

New
Specification



General Certificate of Secondary Education
2018–2019

**Double Award Science:
Chemistry**

Unit C1

Higher Tier

[GDW22]

THURSDAY 8 NOVEMBER 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	<p>(a) Any three from: gaps (for undiscovered elements) no transition element block in order of atomic mass no lanthanides/actinides or fewer elements or other correct accept converse consistent answers 3 × [1]</p>	[3]
	<p>(b) (i) lack of reactivity/more stable/do not form compounds [1] idea of being odourless/colourless or other correct e.g. idea of (some) being rare [1]</p>	[2]
	<p>(ii) colourless</p>	[1]
		6
2	<p>(a) mixture* designed as useful product [1] (carefully) measured quantities/proportions [1] ensure product has required properties [1] * unless wrong qualified</p>	[3]
	<p>(b) filtration</p>	[1]
	<p>(c) Any two of: magnesium hydroxide/powder/solid disappears or dissolves colourless solution formed heat released not fizzing/bubbles etc. i.e. if this answer given max mark is [1] 2 × [1]</p>	[2]
		6

- 3 (a) (i) 66 [1]
 (ii) 46 [1]

(b) (i)

Atom OR Ion	Atomic number	Mass number	Number of electrons	Electronic configuration
Q	3	7	2	2
R	11	23	11	2,8,1
S	17	37	17	2,8,7
T	19	39	18	2,8,8
U	14	28	14	2,8,4
V	8	16	10	2,8

[1] per column correct [4]

- (ii) Q, T and V all needed
 [2] marks for all 3 correct
 [1] mark for 2 correct
 if 4 answers given – 3 correct = [1], 2 correct = [0] [2]

(c) $\frac{30 \times 203 + 70 \times 205}{100}$ [1] = 204.4 [1]

Correct answer alone gets both marks [2] 10

- 4 (a) Any **two** from:
 melts/forms a ball
 disappears/dissolves
 idea of vigorous reaction (allow e.g. sparks allow yellow or orange flame)
colourless solution remains
not moving on surface or floating
not fizzing or equivalent
not heat release
 Any 2 × [1] [2]

- (b) $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$
 correct formulae of reactants [1]
 correct formulae of products [1]
 correct balancing (if all formulae correct) [1] [3]

- (c) (i) lilac flame [1]
 sparks*/crackle/explosion [1] [2]
 sparks* if not given in 4(a)

- (ii) both lose one electron [1] to have a stable electron configuration [1] [2] 9

5 (a) Indicative content

Sublimation:

- Grey-black **or** dark grey solid (in bottom of boiling tube)
- **Purple** vapour/gas (rises up boiling tube) (without liquid state)
- Idea that (grey-black **or** dark grey) solid/crystals form on sides of/near top of boiling tube

Fume cupboard:

- Iodine (vapour) is **poisonous/toxic not harmful not dangerous**

Sublimation reason:

- Forces **between** molecules (in a molecular covalent substance) are weak/Van der Waals
- Idea that these weak/Van der Waals' forces need little energy to break

Band	Response	Mark
A	Candidates must use appropriate scientific terms throughout to describe and explain the sublimation of iodine using 5–6 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 3–4 points from the indicative content to describe and explain the sublimation of iodine 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 of the points from the indicative content to describe and explain the sublimation of iodine. 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]

(b) Test: **damp** universal indicator **paper** [1]

Result: turns red [1] and then bleaches [1]

[3]

(c) $\text{Cl}_2 + 2\text{KBr} \rightarrow \text{Br}_2 + 2\text{KCl}$

LHS [1] RHS [1] balancing if all formulae correct [1]

[3]

12

AVAILABLE
MARKS

			AVAILABLE MARKS	
6	(a) (i)	116	[1]	
	(ii)	400	[1]	
	(b)	idea of (numerically) equal to the relative formula mass	[1]	
	(c) (i)	0.02 moles	[1]	
	(ii)	2:1 ratio between $\text{Fe}(\text{OH})_3$ and Fe_2O_3 [1] 0.01 moles Fe_2O_3 [1] theoretical yield = $0.01 \times 160 = 1.6$ [1] correct answer gains all [3] marks – up to 2 method marks available each error reduces maximum by 1 mark apply ECF for 0.02 moles of $\text{Fe}(\text{OH})_3$	[3]	7
7	(a)	shared pair of electrons	[1]	
	(b)	correct sharing [1] correct total number of electrons [1] dot and cross [1]	[3]	
	(c)	7	[1]	5
8	(a)	delocalised [1] electrons [1]	[2]	
	(b)	attraction [1] between positive ions and (delocalised) electrons [1]	[2]	
	(c)	(delocalised) electrons can move [1] and carry charge [1]	[2]	
	(d)	layers* of (positive) ions [1] can move/slide over each other [1] without disrupting the bonding [1] *accept 'layers' unless wrongly qualified	[3]	9
9	(a)	H_2CO_3	[1]	
	(b)	It is partially ionised/only some molecules dissociate to give hydrogen ions [1] in water/solution [1] second mark dependent on first	[2]	
	(c)	$\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$ LHS [1] RHS [1] state symbols – if all formulae correct [1]	[3]	6
			Total	70