



Rewarding Learning

**General Certificate of Secondary Education
2016–2017**

**Double Award Science:
Chemistry**

Unit C1

Foundation Tier

[GSD21]

THURSDAY 10 NOVEMBER 2016, MORNING

**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)	Property	Description	AVAILABLE MARKS
	ductile	can be hammered into flat sheets	
		good conductor of heat	
	malleable	can be pulled into wires	
		conducts electricity when solid	
	sonorous	makes a ringing sound when hit	
	3 × [1]		[3]
(b) (i)	1. malleable [1] 2. sonorous [1]	Apply CM	[2]
(ii)	light/low density, unreactive with air, strong any suitable		[1]
			6
2 (a)	dissolve		[1]
(b)	evaporates		[1]
(c)	condenses		[1]
(d)	sublime		[1]
(e)	melt [1], freezes [1] in correct order		[2]
			6
3 (a)	A mixture of elements – mixture essential for any credit of which at least one is a metal [2] mixture of metals/mixture of elements/mixture containing at least one metal [1]		[2]
(b) (i)	50p		[1]
(ii)	24% (Accept up to 24.5%)		[1]
(iii)	94 + 76 + 70 + 76 = 316 [1] 316 ÷ 4 = [1] 79 [1] (apply e.c.f.)		[3]
(c)	resistance to corrosion/cost/colour/durability/rigidity Accept hard or other suitable not strength not malleable		[1]
			8

- 4 (a) transferred [1]
 (b) ionic [1]
 (c) strong [1]
 (d) a giant lattice structure [1]

AVAILABLE
MARKS

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5 (a)

Statement	True	False
Mendeleev arranged elements in order of atomic numbers.		✓ [1]
Newlands wrote the law of octaves.	✓ [1]	
Mendeleev was able to predict the properties of undiscovered elements.	✓ [1]	
An atom with 4 electrons in its outer shell would belong to an element in Group 4.	✓ [1]	
The elements of Group 0 are non-reactive metals.		✓ [1]

[5]

- (b) (i) alkali metals/Group 1 [1]
 (ii) Period 3 [1]
 (iii) gas [1]

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			AVAILABLE MARKS	
6	(a) (i)	lithium hydroxide [1] + hydrogen [1]	[2]	
	(ii)	12	[1]	
	(iii)	$2\text{Li} + \text{Cl}_2 \rightarrow 2\text{LiCl}$ LHS [1], RHS [1] correct balancing if formulae all correct [1]	[3]	
	(iv)	Li^+	[1]	
	(b)	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> lithium does not catch fire slower reaction idea that it does not form a ball/melt does not explode or other correct any 3 × [1] </td> <td style="width: 50%; vertical-align: top;"> potassium catches fire/lilac flame idea of faster reaction forms a ball/melts idea of exploding or other correct any 3 × [1] </td> </tr> </table>	lithium does not catch fire slower reaction idea that it does not form a ball/melt does not explode or other correct any 3 × [1]	
lithium does not catch fire slower reaction idea that it does not form a ball/melt does not explode or other correct any 3 × [1]	potassium catches fire/lilac flame idea of faster reaction forms a ball/melts idea of exploding or other correct any 3 × [1]			
(c)	corrosive to skin [1]/handle with tongs [1] or dangerous if gets into eyes [1]/wear goggles [1] or other suitable – risk and management must be linked	[2]	12	
7	(a)	Q	[1]	
	(b)	S	[1]	
	(c)	P and R both required	[1]	
	(d)	17	[1]	
	(e)	23	[1]	
	(f)	correct 2,8,7 drawing	[1]	

- 8 (a) C A B in correct order [1]
 (b) CuSO_4 [1] + H_2O [1] [2]
 (c) (i) green [1]
 (ii) carbon dioxide [1]

(d) **Indicative content**

Apparatus used

- beaker
- spatula
- filter funnel
- filter paper
- evaporating basin/dish
- tripod
- Bunsen
- (retort) stand
- clamp
- (wire) gauze

Maximum [4] IPs for apparatus

Steps

- D idea of **adding until** no more solid dissolves
- C idea of **filtering** to remove excess solid/copper oxide/residue
- A heating to remove water/to evaporate
- B (idea of) cooling to produce crystals

Colours

- copper oxide – black
- copper sulfate – blue
- dilute sulfuric acid – colourless

Safety

- goggles/care in use of Bunsen burner or other

There is a maximum of [12] IPs – apparatus [4], steps [4], colours [3], safety [1]

Response	Mark
Candidates must use appropriate scientific terms throughout to describe the method of making the crystals using 9–12 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]
Candidates use 6–8 points from the indicative content to describe the method of making the crystals using some scientific terms. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates use 2–5 of the points from the indicative content to describe the method of making the crystals. 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]
One 1 or 0 indicative points correct. Response not worthy of credit	[0]

[6]

AVAILABLE
MARKS

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9	(a)	(i)	(As the temperature rises) the solubility falls	[1]	AVAILABLE MARKS
		(ii)	chlorine	[1]	
		(iii)	carbon dioxide	[1]	
		(iv)	carbon dioxide	[1]	
		(v)	nitrogen, oxygen and chlorine [2] any two correct [1] mark only if 4 gases given and 3 are correct award [1] two correct and one incorrect [0]	[2]	
		(vi)	chlorine	[1]	
	(b)	(i)	thermal	[1]	
		(ii)	oxygen	[1]	
					9
				Total	70