



**General Certificate of Secondary Education
2017–2018**

**Double Award Science:
Chemistry**

Unit C1

Foundation Tier

[GSD21]

THURSDAY 22 FEBRUARY 2018, 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.

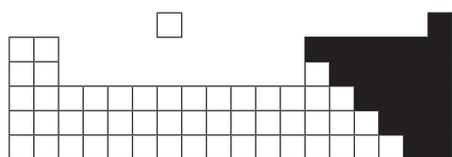
		AVAILABLE MARKS	
1	(a)		
	Label		
	Risk or danger		
	flammable		
	explosive		
	corrosive		
	irritant (also used for caution)		
	toxic	[4]	
	(b) hazard	[1]	
	(c) idea of being internationally accepted, idea that some people can't read, idea of greater visual impact	[1]	6
2	(a) solute [1], solvent [1] in correct order	[2]	
	(b) thermometer	[1]	
	(c) evaporates	[1]	
	(d) condenses	[1]	
	(e) distillate	[1]	6

3 (a) Periodic Table outline

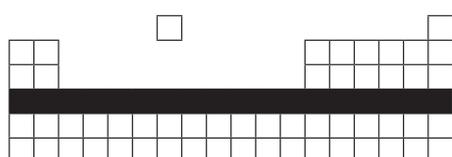


Statement about shaded area

The shaded area shows non-metals only

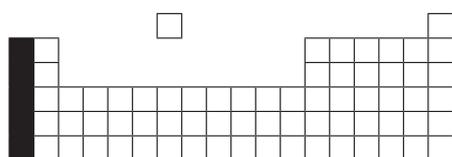


The shaded area shows Period 4 only



The shaded area shows transition metals only

The shaded area shows Group 4 only



The shaded area shows the alkali metals only

[4]

- (b) Arranged in order of **atomic mass**, [1] **left gaps** (for undiscovered elements) [1]
 arranged in Groups/Periods [1]
 Max. 2 × [1]

[2]

6

4 (a) (i) ethanoic acid

[1]

(ii) potassium hydroxide

[1]

(iii) sodium chloride or sodium sulfate

[1]

(b) (i) 10

[1]

(ii) 0–2

[1]

(c) (i) potassium chloride [1] water [1] (either order)

[2]

(ii) neutralisation

[1]

8

- 5 (a) correct electronic arrangement 2,3 [1]
 diagram showing protons and neutrons in the nucleus [1]
 5 protons [1]
 6 neutrons [1] [4]

(b) idea of equal numbers of protons and electrons not just 'charges cancel' [1]

(c) (total) number of protons and neutrons, [1] in an atom/nucleus [1]
 second mark dependent on first [2]

(d) isotopes [1]

6 (a) (i) 2 [1]

(ii) 1 [1]

(iii) XY_2 not CaF_2 not Y_2X not XY^2 [1]

(b) correct sharing [1]
 correct total number of electrons [1]
 dot and cross [1] [3]

(c) Covalent bonds are strong and need a lot of energy to break them [1]

7 (a)

	Statement	True or False
A	The electrodes in both processes can be made of carbon/graphite	True
B	Aluminium is formed at the cathode but lithium is formed at the anode	False
C	The anodes, in both processes, gradually disappear	False
D	The electrolyte in both processes is molten	True
E	The current is carried by ions in both processes	True

Each correct answer = [1] [5]

(b) bauxite [1]

(c) costs less/uses less energy [1]
 reduces waste [1] conserves natural resources [1]
 or other correct, e.g. reduces amount of CO_2 released
 Max. $2 \times [1]$ [2]

AVAILABLE
MARKS

8

7

8

			AVAILABLE MARKS		
8	(a)	7 or 8 points correctly plotted [2] 5 or 6 points correctly plotted [1] Points joined to form a smooth curve/line [1]	[3]	5	
	(b)	the solubility increases as the temperature increases	[1]		
	(c)	51.25	[1]		
9	(a)	41.7 % other metals	[1]	10	
	(b)	they are mixtures of more than one element (implied) [1] they contain at least one metal [1] second mark depends on 'mixture' for this particular question 'mixture of metals' [2]	[2]		
	(c)	(i)	the higher the number of carats (or equivalent) the lower the hardness		[1]
		(ii)	18 carat gold		[1]
	(d)	Idea that it has a high gold content [1] Idea that it is hard(er)/won't go out of shape easily [1] Accept use of specific gold	[2]		
	(e)	$\text{£}11.60 \times 5 = \text{£}58$ [1] or $\text{£}28.30 - \text{£}11.60 = \text{£}16.70$ [1] $\text{£}28.30 \times 5 = \text{£}141.50$ [1] $\text{£}16.70 \times 5$ [1] = $\text{£}83.50$ $\text{£}141.50 - \text{£}58 = \text{£}83.50$ Correct answer gains all [3]	[3]		

10 Indicative content

- Allotrope – different forms 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 wrong 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 8–10 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 5–7 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 2–4 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]

TotalAVAILABLE
MARKS

6

70