



Rewarding Learning

**General Certificate of Secondary Education
2024–2025**

**Double Award Science
Chemistry**

Unit C1

Higher Tier

[GDW22]

MONDAY 19 MAY 2025, MORNING

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCSE Double Award Science.

Candidates must:

- AO1** Demonstrate knowledge and understanding of:
- scientific ideas; and
 - scientific techniques and procedures;
- AO2** Apply knowledge and understanding of and develop skills in:
- scientific ideas; and
 - scientific enquiry, techniques and procedures; and
- AO3** Analyse scientific information and ideas to:
- interpret and evaluate;
 - make judgements and draw conclusions; and
 - develop and improve experimental procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. The exception to this for GCSE Double Award Science is when examiners are marking complex calculations when the Examiners are briefed to mark by error or omission. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'carry error through' rule so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

In deciding which level of response to award, examiners should look for the number of indicative content points in candidate responses to ensure that the answer has been written to coincide with the question. In deciding which mark within a particular level to award to any response, quality of communication will be assessed and examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- ***Threshold performance:*** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- ***High performance:*** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of bands of response. The description for each band of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within bands of response as follows:

Band A: Quality of written communication is excellent.

Band B: Quality of written communication is good.

Band C: Quality of written communication is basic.

Band D: Response not worthy of credit.

In interpreting these band descriptions, examiners should refer to the more detailed guidance provided below:

Band A (Excellent): Excellent reference to scientific terminology. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

Band B (Good): Good reference to scientific terminology. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Band C (Basic): Basic reference to scientific terminology. The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Where one response is required to gain a mark, candidates will not gain credit if a correct response is given alongside one or more incorrect responses.
This is referred to as listing.

- 1 (a) atomic mass [1]
noble gases [1]
left gaps [1] [3]
- (b) P/As [1]
K [1]
N/O/F [1] [3]
- (c) (use) tongs/large volume of water/use small piece of sodium/safety screen
(Any two) [2]
- (d) (i) $\text{Br}_2 + 2\text{I}^- \rightarrow 2\text{Br}^- + \text{I}_2$
reactants [1] products [1] balancing [1] [3]
- (ii) colourless [1] yellow/brown [1] [2]

AVAILABLE
MARKS

13

2 (a) (i) The number of protons (in the nucleus of an atom) [1]

(ii) 2,8 [1]
Charge 2−/−2 [1] [2]

(b) Indicative Content

Define the term isotopes

- (Atoms of the same element with the) same atomic number/number of protons
- Different number of neutrons/mass number

Position of protons, neutrons and electrons in an atom of chlorine

- Protons found in the nucleus
- Neutrons found in the nucleus
- Electrons found in shells

Number of protons, neutrons and electrons in atoms of chlorine-35 and chlorine-37

- Chlorine-35 has 17 protons and chlorine-37 has 17 protons/both have 17 protons
- Chlorine-35 has 17 electrons and chlorine-37 has 17 electrons/both have 17 electrons
- Chlorine-35 has 18 neutrons
- Chlorine-37 has 20 neutrons

Band	Response	Mark
A	Candidates must use appropriate specialist terms including a minimum of 7–9 points of indicative content. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use appropriate specialist terms including a minimum of 4–6 points of indicative content. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates brief and partial response includes a minimum of 2–3 points of indicative content. They use limited spelling, punctuation and grammar and they have made little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

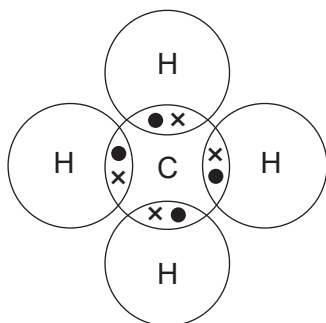
[6]

AVAILABLE
MARKS

9

			AVAILABLE MARKS												
3	(a) HCl/CO [1] 14 [1] 2 [1]	[3]	6												
	(b) calcium carbonate [1] magnesium hydrogencarbonate [1]	[2]													
	(c) NaCl H ₂	[1]													
4	(a) Ethanoic acid pH = 3–6 [1] Sodium hydroxide pH = 12–14 [1]	[2]													
	(b)														
	<table><tr><th>Substance</th><th>pH</th><th>Rank order of hydrogen ion concentration (1 being the highest concentration and 3 being the lowest)</th></tr><tr><td>lemon juice</td><td>4</td><td>2</td></tr><tr><td>shampoo</td><td>6</td><td>3</td></tr><tr><td>battery acid</td><td>1</td><td>1</td></tr></table>		Substance	pH	Rank order of hydrogen ion concentration (1 being the highest concentration and 3 being the lowest)	lemon juice	4	2	shampoo	6	3	battery acid	1	1	[1]
Substance	pH	Rank order of hydrogen ion concentration (1 being the highest concentration and 3 being the lowest)													
lemon juice	4	2													
shampoo	6	3													
battery acid	1	1													
	(c) MgO + 2HCl → MgCl ₂ + H ₂ O reactants [1] products [1] balancing [1]	[3]	7												
	(d) OH ⁻	[1]													

5 (a)



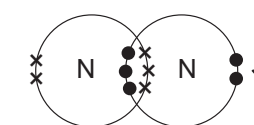
correct sharing [1] all of electrons correct [1] dot and cross [1]
Each mark is dependent on the previous mark

[3]

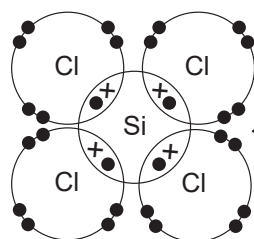
(b)

Dot and cross diagram

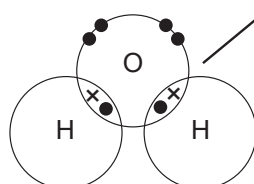
Description



has four covalent bonds



has the same number of lone pairs
as shared pairs of electrons



has a triple covalent bond

has no lone pairs

3 × [1]

[3]

(c) the attraction between [1] the positive ions (in a regular lattice) [1]
and the delocalised electrons [1]

[3]

9

6	(a)	102 [1] 148 [1]	[2]	AVAILABLE MARKS
	(b) (i)	$112/292 \times 100$ [1] = 38.356 [1] %	[2]	
	(ii)	0.05	[1]	
	(iii)	moles of iron chloride 0.1 [1] 16.25 g [1] 16.3 g [1]	[3]	
	(iv)	side reactions/loss of product in separation/reaction not gone to completion	[1]	9
7	(a)	spot marked accurately at 3 cm above the X	[1]	
	(b)	base line labelled	[1]	
	(c)	D4	[1]	
	(d)	solvent front	[1]	
	(e)	D1	[1]	
	(f)	capillary tube/pipette	[1]	6
8	(a) (i)	A = diamond [1] B = graphite [1]	[2]	
	(ii)	carbon atom	[1]	
	(iii)	covalent bond	[1]	
	(iv)	van der Waals forces	[1]	
	(b) (i)	strong ionic bonds [1] require substantial energy to break [1]	[2]	
	(ii)	ions [1] can move and carry charge [1]	[2]	
	(c) (i)	1–100	[1]	
	(ii)	potential cell damage/harmful to environment	[1]	11
Total				70