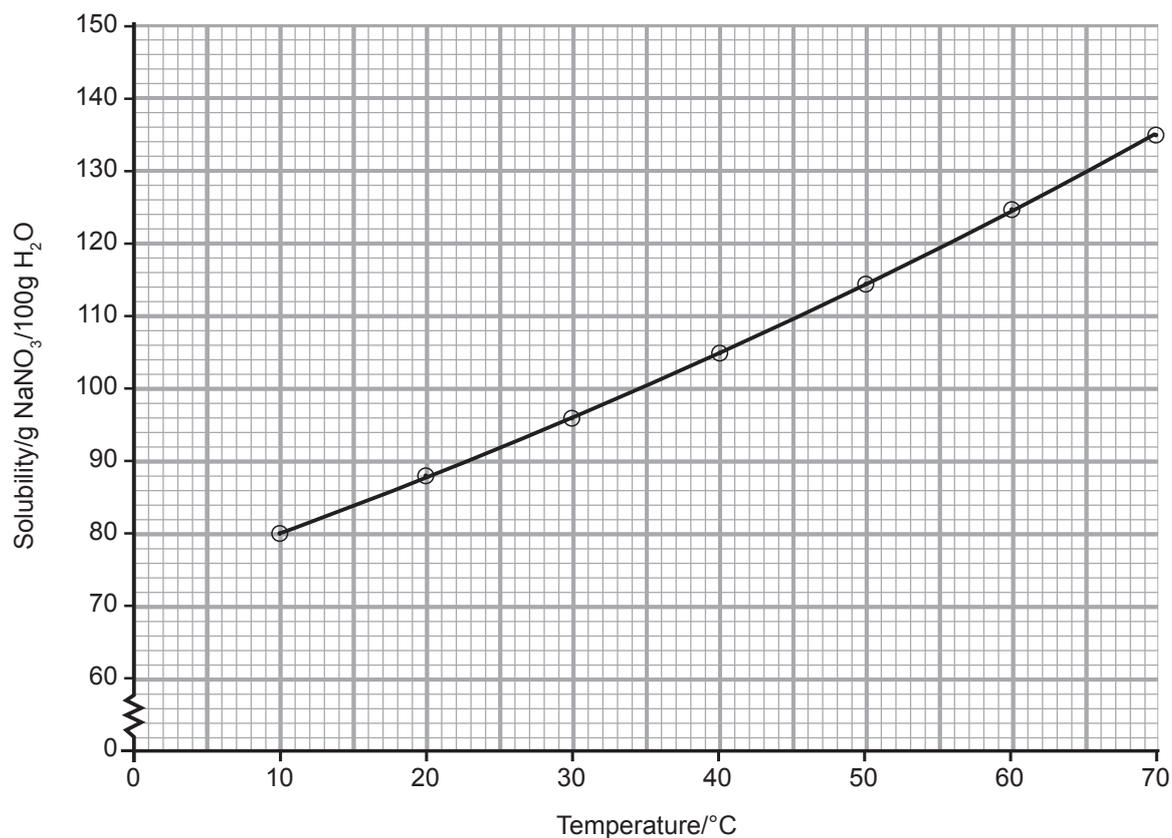
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MARKS

- 7 (a) The mass of solid required to **saturate** [1] **100 g** [1] of **water/solvent** [1] at a particular **temperature** [1]

[4]

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- (b) (i)



Correct plotting of 6 or 7 points [2] Correct plotting of 4 or 5 points [1]  
Correct curve [1] – Ignore extrapolation unless clearly wrong, e.g. dip towards origin [3]

- (ii) At 25 °C solubility is 92(g/100g H<sub>2</sub>O) Accept 92±1 (apply e.c.f.) [1]

- (c) (i) Solubility increases as temperature increases [1]

- (ii)

Substance	Solubility <b>increases</b> with temperature increase	Solubility <b>decreases</b> with temperature increase
potassium chloride	✓ [1]	
carbon dioxide		✓ [1]
copper(II) sulfate	✓ [1]	

[3]

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8 (a)

atom/ion	mass number	number of protons	number of neutrons	number of electrons
A	23 [1]	11	12	11
B	16	8	8 [1]	10
C	7	3 [1]	4	2

[3]

(b)

atom/ion	chemical symbol/formula	charge
A	Na [1]	0 [1]
B	O or O <sup>2-</sup> [1]	2 <sup>-</sup> or -2 [1]

[4]

Total

7

70

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