



**General Certificate of Secondary Education
2022**

Double Award Science: Chemistry

Unit C2

Foundation Tier

[GDW51]

MONDAY 20 JUNE, 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.

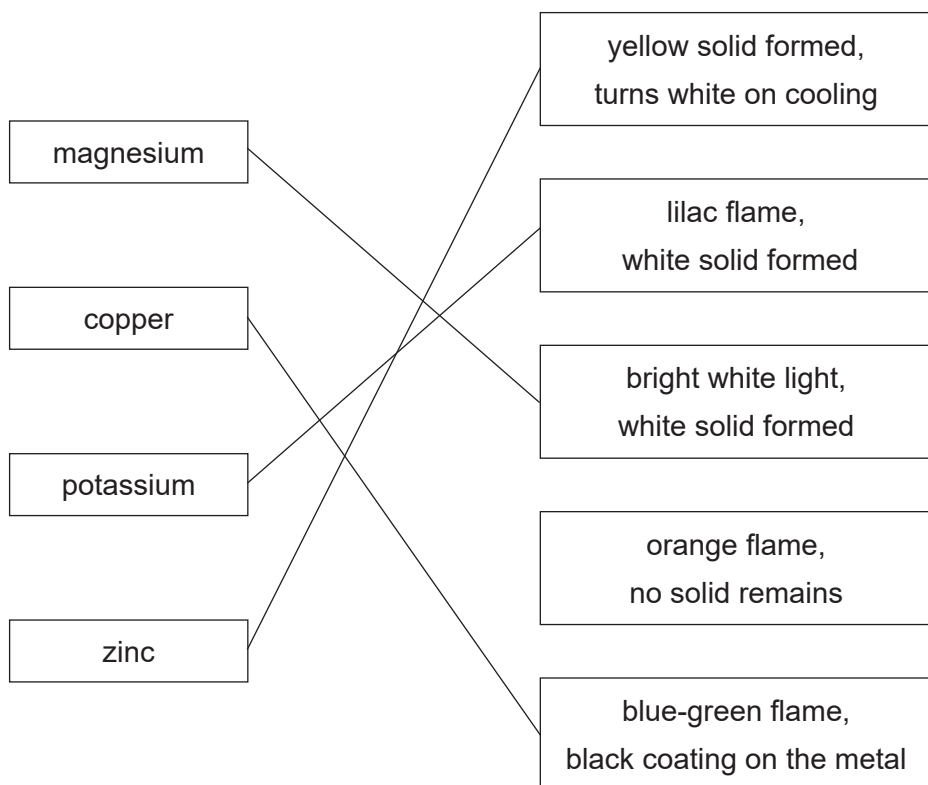
It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience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

COVID-19 context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021-2022 only.

1 (a) (i)

metal

observation from reaction
with airAVAILABLE
MARKS

(4 × [1])

[4]

(ii) potassium
magnesium
zinc
copper

[1]

(iii) → magnesium oxide + hydrogen

[1]

(iv) copper

[1]

(b)

observation	tick (✓) if correct
a green gas is given off	
the blue solution turns colourless	✓
a red-brown solid is formed	✓
no solid remains at the end	

2 correct = [2]; 1 correct = [1]

if 3 ticked – 2 correct + 1 wrong = [1]; 1 correct + 2 wrong = 0

[2]

9

			AVAILABLE MARKS
2	<p>(a) air [1] water [1] NB 1st and 2nd answers can be either order</p> <p>(b) (i) Idea that they prevent iron coming in contact with air/water/oxygen/ moisture</p> <p>(ii) any two from: painting, plastic coating, metal coating, galvanising (2 × [1])</p> <p>(c) hydrated [1] iron (III) oxide [1]</p>	<p>[2]</p> <p>[1]</p> <p>[2]</p> <p>[2]</p>	7
3	<p>(a) (i) nitrogen [1] water vapour [1]</p> <p>(ii) 21%</p> <p>(b) tasteless [1] odourless [1]</p> <p>(c)</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>use</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">fire extinguishers</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">welding</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">weather balloons</div> <div style="border: 1px solid black; padding: 5px;">food packaging</div> </div> <div style="text-align: center;"> <p>gas</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">hydrogen</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">nitrogen</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">carbon dioxide</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">chlorine</div> <div style="border: 1px solid black; padding: 5px;">oxygen</div> </div> </div> <p>(4 × [1])</p> <p>(d) Any three of: yellow solid OR solid disappears OR no solid remains blue flame pungent/bad smell/odour melts/forms a liquid brown/red liquid formed (3 × [1])</p>	<p>[2]</p> <p>[1]</p> <p>[2]</p> <p>[4]</p> <p>[3]</p>	12

- 4 (a) anode [1]
inert [1] [2]
- (b) (i) reduces melting point (unless wrongly qualified)/improves electrical conductivity/reduces the OPERATING temperature [1]
- (ii) good conductor of electricity/cheap/readily available/high melting point [1]
- (iii) tapped off/run off/drained off [1]
- (iv) oxygen [1] carbon dioxide [1] [2]
- (v) Any **one** of:
saves energy/reduces waste/saves natural resources/reduces carbon dioxide emissions/cheaper [1]

8

- 5 (a) CH₂ [1] chemical [1] physical [1] [3]

(b)

name	molecular formula	structural formula	physical state at room temperature
	C ₂ H ₆ [1]		Gas [1]
propane [1]		$ \begin{array}{ccccc} & \text{H} & & \text{H} & & \text{H} \\ & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - \text{H} \\ & & & & & \\ & \text{H} & & \text{H} & & \text{H} \end{array} $ <div style="text-align: right;">[1]</div>	

[4]

- (c) distillation [1]

- (d) (i) diesel [1]

- (ii) naptha [1]

- (e) (i) water *allow* H₂O [1]

- (ii) A lighted splint is used ☐
- Limewater is used ☒ [1]
- Anhydrous copper(II) sulfate is used ☐
- There is a colour change from colourless to milky white ☒ [1]
- There is a colour change from white to blue ☐
- There is a squeaky pop ☐ [2]

13

- 6 (a) (i) endothermic [1]
- (ii) exothermic [1] given out (or equivalent) [1] [2]
- (b) (i) $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
All formulae correct and in an equation [1] reversible sign [1]
Balancing – if all formulae correct [1] [3]
- (ii) explicit idea that (reactants can change into products and)
products can change (back) into the reactants. [1]

AVAILABLE
MARKS

7

7 Indicative points

Greenhouse effect (global warming)

- sea levels rise
- flooding/drought/hurricanes/tornados/storms/tropical storms/tsunamis/
extreme weather events/climate change
- melting of ice caps/icebergs
- 2IPs habitat loss/crop (or vegetation) loss/forest fires/death of animals/
bleaching of coral reefs

Max 4IPs

Acid rain

- idea of destroying/damage to buildings/statues/named limestone features/
metals/concrete/gravestones
- destroying/damage to vegetation/defoliating trees
- fish killed (in rivers/lakes) **NOT** oceans/seas

Carbon monoxide release

- is toxic/poisonous
- idea of combining with haemoglobin in the blood/reduces its capacity to carry
oxygen)

Response	Marks
Candidates must use specialist terms throughout, 7–9 indicative points required. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates use some specialist terms throughout, 4–6 indicative points required. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates give 2–3 of the indicative points. They use limited spelling, punctuation and grammar and make little use of specialist terms.	[1]–[2]
Response not worthy of credit. Candidates make reference to less than 2 of the points above and offer no other suitable response.	[0]

[6]

6

				AVAILABLE MARKS
8	(a)	blue [1] white [1] anhydrous [1]	[3]	
	(b)	(i) 169	[1]	
		(ii) 203	[1]	
	(c)	(i) crucible/evaporating dish	[1]	
		(ii) explicit idea that the mass will remain constant	[1]	
		(iii) calcium oxide	[1]	8
	Total			70