

New  
Specification



General Certificate of Secondary Education  
2017–2018

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**Double Award Science:  
Chemistry**

Unit C1

Foundation Tier

**[GDW21]**

THURSDAY 22 FEBRUARY 2018, 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.

1 (a)

Particle	Name
	electron [1]
	neutron [1]
	proton [1]

[3]

(b) (i) 4

[1]

(ii) 9

[1]

(c) idea that the number of protons equals the number of electrons  
NOT just 'charges cancel'

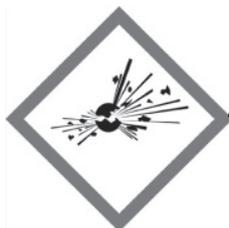
[1]

6

2 (a) (i)

Hazard symbol

Risk or danger



Severe skin burns and eye damage

Contains gas  
under pressure

Flammable

Harmful to the environment

Toxic

4 × [1]

[4]

(ii) idea that wherever you go they mean the same **or** idea they do not require the use of words **or** other correct  
NOT 'warn of danger', NOT 'eye-catching', NOT 'easily recognised'

[1]

(b) (i) red [1] and then bleaches/turns white [1]

[2]

(ii) idea that it has a swimming pool odour/pungent smell  
**or** that it is green or yellow-green in colour

[1]

(iii) seven, 7 or VII

[1]

AVAILABLE  
MARKS

9

		AVAILABLE MARKS
3	(a) Find its melting point <b>not</b> boiling point	[1]
	(b) A (single) <b>element or compound</b> [1] not mixed with another substance [1]	[2]
	(c) (i) to measure the temperature <b>of the vapour/gas</b>	[1]
	(ii) solute [1] solvent [1]	[2]
	(iii) evaporates	[1]
	(iv) condenses	[1]
	(v) distillate	[1]
	(d) idea that a fractionating column is needed	[1]
		10
4	(a) (i) ethanoic acid	[1]
	(ii) potassium hydroxide	[1]
	(iii) sodium chloride or sodium sulfate	[1]
	(b) (i) 4	[1]
	(ii) 12–14	[1]
	(c) (i) sodium nitrate [1] water [1] (either order)	[2]
	(ii) white	[1]
	(iii) neutralisation	[1]
		9
5	(a) (i) 101	[1]
	(ii) 132	[1]
	(b) (i) 48	[1]
	(ii) 35% [3] If answer wrong up to 2 method marks can be awarded	
	$14 \times 2 = 28$ [1]	
	$\frac{28^* \times 100}{80}$ or $\frac{\text{mass of nitrogen} \times 100}{80^{**}}$ [1]	
	Answer of 0.35% with work shown [2]	
	*if 14 used allow mark for recognising correct formula	
	**if "RFM $\text{NH}_4\text{NO}_3$ " used allow mark for recognising correct formula	
	if 17.5% given with method [2]	[3]
		6

			AVAILABLE MARKS	
6	(a)	(i) sodium atom: correct 2,8,1 drawing [1]	[2]	10
		oxygen atom: correct 2,6 drawing [1]		
		(ii) sodium ion: 2,8 [1]	[2]	
		oxide ion: 2,8 [1]		
(iii) Na <sub>2</sub> O	[1]			
(iv) yellow/orange	[1]			
(b)	(i)	correct sharing [1]	[3]	
		correct total number of electrons [1] second mark dependent on first dot and cross [1]		
		(ii) 3		

## 7 (a) Indicative content

- Allotrope – different forms/structures of same element
- Allotrope – in same (physical) state
- Structure A is graphite
- Structure B is diamond
  
- A/Graphite conducts electricity because electrons are free (to move)/ delocalised
- A/Graphite can be used in pencils because the layers can slide over one another
- Idea that A/Graphite can be used in pencils because layers get deposited on the paper **or** because bonds **between layers** are weak/ Van der Waals
  
- Idea that B/Diamond has a very high melting point because it has a giant/3D structure/because each carbon is bonded to 4 other carbon atoms
- Idea that diamond has a very high melting point because the structure is made up of strong (covalent) bonds which need a lot of energy to break – unless wrongly qualified
- Diamond is used in cutting tools because it is very hard

Band	Response	Mark
A	Candidates must use appropriate scientific terms throughout to describe the structures of diamond and graphite using <b>8 – 10</b> of the points in the indicative content. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates use <b>5 –7</b> of the points from the indicative content to describe the structures of diamond and graphite using some scientific terms. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use <b>2 – 4</b> of the points from the indicative content to describe the structures of diamond and graphite. They use limited spelling, punctuation and grammar and make little use of scientific terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

AVAILABLE  
MARKS

- (b) (i) idea that it has **one** layer (of carbon) [1]  
 idea that the layer is one atom thick/is graphite/is made up of hexagons [1]  
 second mark depends on first  
 for 'a single layer of graphite' [2]  
 but reference to graphite without idea of single layer [0] [2]
- (ii) (high) electrical conductivity [1]
- (iii) idea of strong covalent bonds **in a layer** [1]

**Total**

**AVAILABLE  
MARKS**

10

**60**