Cambridge International AS & A Level

CHEMISTRY | **9701/21**

Paper 2 AS Level Structured Questions | **May/June 2026**

MARK SCHEME

Maximum Mark: 60

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.

This document consists of **23** printed pages.

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.

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	<u>'List rule' guidance</u> 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.

6	<u>Calculation specific guidance</u> 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	<u>Guidance for chemical equations</u> 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.

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.

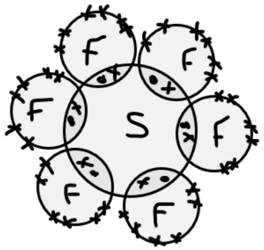
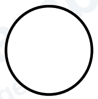
Annotations

Annotation	Meaning
✓	Correct point **or** mark awarded
✗	Incorrect point **or** mark not awarded
?	Unclear
^	Information missing or insufficient for credit
BOD	Benefit of the doubt given
CON	Contradiction in response otherwise markworthy, mark not given
●	Part of the correct answer has been seen. Full credit has not been awarded.
ECF	Error carried forward applied
I	Incorrect or insufficient point ignored while marking the rest of the response
RE	Rounding error

Annotation	Meaning
REP	Repetition
SEEN	Blank page **or** part of script seen
SF	Error in number of significant figures
TE	Transcription error

Mark scheme abbreviations

R	reject the response
A	accept the response
I	ignore the response
ecf	error carried forward
BOD	benefit of doubt given
ora	or reverse argument
owtte	or words to that extent
underline	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
M	marking point

Question	Answer	Marks	Guidance
1(a)(i)		**1**	**A** any symbol for electrons – symbols can all be the same or different **A** electrons can be on the lines or in the spaces **A** non-bonding electrons need not drawn in pairs **I** inner electrons
1(a)(ii)	octahedral	**1**	**A** square bipyramidal **A** octahedron **A** near miss in spelling e.g. octohedral **I** octagonal / octagon
1(b)(i)	 AND label **1**s	**1**	**I** ^{n} in 1s^{n} **I** spherical **I** axes **I** dot-and-cross diagrams
1(b)(ii)	$Cl(g) \rightarrow Cl^{+}(g) + e^{(-)}$	**1**	**A** $Cl(g) - e^{(-)} \rightarrow Cl^{+}(g)$ **I** $Cl(g) + e^{(-)} \rightarrow Cl^{+}(g) + 2\,e^{(-)}$

Question	Answer	Marks	Guidance
1(b)(iii)	**M1** (small) increase in shielding in C*l* is outweighed by **M2** increased nuclear charge in C*l* **M3** C*l* has greater nuclear attraction ora **OR** **M1** similar shielding **M2** C*l* has greater nuclear charge **M3** C*l* has greater nuclear attraction ora	3	For all 3 marks to be awarded: 'chlorine' needs only to be identified once in **M1** or **M2** or **M3** chlorine can be identified by name / symbol or trend across a period e.g. number of protons increases across the period **M1** great(er) = increase = high(er) = more = large(r) etc for shielding: similar = constant = equal = same shielding = screening **I** electron removed from same (sub) shell **I** same number of shells **I** same electron cloud **I** references to arrangement of electrons in the orbitals **I** atomic radius references **M2** **A** number of protons for nuclear charge **A** greater atomic number for greater nuclear charge **A** C*l* has one more proton than S **I** 'effective' of effective nuclear charge **I** nucleon number **M3** (nuclear) attraction = pull = draws (into nucleus) For **M2** and **M3** 'nuclear' needs only to be mentioned once e.g. greater nuclear attraction may be implied by reference to 'increased attraction due to increased nuclear charge' owtte If **M2** and **M3** not awarded: Max 1 for greater nuclear attraction linked to greater nuclear charge if species not identified or incorrectly identified

Question	Answer	Marks	Guidance
1(c)(i)	**M1** 104.5(°) **M2** 2 bonding pairs (of electrons) and 2 lone pairs (of electrons **M3** lone pairs (of electrons) repel more than bonding pairs (of electrons)	3	**M1 A** range 103–105° inclusive **I** reference to stated shape even if incorrect **I** reference to tetrahedral geometry and 109.5 in text **A** 'bonding pairs' and 'lone pairs' assuming they are describing electrons unless stated otherwise. **A** 2 shared pairs for 2 bonding pairs For 2 lone pairs: • **A** 2 pair of lone pairs • **A** 2 non-bonding pairs **I** S—C*l* bond / 2 bonds for bonding pair **I** any electrons on outer shell of chlorine **R** one unpaired electron If **M2** is not awarded from text, award **M2** for a suitably annotated Figure 1.2 or dot-and-cross diagram The electrons in both bond pairs and lone pairs must be shown on Figure 1.2 **M3 A** repulsion from lone pair greater than from bond pair **M3 A** repulsion lone pair – lone pair > lone pair – bonding pair > bonding pair – bonding pair **M3 A** repulsion lone pair – bonding pair > bonding pair – bonding pair Max 1 for 2 bonding pairs and 1 lone pair **AND** between 107–109° inclusive

Question	Answer	Marks	Guidance
1(c)(ii)	S as δ+ **AND** Both C*l* as δ−	1	**A** δ+ δ+ / δ2+ / 2+δ on S **A** +δ and −δ **I** Δ **I** any electrons drawn on the atoms **R** ± without δ **BOD** TWO overall dipole direction arrows parallel to bonds **I** ONE overall dipole direction arrow / arrow
1(d)(i)	<table><tr><th></th><th>SCl_2</th><th>H_2O</th></tr><tr><td>**total number of electrons per molecule**</td><td>50</td><td>10</td></tr></table>	1	
1(d)(ii)	SCl_2 **AND** greater number of electrons (per molecule) **OR** H_2O has weaker id (id) as it has smaller number of electrons (per molecule)	1	greater = higher = larger = bigger = more **M1** awarded if incorrect number of electrons are given in **1(d)(i)** AND still greater than 10 **A** ecf from **1(d)(i)** for SCl_2 < H_2O AND fewer (than 10) electrons per molecule if less than 10 shown in **1(d)(i)**) **A** ecf from **1(d)(i)** SCl_2 = H_2O AND same number of electrons per molecule if 10 shown in **1(d)(i)** **I** greater electron density / electron cloud **I** SCl_2 has more valence / outer electrons

Question	Answer	Marks	Guidance
1(d)(iii)	electronegativity difference (between H and O) is greater (than S and C*l*)	**1**	**A** larger for greater / bigger owtte **A** H−O has large electronegativity difference and S−C*l* has small electronegativity difference **I** H_2O is more polar than SCl_2 **I** oxygen/O is more electronegative than chlorine **I** any comments on hydrogen bonding **R** H_2O is more electronegative than SCl_2 **R** O_2 is more electronegative than Cl_2
1(e)	**M1** mass C*l* = 52.51 **M2** 47.49 / 32.1 : 52.51/35.5 (= 1.48 :1.48) (empirical formula =) SC*l* **M3** (M_r(X) = 135.2) molecular formula) = S_2Cl_2	**3**	check working **M1** allow 100 – 47.49 without being evaluated **A** owtte 135.2 – ×(32.1) s = 2 so M_r=S_2Cl_2✓✓✓ **A** alternative methods **M2 A** ecf from an incorrect **M1** **M3 A** only S_2Cl_2 (with no working)

Question	Answer	Marks	Guidance
2(a)	$SO_3 + H_2O \rightarrow H_2SO_4$	**1**	**BOD** $SO_3 + H_2SO_4 \rightarrow H_2S_2O_7$ **BOD** $H_2S_2O_7 + H_2O \rightarrow 2\ H_2SO_4$
2(b)(i)	increases yield **AND** equilibrium shifts to right (hand side)	**1**	**A** alternatives to increased yield = increased amount / more product / SO_3 **A** equilibrium shifts to the side with fewer gaseous molecules / to side with fewer gaseous moles **A** equilibrium shifts to the right to reduce the concentration of SO_2 **BOD** equilibrium shifts to (favour) forwards reaction / direction **I** equilibrium shifts to side with lower volume **I** limiting reagent I any comments on rate **R** equilibrium shifts to side with more gaseous moles

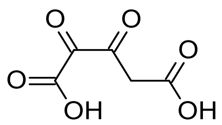
Question	Answer	Marks	Guidance
2(b)(ii)	**M1** it / rate (of reaction) increases **M2** (it) lowers EA OR (used) to lower EA	**2**	rate = speed successful = effective particles = molecules **M1 A** greater frequency of successful collisions / more successful collisions per unit time / higher successful collision rate / more frequent successful collisions / more successful collisions per second **A** for per = / **M2 A** more O_2 and/or SO_2 (molecules) OR more particles have sufficient / enough / minimum energy to react **M2 A** more O_2 and / or SO_2 (molecules) OR more particles have energy $\geqslant$ EA **A** Ea / EA / AE for EA **I** more of the collisions have energy greater than or equal to activation energy **I** pathway (even if wrong) **I** redox **I** it is a catalyst
2(c)(i)	acid rain	**1**	**A** breathing / respiratory problems / asthma **A** harmful to fish / plants / animals **A** damages buildings / statues / trees **BOD** (photochemical) smog **I** ozone **I** greenhouse effect / global warming / climate change **I** harmful to health

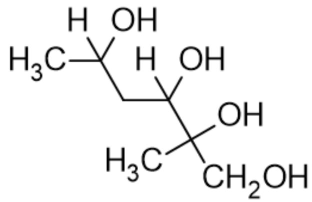
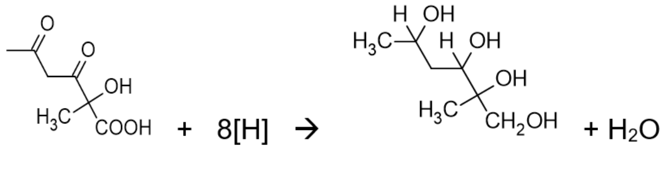
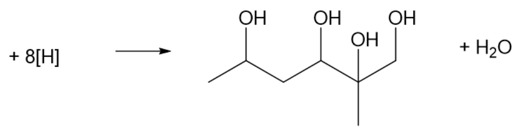
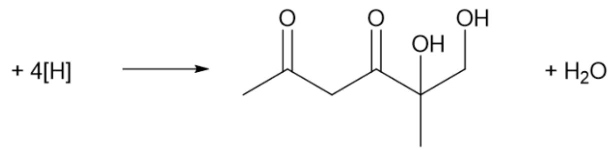
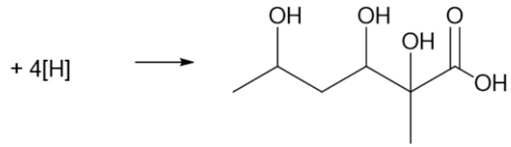
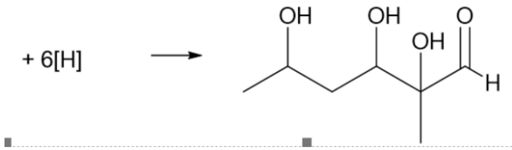
Question	Answer	Marks	Guidance
2(c)(ii)	**M1** PV=nRT **M2** number of mol of O_2 required n = 0.5 ÷ 2 = 0.25 **M3** temperature conversion to kelvin = 400 + 273 = 673 **M4** vol = (M2 × 8.31 × M3) ÷ 101 000 = 0.0138431 AND m^3	4	check the answer line first. **M1 BOD** upper / lower case discrepancies 0.0138(431) **AND** m^3 ✓✓✓✓ 13.8 and dm^3 **OR** 13 800 and cm^3 ✓✓✓✓ 0.014 and m^3 **OR** 14 and dm^3 or 14 000 and cm^3 ✓✓✓✓ 0.0276(86287) **AND** m^3 ✓✓✓ 0.00822(7722772) **AND** m^3 ✓✓✓ 0.0164(55445) **AND** m^3 ✓✓ **A** 2 sig figs up to calculator value final answers must be correctly rounded. **M1–M3** may be seen in working if not described explicitly **M1 A** V = nRT / P or **A** from working in **M4** **M3 A** 273.15 OR 273.2 for 273 **M3 A** 400 + 273 / 673.15 / 673.2 **M4** volume calculated correctly using nRT / P **AND** correct / appropriate unit **M4 A** ecf from **M2** and / or **M3**

Question	Answer	Marks	Guidance
3(a)(i)	$H_2SO_4 + NaCl \rightarrow NaHSO_4 + HCl$.	1	**A** $H_2SO_4 + 2NaCl \rightarrow Na_2SO_4 + 2HCl$ **A** $Cl^- + H_2SO_4 \rightarrow HCl + HSO_4^-$ **A** $2Cl^- + H_2SO_4 \rightarrow 2HCl + SO_4^{2-}$
3(a)(ii)	Cl^- / $NaCl$	1	**A** sodium chloride / chloride (ion) **A** chlorine anion **I** chlorine ion **I** chlorine **R** Cl_2
3(b)	Brown vapour ……Br_2 Purple vapour ……I_2	1	**I** bromine **I** Br **I** iodine **I** I **R** iodide / bromide
3(c)	(purple vapour is produced when) HI / iodide (anions) are oxidised (by H_2SO_4) **OR** (sulfuric) acid / H_2SO_4 oxidises I^- (to iodine)	1	**A** Iodide / I^- loses electrons **A** H_2SO_4 / S (in H_2SO_4) is reduced by HI / I^- / I in NaI / I in HI **A** I^- oxidised by S ((VI))(in H_2SO_4) For (VI) **A** 6+ / +6 / 6 **I** displacement **I** oxidation products **I** oxidation number unless they are specifying S(VI) in H_2SO_4 **I** The reaction is exothermic so the iodine / I_2 produced is vaporised **R** iodine is oxidised by sulfuric acid

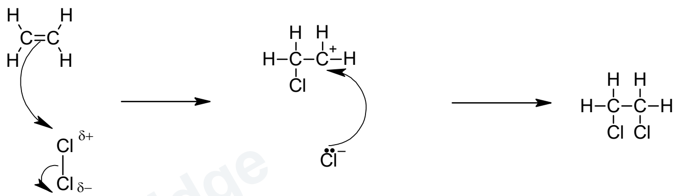
Question	Answer	Marks	Guidance
3(d)	**species** / **oxidation number of sulfur** H_2SO_4: (+)VI **OR** (+)6 SO_2: (+)IV **OR** (+)4 H_2S: –II **OR** –2	2	•✓✓ **A** 6 (+) 4 (+) and 2– **A** VI (+) **AND** IV (+) **AND** II – **R** S^{+4} S^{+6} or S^{-2} **R** S^{4+} S^{6+} or S^{2-}
3(e)	iodide / I^- is a stronger reducing agent (than bromide / Br^-) **OR** HBr / bromide / Br^- is a weaker reducing agent (than iodide / I^-) **OR** HBr / Bromide / Br^- can't reduce S(IV) / SO_2	1	**A** the reducing ability of the halides increases down the group **A** for I^- HI / NaI / I in NaI / I in HI / iodide **A** bromide is not strong enough to fully reduce sulfuric acid strong enough = good enough **I** bond energy arguments **I** reactivity arguments if not linked to redox **I** electronegativity arguments **I** references to H_2SO_4 being an oxidising agent **I** explanations
3(f)(i)	(observation after addition of $Ag^+(aq)$) ….(pale) yellow precipitate (observation after addition of $NH_3(aq)$) ….precipitate remains / precipitate does not dissolve / precipitate does not disappear	2	precipitate = ppt(e) = crystals = powder = (insoluble) solid **M1** ignore shades **R** any other colour **M2 A** no change / no reaction / no visible change if ppt seen in **M1** **M2 A** precipitate is insoluble **M2** yellow ppt if yellow ppt seen in **M1** **M2 A** ecf ppt remains on incorrect colour ppt in **M1**
3(f)(ii)	$Ag^+ + I^- \rightarrow AgI$	1	**I** $Ag^+ + NaI \rightarrow AgI + Na^+$ **I** $Ag^+ + Na^+ + I^- \rightarrow Ag^+ + I^- + Na^+$

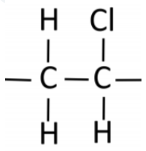
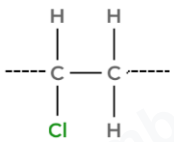
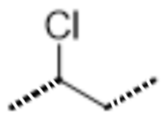
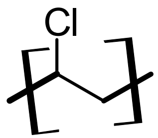
Question	Answer	Marks	Guidance
4(a)(i)	(colour of mixture at start of reaction) …………orange **AND** (colour of mixture after the reaction) …………green	1	**A** any shade of orange **A** any shade of green **I** ppt(e) **BOD** blue / grey for green **BOD** brown for green (as dichromate is in excess)
4(a)(ii)	$C_5H_{12}O_4$ + **2**$Cr_2O_7^{2-}$ + **16**H^+ → $C_5H_6O_7$ + **4**Cr^{3+} + **11**H_2O	1	
4(b)(i)	<table><tr><th>reagent</th><th>observation with A</th></tr><tr><td>Na(s)</td><td>effervescence / fizzing / bubbling</td></tr><tr><td>2,4-dinitrophenylhydrazine (2,4-DNPH)</td><td>none</td></tr><tr><td>Fehling's reagent</td><td>none</td></tr></table>	2	**M1 I** gas produced **M1 I** name of gas produced **M1 I** test for any gases **M1 I** solid disappears / solid dissolves / colourless solution / flame **M2 A** (remains) orange solution / remains orange (solution) / no precipitate / no reaction / no observation **M2 I** 'turns orange'

Question	Answer	Marks	Guidance
4(b)(ii)	Alcohols / Compound **A** are / is not oxidised by Fehling's reagent (Aldehydes are oxidised by Fehling's reagent) **OR** Aldehydes are oxidised by Fehling's reagent (Alcohols / Compound **A** are / is not oxidised by Fehling's reagent)	**1**	**A** for alcohol groups = hydroxy = hydroxyl = OH group **R** for alcohol groups = hydroxide / OH^- group **A** alcohol groups are not a strong enough reducing agent (to reduce Fehling's) **A** Fehling's reagent is not a strong enough oxidising agent to oxidise the alcohol groups **A** Fehling's is a strong enough oxidising agent to oxidise aldehydes **A** Fehling's is **too** mild to oxidise alcohols **A** Fehling's isn't reduced by compound A / alcohols **A** Fehling's is reduced by aldehydes **I** Fehling's is a mild oxidising agent unqualified **I** aldehydes are easier to oxidise than alcohols **I** compound **A** has no aldehyde functional groups. **I** reacts with Fehling's **I** carbonyl **R** ketones are oxidised by Fehling's
4(b)(iii)	$HOOCC{=}OC{=}OCH_2COOH$ ✓✓ **OR**  ✓✓ If 2 marks not awarded then max 1 for 2 of the following: • 5 carbon unbranched linear chain • 2 terminal carboxylic acid groups • 2 adjacent ketone groups only •✓	**2**	**A** any unambiguous structure **I** connectivity

Question	Answer	Marks	Guidance
4(c)	**M1**  **M2** equation fully correct  ✓✓  ✓✓	2	**M1 A** any unambiguous structure of **C** **M2** stoichiometry based on correct structure **C** **A** ecf on **M2** if incorrect structure is correctly balanced – as long as structure contains 7 carbon atoms common ECFs for 1 mark   

Question	Answer	Marks	Guidance
5(a)	**compound** / **type of hybridisation of carbon atoms** 1,2 dichloroethane / sp^3 chloroethene / sp^2	2	**M1 A** sp3 sp_3 SP^3 etc. **M2 A** sp2 sp_2 SP^2 etc.
5(b)	electrophilic addition	1	**I** addition alone
5(c)	One atom takes both of the electrons when the covalent bond is broken ✓✓ **M1** when a (covalent) bond / it is broken **M2** one atom takes both of the electrons from the shared pair	2	**A** breaking = splitting = separation **A** breaking of a specific covalent bond e.g. when a CH bond is broken shared pair of electrons = covalent bond **M2 A** 'one atom takes both electrons' if reference to process involving breaking a (covalent) bond is described **A** takes = receives **A** electrons moves to / electrons transferred to **I** attract / pull towards **M2 A** species = atom **R** element, molecule, compound **I** radical **I** uneven number of electrons **I** formation of (positive and negative) ions **I** both electrons unequally distributed to one atom **I** formation of nucleophile and electrophile

Question	Answer	Marks	Guidance
5(d)	 **M1** curly arrow from C = C bond to C*l* closest to C = C **M2** correct dipoles C*l*δ^+—C*l*δ^- **AND** curly arrow from bond of C*l*δ^+—C*l*δ^- to C*l*δ^- **M3** correct carbocation intermediate **M4** curly arrow from lone pair of : C*l*$^-$ to C$^+$ of intermediate Judgement of arrows: **A** curly arrows that appear straight **NOT** single headed arrows (fishhooks) first time seen-and then **A** **M1** judgement of arrows: π bonds **M1** starts from anywhere on π bond **AND** goes to C*l* or close to C*l* atom of C*l*—C*l* **M1** if arrow does not start at the double bond, but when it is extrapolated back the base of the arrow hits the π bond AND the arrow end goes to C*l* or close to C*l* atom of C*l*—C*l* **M2** judgement of arrows: C*l*—C*l* bond **M2 A** curly arrow from bond of C*l*—C*l* to just beyond the C*l* (if dipole correct).	4	**M1** δ- **I** π or δ– label on the double bond(e.g. C = C) **I** partial charges on C*l* **R** partial charges on C of C = C (e.g. δ^+C = δ^+C / δ^-C = δ^-C) **R** arrows from any other part of the alkene **M2** **A** dipole moment of C*l*$_2$ shown as an arrow with + convention **I** electrons (i.e. dots / crosses above and/or below bond **M3** **A** unambiguous structure **R** δ+ charge on C+ **R** lone pair on C+ **M4** **A** ecf from incorrect intermediate structure in **M3** when no positive charge on C of intermediate **OR** Cδ^+ instead of C$^+$ **I** δ^-C*l*$^-$ if all else ok
5(e)	elimination	1	

Question	Answer	Marks	Guidance
5(f)	-[CH_2-CHC*l*]- **OR**  **OR** 	1	**I** brackets (any) **I** *n* **A** C*l* on either C atom **A** dangling bonds / bracketed repeat unit If skeletal then dangling bonds are different (e.g. dashed, v. long) or go through brackets  ✓ **OR**  ✓
5(g)(i)	**M1** [$CH_2CH^{37}Cl$]$^+$ **M2** [CH_2CH]$^+$	2	**M1** **A** $C_2H_3Cl^+$ where C*l* = C*l*-37 **A** $CH_2CHCl\,37^+$ / [CH_2CHCl^{37}]$^+$ **A** CH_2=CH37C*l*$^+$ **I** lack of brackets **I** dots **M2** **A** $C_2H_3^+$ **A** CH_2=CH^+ **A** molecular formulas for both **A** any unambiguous formula for both **A** any unambiguous representation of ^{37}Cl Max 1 both without charges **OR** both negative charges **OR** both same incorrect positive charge (all else correct).

Question	Answer	Marks	Guidance
5(g)(ii)	**M1** 2 chlorine isotopes (exist) **M2** ^{35}Cl is 3 times more abundant than ^{37}Cl	**2**	75% ^{35}Cl and 25% ^{37}Cl ✓✓ ^{35}Cl is 3 times more abundant than ^{37}Cl ✓✓ ^{35}Cl is more abundant than ^{37}Cl ✓ **M1 A** m / e 64 is $[M+2]^+$ ion with ^{37}Cl **M1 A** peak at m / e 64 is due to ^{37}Cl **AND** peak at 62 is due to ^{35}Cl