CAMBRIDGE
International Education

Cambridge IGCSE™ (9–1)

CHEMISTRY **0971/31**

Paper 3 Theory (Core) **May/June 2026**

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
^	information missing or insufficient for credit
BOD	benefit of doubt given
CON	contradition in response, mark not awarded
✗	incorrect point or mark not awarded
●	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
ECF	error carried forward applied
I	incorrect or insufficient response, mark not awarded
NAQ	response has not answered question
NBOD	benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied
R	incorrect point or mark not awarded
SEEN	blank page seen

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Annotation	Meaning
✔	correct point of mark awarded

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Question	Answer	Marks	Guidance
1(a)(i)	D	1	ALLOW C_3H_8 IGNORE name
1(a)(ii)	B	1	ALLOW C_2H_5OH IGNORE name
1(a)(iii)	A	1	ALLOW H_2O IGNORE name
1(a)(iv)	D	1	ALLOW C_3H_8 IGNORE name
1(a)(v)	E	1	ALLOW $(C_2H_4)n$ -$(CH_2$-$CH_2)$-n IGNORE name
1(a)(vi)	A	1	ALLOW H_2O IGNORE name
1(b)(i)	C (1) D (1)	2	C_2H_4 C_3H_8 ALLOW: E, -$(C_2H_4)n$ -$(CH_2$-$CH_2)$-n IGNORE names
1(b)(ii)	A (1) B (1)	2	H_2O, C_2H_5OH IGNORE names

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Question	Answer	Marks	Guidance
2(a)(i)	values between –6 °C and +183 °C (inclusive of these values)	1	
2(a)(ii)	values between 3.2 and 8.9 (inclusive of these values)	1	IGNORE units
2(a)(iii)	liquid (1) –1 °C is lower than the boiling point but higher than the melting point / –1 °C is between the melting point and boiling point / –1 °C is more than –7 °C AND less than +59 °C	2	Mark independently ALLOW molten IGNORE melted ALLOW: it is between the melting and boiling points ALLOW: melted but not boiled yet IGNORE: values quoted but not used
2(a)(iv)	gas	1	
2(b)(i)	displacement	1	ALLOW redox ALLOW 'reduction AND oxidation'
2(b)(ii)	2 (NaI) (1) I_2 (1)	2	 Reject 2 I_2
2(b)(iii)	bromine less reactive than chlorine / chlorine more reactive than bromine	1	ALLOW 'It' to mean bromine IGNORE: bromine below chlorine in Group VII REJECT: bromine less reactive than chloride / bromine less reactive than sodium
2(b)(iv)	bonding pair of electrons between bromine atoms (1) 6 non-bonding electrons on each bromine atom (1)	2	NOTE: electrons do not have to be paired ALLOW: all dots, all crosses or any mixture IGNORE: inner electrons

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Question	Answer	Marks	Guidance
3(a)	aqueous	1	ALLOW dissolved in water / solvent ALLOW In solution IGNORE mixed with water IGNORE soluble / can dissolve
3(b)(i)	(gas) syringe	1	ALLOW: measuring cylinder/burette over water IGNORE measuring cylinder unqualified CON other apparatus
3(b)(ii)	16 (cm^3)	1	ALLOW 15.5 to 16.5
3(b)(iii)	40 (seconds) (1)	1	ALLOW 39–40
3(b)(iv)	all of the **magnesium** has been used up / all of the **magnesium** has reacted	1	ALLOW Mg for magnesium ALLOW Mg has fully reacted ALLOW All the Mg has dissolved / disappeared ALLOW all the metal has reacted IGNORE all the reactant has reacted
3(b)(v)	steeper gradient with line starting at (0,0) (1) line levels off at 35 cm^3 AND not hitting original line before it's reached 35 cm^3 AND before 35 s (1)	2	Starts at (0,0) away from y-axis by (1,5) (within half a small square) No more than 2 squares high following the original line. ALLOW: overshoot 1 small square at 35 cm^3 AND return ½ small square. ALLOW splitting and rejoining lines if either line could be ok.

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Question	Answer	Marks	Guidance
3(b)(vi)	rate slower / more slowly / decrease	1	comparative answer ALLOW: reaction slows down IGNORE: reference to time IGNORE: reference to hydrogen volume
3(c)(i)	rate faster / reaction speeds up / increase	1	comparative answer IGNORE: reference to time IGNORE: reference to hydrogen volume
3(c)(ii)	filtration(1) dry(1) weigh the catalyst and the mass will be the same / weigh the catalyst and the mass will be 1 g (1)	3	ALLOW: filter / use filter paper IGNORE decant / centrifuge / sieve IGNORE heat The idea that the mass will be the same ALLOW mass / weight / amount

Question	Answer	Marks	Guidance
4(a)(i)	circle around COOH group	1	
4(a)(ii)	$C_7H_{10}O_3$	1	ALLOW: any order REJECT: ‘$C^7H^{10}O^3$‘ ‘C_7 , H_{10} , O_3’

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Question	Answer	Marks	Guidance
4(a)(iii)	contains carbon-carbon double bond(s) / contains C=C bond(s)	1	ALLOW: double bond between carbons / carbon double bond IGNORE: reference to double bonds unqualified / carbon bonds are not single IGNORE: reference to not maximum amount of hydrogen
4(b)(i)	property: have different boiling points (1) how it works: (any 3 points) • heat / vaporise / use **high** temp / temp over 200 °C • temperature gradient (in column) OR (column) cooler at top ora OR low bp at top OR high bp at bottom (of column) • condensing (of gas) • (collection as) liquids	4	IGNORE melting points ALLOW chamber(s) for column
4(b)(ii)	bitumen: (making) roads (1) fuel oil: fuel for ships / or home heating (1)	2	ALLOW: (sealing) roofs / bituminous paint / asphalt / tarmac IGNORE: fuel (unqualified) ALLOW: produce electricity
4(c)(i)	carbon dioxide (1) water (1)	2	ALLOW: formula ALLOW: hydrogen oxide
4(c)(ii)	substitution	1	

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Question	Answer	Marks	Guidance
5(a)	1 mark each for any two of: • has a definite shape / does not take the shape of the container • has a definite volume / fixed volume • does not spread over surface / does not flow • cannot be compressed	**2**	Read across the lines for the two marking points. ALLOW: has a fixed shape / rigid shape / fixed form IGNORE: hardness and strength IGNORE: references to particle arrangement

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Question	Answer	Marks	Guidance
5(b)	solid: separation of particles: touching / close together (1) arrangement: regular / fixed pattern (1) gas: separation of particles: far apart / long way from each other (1) arrangement: irregular / no (particular) arrangement / random (1)	**4**	Answers within the correct box only not read across. ALLOW particle diagrams (do not need to be labelled). If a diagram and written answer given, both must be correct. ALLOW: packed / no spaces / no separation ALLOW: lattice / uniform (pattern) in lines / rows / layers IGNORE: distance between particles / near each other / fixed arrangement / fixed positions / fixed / very arranged If diagram drawn, two rows of three minimum ALLOW: apart / distant spread out lots of space particles away from each other widely separated large gaps IGNORE separate (unqualified) ALLOW: not ordered Ignore 'move randomly'

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Question	Answer	Marks	Guidance
5(c)	all three correct = 2 marks one correct = 1 mark carbon dioxide gas turns into liquid carbon dioxide: condensing ice turns into water: melting liquid nitrogen changes into nitrogen gas: boiling	**2**	
5(d)	(pressure) increases	**1**	comparative answer

Question	Answer	Marks	Guidance
6(a)(i)	IV / 4	**1**	
6(a)(ii)	electrons: 25 (1) neutrons: 32 (1) protons: 27 (1)	**3**	

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Question	Answer	Marks	Guidance
6(b)	one mark each for any two of: • high densities • high melting point / high boiling point • act as catalysts	**2**	ALLOW solid at room temperature ALLOW as additional marking points: • variable oxidation number / ions • malleable • ductile • sonorous • (good) conductor of **heat** / **electricity** • shiny • hard • strong
6(c)(i)	4 (Co) and 3 (O_2) (1)	**1**	
6(c)(ii)	basic because cobalt is a metal	**1**	ALLOW: basic as cobalt is on the left of the Periodic Table / basic because it's a metal
6(d)(i)	decomposition of an ionic compound (when molten or in aqueous solution) (1) by the passage of an electric current (1)	**2**	independent marks ALLOW: breaking down of an ionic compound. ALLOW: using electricity IGNORE conduction of electricity only IGNORE generation of electricity
6(d)(ii)	platinum / Pt	**1**	Allow gold / Au

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Question	Answer	Marks	Guidance
6(d)(iii)	negative electrode: cobalt (1) positive electrode: chlorine (1) observations: (yellow-)green vapour (1)	**3**	NOTE: correct products at wrong electrodes = 1 mark REJECT: charges on products ALLOW: Co ALLOW: Cl / Cl_2 REJECT: chloride ALLOW: green gas / green bubbles IGNORE: smell NOTE: No ECF if reversed
6(e)	183 (2 marks) IF 2 marks not scored allow 1 mark for: N = 28 OR O = 96	**2**	

Question	Answer	Marks	Guidance
7(a)	78 (%)	**1**	
7(b)(i)	combustion of fossil <u>fuels</u>	**1**	ALLOW: volcanoes ALLOW combustion of sulfur-containing <u>fuels</u> IGNORE reference to engines
7(b)(ii)	acid rain	**1**	
7(b)(iii)	pH 3	**1**	

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Question	Answer	Marks	Guidance
7(c)	sewage: (contains microbes) which cause **disease** (1) phosphates: (harm to aquatic life by) deoxygenation of water (1)	**2**	ALLOW: causes **disease** (unqualified) ALLOW sickness for disease ALLOW named water-borne disease e.g. cholera, typhoid ALLOW decrease oxygen levels ALLOW it removes oxygen ALLOW lack of oxygen / decrease concentration of oxygen ALLOW eutrophication IGNORE : kills marine life
7(d)(i)	nitrogen / phosphorus / potassium	**1**	NOTE: need all three IGNORE phosphate / nitrate / ammonia IGNORE phosphor
7(d)(ii)	improved plant growth	**1**	ALLOW: to make crops: grow better grow fast(er) / increase growth of plant boost / increase / improve growth healthy growth ALLOW: to increase yield / more crops IGNORE: helping plant growth reference to soil health / give nutrients reference to pesticides / killing bugs

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Question	Answer	Marks	Guidance
7(e)	chloride ion test: (add nitric acid/ acidify) add (aqueous) silver nitrate (1) observations: white precipitate (1)	2	mark independently ALLOW sulfuric acid REJECT hydrochloric acid

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