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CAMBRIDGE
International Education

Cambridge IGCSE™

CHEMISTRY **0620/41**

Paper 4 Theory (Extended) **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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Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	'List rule' guidance For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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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
	benefit of doubt given
	contradiction 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
	error carried forward applied
	incorrect or insufficient response, mark not awarded
	response has not answered question
	benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied
	incorrect point or mark not awarded
	blank page seen

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Annotation	Meaning
✓	correct point of mark awarded

Mark Scheme Abbreviations	
;	separates marking points
/	alternative responses for the same marking point
R	reject the response
A	allow/accept the response
I	ignore the response
CON	contradiction in response, no mark
ecf	error carried forward
ora	or reverse argument
AW	alternative wording
underline or **bold**	actual word given must be used by candidate (grammatical variants excepted)
( )	the word / phrase in brackets is not required but sets the context
max	indicates the maximum number of marks that can be given
MP / M	marking point

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Question	Answer	Marks	Guidance
1(a) to **1 (f) ALLOW** equations instead of letters **A to J.**			
1(a)	G	**1**	**ALLOW** calcium carbonate → calcium oxide + carbon dioxide
1(b)	I	**1**	**ALLOW** sulfur dioxide + oxygen → sulfur trioxide
1(c)	H	**1**	**ALLOW** $C_8H_{18} \rightarrow C_6H_{14} + C_2H_4$
1(d)	E	**1**	**ALLOW** $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
1(e)	F	**1**	**ALLOW** $N_2 + 3H_2 \rightarrow 2NH_3$
1(f)	B	**1**	**ALLOW** $2KBr + Cl_2 \rightarrow 2KCl + Br_2$
1(g)	D	**1**	**ALLOW** glucose → ethanol + carbon dioxide

Question	Answer	Marks	Guidance
Q2(a) REJECT wrong formulas in all parts e.g. chlorine / C is **CON e.g.** silver / AG is **CON** **REJECT** wrong names e.g. chloride / Cl_2 is **CON**			
2(a)(i)	Al / aluminium	**1**	
2(a)(ii)	Br_2 / Br / bromine	**1**	
2(a)(iii)	V / vanadium	**1**	
2(a)(iv)	Cl_2 / Cl / chlorine	**1**	
2(a)(v)	N_2 / N / nitrogen	**1**	
2(a)(vi)	Si / silicon	**1**	**REJECT** silicone

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Question	Answer	Marks	Guidance
2(b)(i)	**M1** same number of protons(1) **M2** different number of neutrons(1)	**2**	The word 'number' or equivalent need only be used once The word atom is not required in the answer(it is in the question) <u>SALVAGE MARK</u> **IF number** or equivalent is **not** seen **1 mark** can score e.g. for same protons different neutrons **IGNORE** location of particles **IGNORE** if molecules / elements / substances etc. are given instead of atoms **M1 ALLOW** same proton number **M2 ALLOW** different neutron number **REJECT** different number of electrons

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Question	Answer	Marks	Guidance
2(b)(ii)	**M1** [(80 × 24) + (10 × 25) + (10 × 26)] **OR** 2430(1) **M2** 2430 ÷ 100 = 24.3(1)	**2**	**IGNORE** units **M1** is for multiplication of correct (mass × abundance) for **ALL** 3 isotopes (addition sign is not necessary and **IGNORE** any other mathematical operations e.g. division or subtraction) **ALLOW** [(24 × 0.8) and (25 × 0.1) and (26 × 0.1)] or [(24 × 8) and (25 × 1) and (26 × 1)] or [(24 × 8) and 25 and 26] or 243 **ALLOW** if the 3 expressions are not added **IGNORE** missing brackets / brackets used incorrectly e.g. (80 × 24) + 10 × 25 + (10 × 26) ÷ 24 × 0.8 + 25 × 0.1 + 26 × 0.1 both score **M1** **M2 ALLOW** ECF ONLY for correct division of a transcription error.

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Question	Answer	Marks	Guidance
3(a)(i)	**M1** magnesium ion 2,8 all crosses(1) **M2** both fluoride ions 2, 8 outer shell 7 dots and 1 cross(1) **M3** 2+ on Mg and 1- on both F (1)	**3**	**IGNORE** arrows going from one atom to another **IGNORE** any empty outer shells **M2 ALLOW ECF** for **M2** for magnesium with 8 dots in outer shell **AND** both fluorides with 8 dots in outer shell **ALLOW ● and o** as interchangeable for dots **M3 ALLOW** Mg^{2+} and two F **-** **ALLOW** ++ / +2 and –/ –1 **ALLOW** Mg^{++} / Mg^{2+} / Mg^{+2} **and** F^{1-} / F^{-1} written in the spaces left blank for charges

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Question	Answer	Marks	Guidance
3(a)(ii)	**M1 strong** forces of attraction / **strong** bonds(1) **M2 (**between) oppositely charged ions **OR** (between) positive **and** negative ions **OR** (between) cations **and** anions **OR** (between) Mg^{2+} **and** F^{-}(1)	**2**	**ALLOW** strong attraction / strong holding (together) **ALLOW** stronger or strongest or high or higher attraction instead of strong attraction **ALLOW** need large or larger or more or high or higher amounts of heat **or** energy to break **or** overcome **or** weaken bonds **or** weaken attraction **or** to separate particles **IGNORE** strong **forces** (must be forces of attraction) **IGNORE** no weak bonds / bonds difficult to break **IGNORE** high temperature needed to break bonds(must be heat or energy) **IGNORE** need large **or** larger **or** more **or** high **or** higher amounts of heat or energy to break or overcome the lattice(it must be to break **bonds** or **attraction**) **REJECT between** bonds (therefore strong attraction between bonds does not get **M1**) **M2 ALLOW** wrong charges on ions as long as they are oppositely charged e.g. Mg^{+} and F^{2-} **/** Mg^{-} and F^{2+} / positive anions and negative cations **ALLOW** (between) +ve **and** –ve ions **ALLOW** (between) magnesium ions and fluoride ions **ALLOW** fluorine ions instead of fluoride ions **IGNORE** (between) ions (must be qualified by reference to charges etc.) **IGNORE** reference to lattice / giant structure **IGNORE** bond between metal and non-metal **IGNORE** oppositely charged particles (must be ions etc.) **IGNORE** charged atoms **REJECT (**between) atoms / molecules / electrons (unless reference to ionic bonding by electron transfer) /elements / covalent / metallic / intermolecular(**for M2**)

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Question	Answer	Marks	Guidance
3(a)(iii)	Ions move (when molten not when solid)	**1**	**ALLOW** move = flow = mobile = pass(through) = slide = migrate = travel **ALLOW** the ions become mobile **ALLOW** mobile ions are formed (taken to mean the ions become mobile **BOD**) **REJECT** moving electrons **REJECT** any idea that new ions are formed when magnesium fluoride becomes molten
3(b)(i)	**M1** one shared dot and cross(1) **M2** 6 non-bonding dots on one fluorine atom and 6 non-bonding crosses on the other fluorine atom to complete both octets (1)	**2**	If the number of shared electrons is anything other than 2 there are no marks for the question **ALLOW ● and o** as interchangeable for dots Non-bonding electrons need not be drawn in pairs **ALLOW** 1 mark only for otherwise correct diagram of all dots or all crosses or an incorrect mixture or use of a different symbol e.g. triangle **M1 REJECT** any other symbols except dots and crosses (e.g. triangles) **M2** can score if **M1** does not score **ONLY** if the shared pair is two dots or two crosses If the shared pair is two dots or two crosses **ALLOW M2** for 6 non-bonding electrons of any type (dots or crosses) on both atoms

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Question	Answer	Marks	Guidance
3(b)(ii)	**M1** solid(1) **M2** because –240 °C is lower than the melting point / melting point is above –240 °C (1)	**2**	Marks are independent e.g. M1 liquid × M2 –240 is lower than –220 gets M2 NO ECF on wrong state e.g. M1 liquid × M2 –240 is higher than –220 × It is not necessary to refer to the boiling point / –188 but any reference must be correct **M2 ALLOW –**220 (°C) as alternative to melting point **ALLOW** –240(°C) is lower than -220(°C) **ALLOW** –240(°C) < –220(°C) / –220(°C) > –240(°C) **ALLOW** temperature or **it** as alternative to –240 °C e.g. it is lower than –220 gets **M2** **ALLOW** temperature is colder than the melting point **ALLOW** temperature not hot enough to melt **ALLOW** number lines that show –240(°C) is lower than –220(°C) **ALLOW** (it is) before or below or under the melting point **ALLOW** (it has) not reached the melting point/ melting point not exceeded **REJECT** –240 °C is higher than boiling point **REJECT** –240 °C is beyond the melting point

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Question	Answer	Marks	Guidance
4(a)	$2H_2O_2(aq) \rightarrow 2H_2O(l) + O_2(g)$ **M1** all three formulas correct(1) **M2** equation correct(1) **M3** state symbols(1)	**3**	 **M1 REJECT** any other species except H_2O_2, H_2O and O_2 (also means **M2** cannot score) **IGNORE** attempted formula of catalyst over the arrow (means M1 is available) **M2 ALLOW** multiples **M3 REJECT** AQ / Aq / aQ instead of aq **REJECT** G instead of g
4(b)	 **M1** increases the rate of a reaction(1) **M2** unchanged at the end of the reaction(1)	**2**	Marks are independent **IGNORE** any reference to enzymes or proteins(anywhere) **IGNORE** if catalyst is described as an element or compound or molecule anywhere **M1 ALLOW** speeds up a reaction / reaction faster **IGNORE** alters speed of reaction / alters rate of reaction **REJECT** decreases the rate **M2 ALLOW** unchanged (at the end of the reaction) / unchanged (chemically) / unaffected/ lowers **activation energy**(or any phrase that means activation energy e.g. minimum energy required for reaction to occur) / remains unchanged / remains unaffected / mass(of catalyst) doesn't change / reforms at the end of the reaction **ALLOW** Ea / EA / AE / energy needed to start reaction as alternatives to activation energy **REJECT** increase / decreases the yield(**M2** not available)

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Question	Answer	Marks	Guidance
4(c)(i)	Answers must be based on EITHER concentration OR distance between particles OR collision frequency • **concentration** (of hydrogen peroxide or reactant) is **highest** (at the start) **OR** • **particles or molecules (**of hydrogen peroxide or reactant) are **closest** (at the start) **OR** • **collision frequency** (of hydrogen peroxide particles or molecules or reactant) is **highest** (at the start)	**1**	Hydrogen peroxide need not be mentioned **ALLOW** reactant(s) or reagent(s) or particles or molecules or ions or atoms **as alternatives to hydrogen peroxide** **Comparatives can be used instead of superlatives ie** **ALLOW higher = highest / closer = closest / more = most = highest** **BUT IGNORE** high / close • **ALLOW** moles(of hydrogen peroxide) per unit volume is highest(at the start) • **ALLOW** maximum concentration (of hydrogen peroxide) (at start) / • Concentration(of hydrogen peroxide) decreases(with time) **IGNORE** Highest number of (hydrogen peroxide) particles or molecules(at start) **IGNORE** mass or amount or volume instead of concentration **OR** • **ALLOW** atoms or ions as alternatives to molecules **ALLOW** minimum distance between (hydrogen peroxide) particles (at start) / distance between(hydrogen peroxide) particles increases(with time) / more (hydrogen peroxide) particles per unit volume or per cm^3 • (**ALLOW** per unit area instead of per unit volume) **OR** • **ALLOW** rate of collisions (of hydrogen peroxide particles) highest (at start) most collisions between (hydrogen peroxide) particles per unit time / collisions between (hydrogen peroxide) particles occur most often/ more frequent collisions between (hydrogen peroxide) particles / frequency of collisions (between particles) decreases

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Question	Answer	Marks	Guidance
4(c)(i)			**IGNORE** more collisions **/** most chance of collisions / most probability of collisions / most collisions / reference to collisions with container / successful / effective/ high frequency of collisions(must be higher or highest) **REJECT** any reference to catalyst changing e.g. catalyst concentration highest at start **REJECT** any reference to surface area / particles size / temperature / energy / speed of particles
4(c)(ii)	the **hydrogen peroxide** is used up **OR** **ALL** the **hydrogen peroxide** has reacted or decomposed	**1**	Hydrogen peroxide or H_2O_2 must be mentioned to score **ALLOW** all the hydrogen peroxide is used / the hydrogen peroxide has fully reacted **IGNORE** the hydrogen peroxide has stopped reacting **or** the hydrogen peroxide has finished reacting (neither means there is none left) **or** the hydrogen peroxide has reacted / hydrogen peroxide is limiting / reagents or reactants are used up etc. (there must be a reference to hydrogen peroxide or H_2O_2) **REJECT** any reference to catalyst / surface area / particle size / temperature changing / energy changing

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Question	Answer	Marks	Guidance
4(d)		3	**IGNORE** statements about equilibrium IGNORE comments about higher temperature **Comparisons** are needed for all marking points
	M1 kinetic energy of particles is lower(1)		**M1** Particles / molecules / atoms / ions must be **seen somewhere** in the answer for **M1** to be awarded **ALLOW** particles have less (kinetic or heat) energy / particles move slower / particles collide slower/ particles lose(kinetic or heat) energy / (kinetic or heat) energy of particles decreases / particles lose(kinetic or heat) energy / less energy **between** particles / particles gain less energy
	M2 frequency of collisions between particles is lower(1)		**IGNORE** vibrate slower **REJECT** particles **produce** less energy
	M3 fewer or lower percentage **or** lower proportion **or** lower fraction of **particles** have energy greater than / equal to activation energy **OR** **fewer of the** collisions **or** lower percentage **or** lower fraction of **collisions** have energy greater than or equal to activation energy(1)		**M2 ALLOW** frequency of collisions is lower or decreases / rate of collisions is lower or decreases / fewer collisions per unit time / collisions occur less often(particles don't have to be mentioned for **M2**) / collisions decrease per unit time / less frequent collisions **IGNORE** less chance of collisions / less probability of collisions / fewer collisions / reference to collisions with container **M3** Activation energy or a phrase meaning activation energy must be mentioned **ALTERNATIVES** to activation energy **/** Ea / EA / AE / energy needed to start reaction / sufficient energy to react / energy to overcome activation energy **ALLOW fewer or less** particles have energy **greater than** activation energy / **Fewer or less** particles have energy **equal** to activation energy **IGNORE** energy to break bonds if **PARTICLES** are referred to the phrase less **of the** / reference to **lower percentage of** etc. is **NOT essential** for **M3**

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Question	Answer	Marks	Guidance
4(d)			**ALLOW MORE** (of the) **particles have energy LESS than activation energy** **ALLOW MORE** of the collisions have energy LESS than activation energy **IGNORE** fruitful / successful / effective **REJECT** decrease / increase in no of particles **REJECT** activation energy is decreased / increased if **COLLISIONS** are referred to the phrase **less of the** / reference to **lower percentage of** etc. **IS** essential for **M3**

Question	Answer	Marks	Guidance
5(a)(i)	electrolysis	**1**	**IGNORE** redox / decomposition **REJECT** thermal decomposition/ electrolyte

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Question	Answer	Marks	Guidance
5(a)(ii)	**M1** inert(1) **M2** good conductor of electricity(1)	**2**	Only use **CON** if more than two answers are given Answers can be in any order **M1 ALLOW** not reactive / unreactive / does not react/does not react with the electrolyte / does not react with the solution / does not react with the products (of electrolysis) / does not take part in the reaction **IGNORE** not very reactive / low reactivity / quite unreactive / does not break down / does not corrode / does not affect the reaction / does not dissolve in the electrolyte **M2 ALLOW (**good) conductor of electricity / allows electricity to pass through **ALLOW** electric current or electrical energy as alternatives to electricity **IGNORE** conductor (alone) / conductive / increases conductivity / conducts heat / carries electric charge / carries or conducts current (must be electrical current) **IGNORE** any reasons given for conductivity e.g. electrons or ions **IGNORE** high melting point / high boiling point **IGNORE** cost **REJECT** conducts electricity when molten or aqueous **REJECT** graphite is a metal

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Question	Answer	Marks	Guidance
5(a)(iii)	$2H^+ + 2e(^-) \rightarrow H_2$ **M1** H^+ + e on LHS of equation(1) **M2** equation fully correct(1)	**2**	**ALLOW** e **or** $e(^-)$ **or** es for electrons **IGNORE** state symbols **ALLOW** multiples **SALVAGE MARK** **ALLOW** 1 mark for $2H^+ \rightarrow H_2 - 2e(^-)$ **M1 ALLOW ANY** number of positive hydrogen species with **ANY** positive charge + **ANY** number of electrons on **LHS** e.g. $H_2^{2+} + 4e \rightarrow$ scores **M1** **M2 REJECT** H_2^0 (M**1** still can score) **Special case** $2H_2O + 2e(^-) \rightarrow 2OH^- + H_2$ **M1** for H_2O + electrons on **LHS** of equation(1) **M2** equation fully correct(1)

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Question	Answer	Marks	Guidance
5(a)(iv)	**M1** hydroxide ion is negative OH^- is negative(1) **M2** There are 4 alternatives that can get M2 based on: • movement of negative ions to anode • concentration • process of hydroxide(ions) forming oxygen • oxygen formed and not chlorine hydroxide ion is attracted to electrode of opposite charge or positive charge/ hydroxide ion is attracted to positive anode(1)	2	**$4OH^- \rightarrow O_2 + 2H_2O + 4e$ or $4OH^- - 4e \rightarrow O_2 + 2H_2O$** both get 2 marks even if unbalanced or if water is absent e.g. $OH^- \rightarrow O_2 + e$ would score 2 If there are any other errors in the equation OH^- can get **M1** on LHS of equation **M1 ALLOW** hydroxide **ions** / OH **ions** / OH^- / hydroxide or OH is an anion **IGNORE** hydroxide(alone) / chloride ion / C*l* **REJECT** wrong negative ions e.g. oxide ions / oxygen ions / negatively charged oxygen **REJECT** hydroxide ions **produced by electrolysis** **M2 ALLOW** attraction of or movement of **ANY** negative **ion** (named or unnamed) this includes wrong negative ions e.g. oxide ion / oxygen ion or (any) anion or hydroxide ion or OH^- or OH anion to the **positive** electrode or **positive** anode **IGNORE** oxygen has negative charges (without ion) **OR M2 ALLOW (**the solution is) **dilute or diluted** / the solution is **not concentrated** **ALLOW** concentration (of sodium chloride or chloride ions) is not (high) enough **ALLOW** concentration of hydroxide (ion) is high / concentration of chloride(ion) is low **ALLOW** concentration of hydroxide(ion) is higher than chloride (ion) **ALLOW** concentration of chloride(ion) is lower than hydroxide (ion) / more hydroxide(ion) than chloride(ion) **IGNORE** any comments about concentrations of oxygen / chlorine **OR M2 ALLOW hydroxide**(ion) / OH (ion) / OH^- **discharged** or **decompose** or **oxidised** or **lose electrons**(forming **oxygen** and water or forming oxygen alone **OR** instead of chloride (ions)) **IGNORE** hydroxide (ion) **forms** oxygen(essentially this is repeating the question) **IGNORE** electrolysed

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Question	Answer	Marks	Guidance
5(a)(iv)			**OR M2 ALLOW oxygen** forms and not **chlorine** **ALLOW hydroxide** (ion) **react or form products** instead of **chloride**(ion) **IGNORE any** statements about reactivity of oxygen and chlorine **IGNORE** electrolysed
5(a)(v)	electron(s)	**1**	**IGNORE** e / e(s) / e^- / free / delocalised / sea / mobile
5(a)(vi)	**M1** anode: chlorine(1) **M2** cathode: hydrogen(1)	**2**	
5(b)(i)	bauxite	**1**	
5(b)(ii)	aluminium oxide	**1**	**ALLOW** aluminium(III)oxide **REJECT** wrong oxidation state e.g. aluminium(II)oxide does **not** score **REJECT** e.g. aluminium(II)oxide + Al_2O_3 does **not** score
5(b)(iii)	(molten)cryolite	**1**	

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Question	Answer	Marks	Guidance
5(b)(iv)	**M1** anodes **or** carbon react with oxygen(1) **M2** (form) carbon dioxide(1)	**2**	Marks are independent **AWARD BOTH MARKS for C** + $O_2 \rightarrow CO_2$ or (2)O^{2-} + C → CO_2 (+ $4e^-$) **It** or **they** refer to **anodes / carbon** **M1 ALLOW** electrode(s) or graphite **as alternatives to anode or carbon** **ALLOW** oxidised **or** bond with **or** burns **or** forms product **as alternatives to reacts with** **ALLOW** O_2 / O^{2-} / O / oxide ions / oxygen atoms / oxygen ions / oxygen in the electrolyte **as alternatives to oxygen** **ALLOW** any chemical or word equation which shows carbon reacting with oxygen (irrespective of products e.g. carbon monoxide) **REJECT** oxygen **from air** **M2 IGNORE** anything that happens to the anodes after formation of CO_2 e.g. dissolve / wear away / corrode / erode / burn / decay / decompose / used up

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Question	Answer	Marks	Guidance
6(a)(i)	amphoteric(oxides)	1	**REJECT** atmospheric
6(a)(ii)	Na_2ZnO_2	1	**REJECT** symbols in wrong order ZnO_2Na_2 **REJECT** any numbers in front e.g. $2Na_2ZnO_2$ unless part of an attempted 'equation' **REJECT** any formulas with charges e.g. $Na^+{}_2ZnO_2{}^{2-}$
6(a)(iii)	$ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$ **M1** $ZnSO_4$(1) **M2** equation correct(1)	2	**ALLOW** multiples **IGNORE** state symbols **M1** $ZnSO_4$ must be a product of an equation
6(a)(iv)	$Ba^{2+}(aq) + SO_4{}^{2-}(aq) \rightarrow BaSO_4(s)$ **M1** correct ionic equation(1) **M2** state symbols(1)	2	**M1 only** $BaSO_4$ on the right **and only** $Ba^{2+} + SO_4{}^{2-}$ on the left in a balanced ionic equation **REJECT** ionic charges on $BaSO_4$/ $BaSO_4{}^0$ **REJECT** spectator ions / electrons as reactants or products **M2 ALLOW** for state symbols on any positive barium ion **and** any negative sulfate ion **and** any uncharged barium sulfate formula (as the only product) eg $Ba^{3+}(aq) + SO_4{}^-(aq) \rightarrow Ba(SO_4)_2(s)$ gets **M2** **REJECT** AQ / Aq / aQ instead of aq **BUT** do **NOT** penalise this error if **EXACTLY THE SAME** error is already penalised in **4(a)** (response is clipped)
6(a)(v)	white	1	**REJECT** cream / colourless / off white

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Question	Answer	Marks	Guidance
6(b)(i)	**M1** 0.04(1) **M2** 0.02(1) **M3** 3.04 (1)	**3**	3.04 does not automatically get all 3 marks, need working **IGNORE any** units anywhere **IGNORE** presence or absence of trailing zeros anywhere Penalise fractions once only e.g. M1 1 / 25 × M2 1 / 50 ✓ ECF M3 76 / 25 ✓ ECF **M2 ALLOW ECF M1 ÷ 2** correct to at least 3 significant figures **IGNORE** rounding/ truncating errors after 3rd SF **M3 ALLOW ECF M2 × 152** correct to at least 3 significant figures **IGNORE** rounding / truncating errors after 3rd SF

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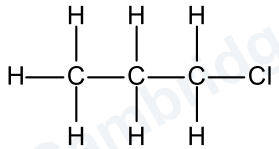
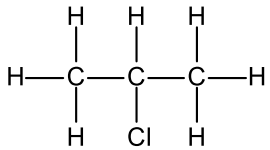
Question	Answer	Marks	Guidance
6(b)(ii)	**M1** oxidation number of chromium / oxidation number of Cr(1) **M2** oxidation number = + 6(1)	**2**	Marks are independent If CHARGE on chromium is referred to 0/2 **IGNORE** references to electrons **M1 ALLOW** oxidation state or oxidisation number or oxidisation state or oxidising number as alternatives to oxidation number **ALLOW** chromium atom / chromium isotope / chromium(VI) / Cr atom / Cr(VI) as alternatives to chromium **REJECT** oxidation number of compound/ potassium chromate / chromate / K_2CrO_4 for M1 **REJECT** oxidation number of chromium molecule/ chromium ions / **CHARGE on chromium** **M2 ALLOW** oxidation number of the ion = +6 **REJECT oxidation** number = + six / six + / plus 6 / 6 plus / plus six / six plus / + VI / VI+ **REJECT CHARGE** is +6 / 6+ / Cr^{+6} / Cr^{6+}
6(b)(iii)	Cr / chromium	**1**	
6(c)	**M1** decreases(1) **M2** decreases(1) **M3** no change(1)	**3**	

GradeMax

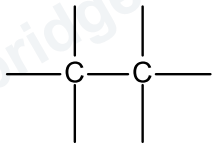
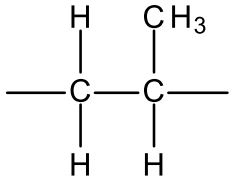
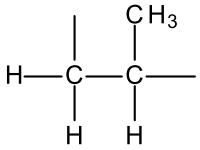
Question	Answer	Marks	Guidance
7(a)(i)	compound(s) containing hydrogen and carbon **only**	**1**	**ALLOW** (compound(s) or molecule(s) containing hydrogen / H and carbon / C **only** **ALLOW** purely / solely / exclusively / just as alternatives to only **ALLOW** hydrogen / carbon identified as atoms or elements e.g. compound only containing carbon and hydrogen atoms scores 1 **REJECT** carbon and / or hydrogen identified as molecules **REJECT** hydrocarbons identified as mixtures / elements / atoms **REJECT** contain only carbon and / or hydrogen **bonds** **REJECT** additional incorrect phrases e.g. contains single bonds
7(a)(ii)	any two from • (same) chemical properties • (same) functional group • (same) general formula	**2**	**CON** can be used once or twice **ONLY** if more than two answers are given **ALLOW** characteristic(s) or reaction(s) as alternatives to properties **ALLOW** similar chemical properties **ALLOW** the reactive part of the molecule or compound or substance as alternatives to functional group **ALLOW** function / functioning as alternatives to functional **ALLOW** functional group has same structure / functional group has same bonds **ALLOW** share or belongs to (the same) functional group **ALLOW** (same or similar) chemical behaviour **REJECT same** functional group / **same** physical properties **REJECT** same general **molecular** formula
7(a)(iii)	$C_{10}H_{22}$	**1**	Subscripts must be smaller than symbols

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0620/41 Mark Scheme June 2026

Question	Answer	Marks	Guidance
7(b)(i)	needs or uses light	1	**ALLOW needs or uses**: • UV/ ultra violet / sunlight / light / infra-red / UV energy **ALLOW** suitable equivalents to needs or uses e.g. absorbs **REJECT** produces UV / produces ultra violet (light) **REJECT** catalyst / lowers Ea
7(b)(ii)	**M1** displayed formula of 1-chloropropane e.g.  (1) **M2** displayed formula of 2-chloropropane e.g.  (1)	2	If **3 displayed formulas are attempted** and one or two are repeats of the same isomer, candidates can only score a maximum of 1 mark If **4 displayed formulas are attempted** 0 marks for the question **REJECT** lower case h
7(c)(i)	CH_2	1	
7(c)(ii)	**M1** but-1-ene(1) **M2** but-2-ene(1) Names can be in any order	2	Only use **CON** if more than 2 answers are given **REJECT** butene / butan-1-ene / butan-2-ene

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Question	Answer	Marks	Guidance
7(c)(iii)	**M1** two carbon atoms joined by a single bond and an extension bond on either side  (1) **M2** repeat unit  (1)	**2**	If the bond between the two carbon atoms is missing or shown as a multiple bond 0 marks for the question **M1** The extension bonds will normally be drawn horizontally but can be vertical e.g. this gets both marks  **M2** CH_3 can be at the end of any of the bonds CH_3 can be displayed If the CH_3 is undisplayed ignore connectivity errors i.e. **ALLOW** CH_3– and $–CH_3$ or $–H_3C$ **SALVAGE MARK** • If both extension bonds are missing and there are no other errors award **1 salvage mark** **OR** • If 2 or more repeating units are fully correct **ALLOW 1** mark

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