Mark Scheme (Results)

Summer 2019

Pearson Edexcel GCSE
In Chemistry (1CH0) Paper 2F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

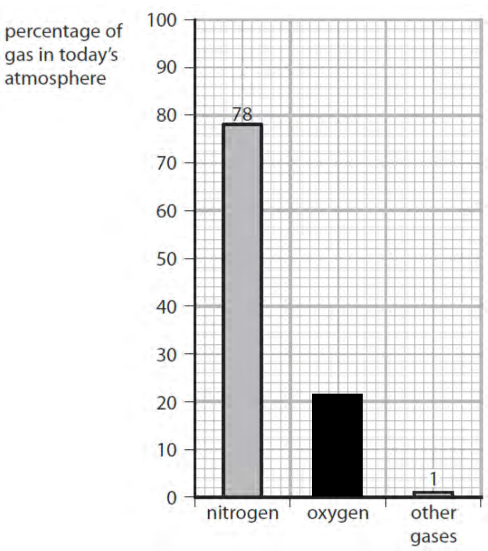
Mark schemes have been developed so that the rubrics of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So for example the command word 'Explain' requires an identification of a point and then reasoning/justification of the point.

Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.

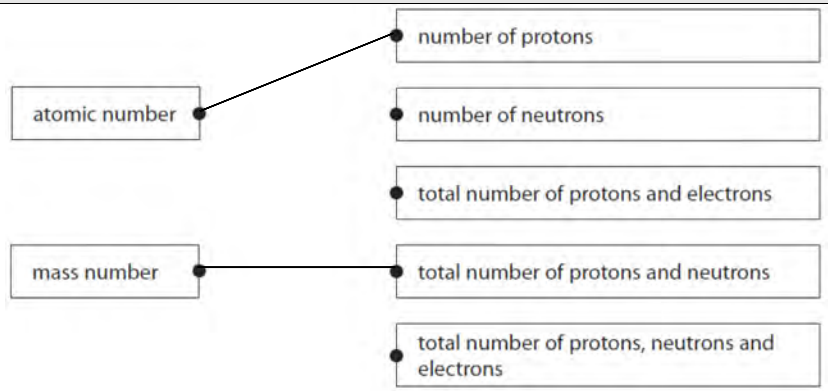
When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		**Command Word**	
Strand	**Element**	**Describe**	**Explain**
AO1		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

Question number	Answer	Mark
1(a)	**C** photosynthesis is the only correct answer **A** and **B** are processes that required oxygen **D** is a process that does not involve oxygen	**1**

Question number	Answer	Additional guidance	Mark
1(b)(i)	Vertical bar for oxygen to just over 20% as shown in the bar chart (ignore width):  (1)	ignore bars touching each other ignore 21 above bar	**(1)**

Question number	Answer	Additional guidance	Mark
1(b)(ii)	MP1 : $\frac{21}{100}$ (1) (=0.21) MP2 : 0.21 x 300 (1) (= 63) (cm^3)	63 (cm^3) with no working scores 2 marks 300/4.76 = 63 (2) 300/4.8 = 62.5 (2) allow 21 x 300 (1) (= 6300) allow $\frac{300}{100}$ (1) (= 3)	**(2)**

Question number	Answer	Additional guidance	Mark
1(c)	 1 mark for each line	Each line 1 mark Do not award mark if more than one line joins the left hand boxes with those on the right	**(2)**

Question number	Answer	Mark
1(d)	**B** a glowing splint will relight when placed in the gas is the only correct answer **A** describes the test for carbon dioxide **C** describes the test for hydrogen **D** describes the test for an alkaline gas such as ammonia	**(1)**

Total for Question 1 = 7 marks

Question number	Answer	Additional guidance	Mark
2(a)(i)	halogens or halogen	reject halide	**(1)**

Question number	Answer	Additional guidance	Mark
2(a)(ii)	**noble** gases or **inert** gases or **rare** gases	Do not allow gases alone	**(1)**

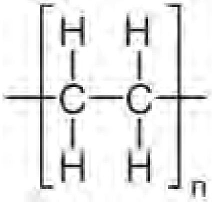
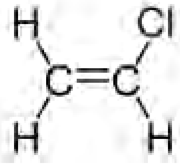
Question number	Answer	Mark
2(b)	**C** yellow-green red-brown is the only correct answer **A** gives the colours for iodine vapour and chlorine gas **B** gives the colours for solid iodine and iodine vapour **D** gives the colours for bromine liquid and iodine vapour	**(1)**

Question number	Answer	Mark
2(c)	**D** liquid solid is the only correct answer **A**, **B** and **C** are incorrect because bromine is a liquid and iodine is a solid at 50 °C	**(1)**

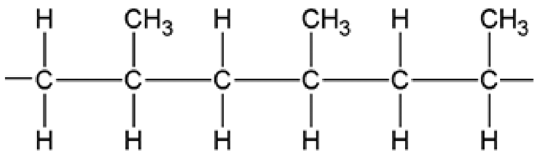
Question number	Answer	Additional guidance	Mark
2(d)	accept any number in the range **1.4 – 3.5** **accept value either on answer or in the space in the table**	Allow any number of decimal places Do not allow number below 1.4 Do not allow negative numbers Do not allow numbers greater than 3.5	**(1)**

Question number	Answer	Additional guidance	Mark
2(e)	An explanation linking the points in one of the pairs **EITHER** • argon is {inert / a noble gas} OR **argon** has /atoms have) {full / 8 electrons in} outer shell (1) • so (it) does not react (with metal filament) OR (argon/atoms) do not {gain / lose / share electrons} **OR** • **oxygen** is reactive (1) • (air/oxygen) reacts with metal filament / forms metal oxide (1)	so metal does not burn/ combust (in argon) so (argon) does not {burn / combust} with metal (filament) so (argon) {is unreactive / less reactive / not very reactive / inactive } (with metal filament) ignore air for MP1 here allow metal burns	**(2)**

Total for Question 2 = 7 marks

Question number	Answer	Additional guidance	Mark
3(a)	 (1)  (1) poly(tetrafluoroethene) (1)	note **n** must be present on the repeating unit allow polytetrafluoroethene ignore ptfe / Teflon	**(3)**

Question number	Answer	Additional guidance	Mark
3(b)	any two from • polymers degrade very slowly / last very long time in landfill (1) • not biodegradable (1) • landfill sites fill up quickly (1) • (toxic) gases produced during disposal by combustion (1) • harmful to wildlife / habitats / ecosystems(1)	allow decompose/ breakdown / disintegrates allow named gases allow carbon dioxide	**(2)**

Question number	Answer	Mark
3(c)	**B**  is the only correct answer **A** is not correct because there are insufficient CH_3 groups attached to the carbon chain **C** is not correct because only one CH_3 group can be attached to a carbon atom **D** is not correct because there are no H atoms attached to the carbon chain	**(1)**

Question number	Answer	Additional guidance	Mark
3(d)	**MP1 : calculation** 24 600 x 42 (1) (=1 033 200) **MP2 : answer to 3 sig figs** = 1 030 000 / 1.03 x 10^6 (1) (to 3 sig figs)	without working: 1 030 000 – 2 marks 1 033 200 – 1 mark allow 24600/42 = 586 (1)	**(2)**

Total for Question 3 = 8 marks

Question number	Answer	Additional guidance	Mark
4(a)	(top pan) balance (1)	allow (weighing) scale(s)	**(1)**

Question number	Answer	Additional guidance	Mark
4(b)	An explanation linking • temperature rises / increases (by 11 °C) (1) • exothermic process (1)	allow gets hotter / water heats up {temperature / it} goes up Ignore heat increasing for MP1 allow heat / energy {given out / released to surroundings} reject endothermic for MP2	**(2)**

Question number	Answer	Mark
4(c)(i)	**C**  is the only correct answer **A** is the hazard symbol for corrosive substances **B** is the hazard symbol for substances that are harmful to the environment **D** is the hazard symbol for flammable substances	**(1)**

Question number	Answer	Additional guidance	Mark
4(c)(ii)	wear {goggles / **safety** glasses} / wear gloves	allow eye protection ignore tie long hair back ignore safety clothing / ppe	**(1)**
Question number	**Answer**	**Additional guidance**	**Mark**
4(d)	put a lid on / put cover on top / lag beaker / use insulation / use polystyrene cup (1)	allow any material around the beaker that prevents heat loss eg cotton wool /(aluminium) foil	**(1)**

Question number	Answer	Additional guidance	Mark
4(e)	MP1 : using volume = $\frac{\text{mass}}{\text{concentration}}$ (1) MP2: volume = $\frac{9.0}{12}$ (dm^3) (1) (= 0.75 dm^3) MP3: converting volume to cm^3 = 0.75 x 1000 (1) (= 750 (cm^3))	without working 750 cm^3 (3) 0.75 (dm^3) (2) $\frac{12}{9}$ (0) x 1000 (1) = 1333 cm^3	**(3)**

Total for Question 4 = 9 marks

Question number	Answer	Mark
5(a)(i)	x = 6 (1) y = 14 (1)	**(2)**

Question number	Answer	Mark
5(a)(ii)	25 (g)	**(1)**

Question number	Answer	Additional guidance	Mark
5(b)(i)	4 electrons shown between the 2 carbon atoms	electrons may be shown as dots, crosses or as a mixture	**(1)**

Question number	Answer	Additional guidance	Mark
5(b)(ii)	carbon monoxide / carbon / soot	allow CO / C ignore carbon dioxide	**(1)**

Question number	Answer	Additional guidance	Mark
5(c)	An explanation linking • (molecules of X) contain double bonds / C=C (1) • **only** contain carbon and hydrogen atoms (1)	 allow multiple bond	**(2)**

Question number	Answer	Additional guidance	Mark
5(d)	An explanation linking any two of the following • **A** reacts with bromine (water) (1) • (therefore) **A** is unsaturated (1) OR • **B** does not react with bromine (water) (1) • (therefore) **B** is saturated (1)	allow **A** is alkene / **B** is alkane (1) allow alkane does not decolourise / alkene does decolourise (1) allow A is unsaturated and B is saturated (2) allow A reacts and B does not react (2) ignore bromine water turns clear / is discoloured	**(2)**

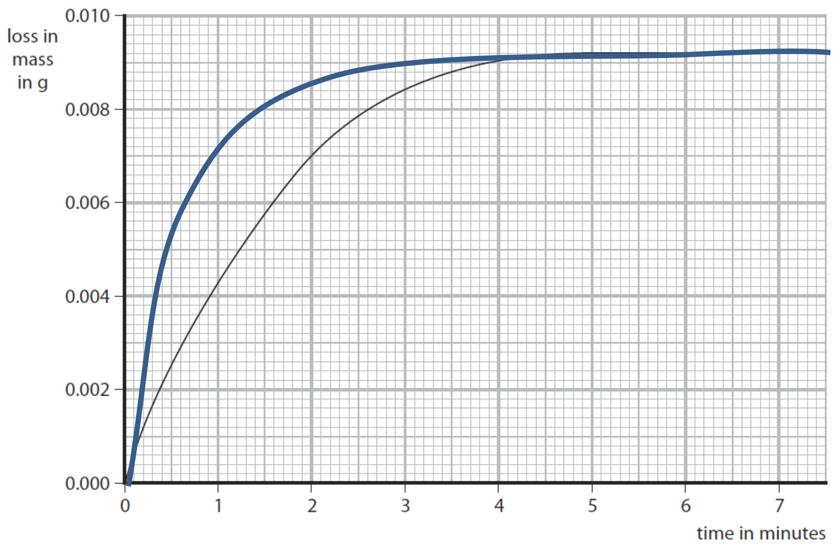
Total for Question 5 = 9 marks

Question number	Answer	Additional guidance	Mark
6(a)	Any suitable container for measuring volume of 100 cm^3 eg measuring cylinder	allow burette / pipette ignore beaker, conical flask, measuring jug	**(1)**

Question number	Answer	Additional guidance	Mark
6(b)	An explanation linking • {hydrogen / gas} formed / OWTTE (1) • escapes (from the flask) (1)	allow released (from the flask) ignore references to magnesium reacting	**(2)**

Question number	Answer	Additional guidance	Mark
6(c)	An explanation linking • MP1 : fewer reacting particles left / some particles reacted (1) • MP2: fewer collisions (1) • MP3: (fewer) frequent (collisions) (1)	for full marks, reference needs to be made to **particles** in answer allow more particles at the start (than at the end) allow less magnesium / less reactants (1) allow 'less' ignore particle speed allow (fewer collisions) per {second / unit time} (less/fewer) frequent collisions scores MP2 and MP3	**(3)**

Question number	Answer	Additional guidance	Mark
6(d)	(mass loss will be) greater (1)	Allow more gas Ignore references to reaction rate	**(1)**

Question number	Answer	Additional guidance	Mark
6(e)	 (2)	line drawn with steeper gradient to left of line (1) levelling off at the same height as the existing line (1)	**(2)**

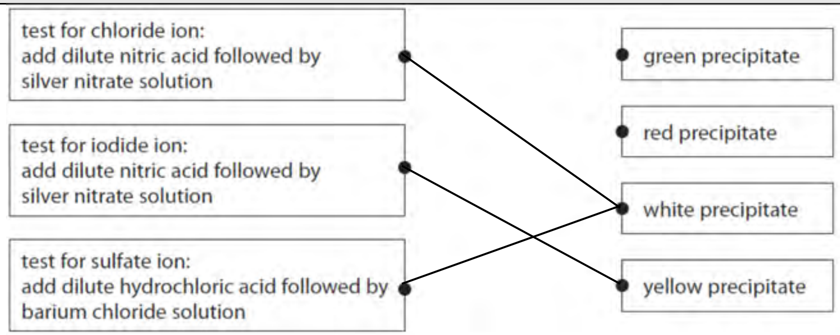
Question number	Answer	Additional guidance	Mark
6(f)(i)	makes it faster / increases rate / lowers activation energy	accept speeds it up / increases collision rate allow shorter reaction time / alternative reaction pathway / it could be carried out at a lower temperature ignore other aspects of catalysis eg is not used up ignore 'slows down the activation energy' ignore speeds up reaction time	**(1)**

Question number	Answer	Additional guidance	Mark
6(f)(ii)	Any three experimental points to include MP1 : use known mass of catalyst in a reaction / find mass of catalyst before reaction (1) MP2 : after reaction {remove / filter}, wash & dry (1) MP3 : find mass of catalyst afterwards / mass of catalyst unchanged (1)	 calculate difference in final and initial masses	**(3)**

Total for Question 6 = 13 marks

Question number	Answer	Mark
7(a)(i)	An explanation linking one of the following pairs • the test only detects that ion (1) • so no confusion with other ions (1) OR • if same result is given by more than one ion (1) • do not know which ion is present (1)	**(2)**

Question number	Answer	Additional guidance	Mark
7(a)(ii)	carbon dioxide	allow CO_2 ignore CO^2 / CO2 / Co_2	**(1)**

Question number	Answer	Additional guidance	Mark
7(a)(iii)	 (3)	chloride ion – white precipitate (1) iodide ion – yellow precipitate (1) sulfate ion – white precipitate (1) 1 mark for each line If more one line connects a left hand box to those on the right, do not award that mark	**(3)**

Question number	Indicative content	Mark
*7(b)	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive, and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO1 (3 marks) AO3 (3 marks)** • sodium, potassium and calcium ions detected by flame test • clean flame test wire with hydrochloric acid • dip wire into solid • hold wire in flame • if flame is yellow - sodium • if flame is lilac - potassium • if flame is orange-red – calcium • if no flame colour – could be aluminium • calcium and aluminium ions detected using sodium hydroxide solution • dissolve white solid in water • add drops of sodium hydroxide solution • white ppt shows calcium or aluminium ions • no ppt shows sodium or potassium ions • add more drops sodium hydroxide solution • if white ppt dissolves to form colourless solution • is aluminium ions • if white ppt does not dissolve • is calcium ions	**(6)**

Level	Mark	Descriptor
	0	• No awardable content
Level 1	1–2	• Interpretation and evaluation of the information attempted but will be limited with a focus on mainly just one variable. Demonstrates limited synthesis of understanding. (AO3) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Interpretation and evaluation of the information on both variables, synthesising mostly relevant understanding. (AO3) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Interpretation and evaluation of the information, demonstrating throughout the skills of synthesising relevant understanding. (AO3) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Level	Mark	Additional Guidance	General additional guidance – the decision within levels Eg - At each level, as well as content, the scientific coherency of what is stated backed up by planning detail will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance State test OR State the result of a test OR knows that sodium hydroxide solution can be used to test for some metal Gives correct flame colour for more than one metal One test stated and one correct result One test poorly described	Possible candidate responses • use a flame test OR sodium gives a yellow flame OR carry out precipitate test OR use sodium hydroxide • sodium gives a yellow flame and potassium gives a lilac flame • use a flame test, and sodium gives a yellow flame • use sodium hydroxide for a ppt test OR sodium above blue flame
Level 2	3–4	Additional guidance One test poorly described and one correct result for either test OR One test well described States both tests, including sodium hydroxide OR One test well described and at least one correct result Both tests poorly described OR One test poorly described, two correct results from either test	Possible candidate responses • sodium (compound) above blue flame gives yellow flame OR add sodium hydroxide and aluminium gives white ppt • sodium (compound) on wire/splint and in blue flame OR dissolve solid in water and add sodium hydroxide • do flame test; use sodium hydroxide for a ppt test OR dissolve solid in water and add sodium hydroxide and aluminium gives white ppt OR sodium (compound) on wire/splint and in blue flame gives yellow flame • sodium (compound) above the blue flame; use sodium hydroxide for a ppt test OR sodium (compound) above the blue flame gives a yellow flame, carry out precipitate test, white ppt formed
Level 3	5–6	Additional guidance Both tests poorly described, a correct result for both tests Both tests well described One test well described, one test poorly described, and a correct result for either test Both tests well described, and a correct result for both tests	Possible candidate responses • sodium (compound) on wire/splint gives yellow flame AND Add sodium hydroxide and aluminium gives white ppt • dissolve solid in water and add sodium hydroxide AND Sodium (compound) on wire/splint and in blue flame. • sodium(compound) on wire/splint and in blue flame gives yellow flame AND add sodium hydroxide to metal. • Dissolve solid in water and add sodium hydroxide and sodium on wire/splint and in blue flame AND sodium gives yellow flam AND aluminium gives white ppt.

Total for Question 7 = 12 marks

Question number	Answer	Mark
8(a)	**B** Crude oil is a mixture of hydrocarbons is the only correct answer Answer **A**, **C** and **D** are factually incorrect	**(1)**

Question number	Answer	Additional guidance	Mark
8(b)(i)	kerosene: (fuel for) aircraft / jets / lamps / cooking / heaters / fire lighters / rocket fuel (1) diesel oil: (fuel for) cars / trains / trucks / lorries / vehicles / tractors / generators / boats (1)	Ignore generic uses such as factories / machines / engines / fuel reject trains, boats allow ships	**(2)**

Question number	Answer	Additional guidance	Mark
8(b)(ii)	any one of • boiling point: low(er) • melting point: low(er) • ignition: easy / easier • viscosity: low(er) / {runny / runnier} / thin(ner) • flammability: high(er) • volatility: high(er) • density: low(er)	Note : unless otherwise stated, comparison is kerosene with diesel oil ignore lower number of carbons and hydrogens: lower length of chain: lower /shorter molecule / colour sootiness: diesel has sootier flame accept reverse argument for diesel oil note: property may be implicit in comparison	**(1)**

Question number	Answer	Additional guidance	Mark
8(c)(i)	An explanation linking • they differ **by CH_2** / differ by **one** carbon atom / pentane has **one** more carbon (1) • they have the **same** general formula / C_nH_{2n+2} / both alkanes (1)	ignore: similar chemical properties, quoting the two molecular formulae, they are both saturated, both have single bonds (only) reject carbon or hydrogen molecules for MP1 ignore same pattern of formula / **similar** general formula reject same {chemical / molecular} formula	**(2)**

Question number	Answer	Additional guidance	Mark
8(c)(ii)	82.8 with or without working scores 3 correct answer but incorrectly rounded or not to 3sf scores 2 4 x 12 (1) (= 48) OR $\frac{100}{58}$ (= 1.724...) (1) $\frac{48}{58}$ x 100 (1) (= 82.759) = 82.8 (g) (1)	allow ecf but calculation must use 12, 58, 100 if working rounded to 1dp and carried forward, allow full marks eg 1.72 x 48 = 82.56 (2) or 82.6 (3) allow $\frac{100}{58}$ (1) (= 1.72414) = 1.72 (1) (to 3 sf) OR $\frac{100}{58}$ (1) x 12 (= 20.68966) = 20.7 (1) (to 3 sf) OR 4 x 12 (1) x 100 (= 4800) = 4.80 x 10^3 (1) (to 3 sf)	**(3)**

Question number	Answer	Additional guidance	Mark
8(c)(iii)	butane + oxygen $\rightarrow$ carbon dioxide + water (2) butane + oxygen $\rightarrow$ (1) $\rightarrow$ carbon dioxide + water (1)	allow $C_4H_{10} + 6.5\ O_2 \rightarrow 4CO_2 + 5H_2O$ (2) allow multiples correct formulae no balancing (1) allow hydrogen oxide for water allow reactants and products in either order ignore state symbols allow = for $\rightarrow$	**(2)**

Total for Question 8 = 11 marks

Question number	Answer	Mark
9(a)	**B** 13 14 10 is the only correct answer **A** is incorrect because it is the numbers of subatomic particles in the atom not the ion **C** is incorrect because it would be an isotope of silicon with a +4 charge to it **D** is incorrect because it would be another isotope of silicon but with a 3- charge to it.	**(1)**

Question number	Answer	Additional guidance	Mark
9(b)	2.25/ 2.3 with or without working scores 3 MgO = 24 + 16 = 40 (1) **THEN** 1 g Mg forms $\frac{40}{24}$ (1) = 1.67 (g) MgO 1.35 g Mg forms $\frac{40 \times 1.35}{24}$ (1) MgO = 2.25 (g) **OR** Mg $\frac{1.35}{24}$ (1) = 0.05625 MgO 0.05625 x 40 (1) = 2.25 (g)	allow ecf for incorrect formula mass allow 48 g Mg forms 80 g MgO (1) (could be under the equation) **THEN** 1 g Mg forms $\frac{80}{48}$ (1) = 1.67 g MgO 1.35 g Mg forms $\frac{80 \times 1.35}{48}$ (1) MgO = 2.25 (g) **OR** Mg $\frac{1.35}{48}$ (1) = 0.028125 MgO 0.028125 x 80 (1) = 2.25 (g) Note 40 x 1.35 = 54 (2) or 80 x 1.35 = 108 (2)	**(3)**

Question number	Answer	Additional guidance	Mark
9(c)	Cl_2 + H_2 $\rightarrow$ 2HCl (3) Cl_2 + H_2 $\rightarrow$ (1) $\rightarrow$ HCl (1) balancing of correct formulae (1)	do not penalise incorrect small/ capital letters for left hand side formulae, do not allow Cl^2 or Cl2, but allow MP3 if correctly balanced allow reactants in either order allow ClH for HCl allow = for → allow multiples ignore state symbols if molecules have a + or – charge do not allow mark for formulae but allow MP3 for correct balancing	**(3)**

Question number	Indicative content	Mark
*9(d)	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive, and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO1 (3 marks) AO3 (3 marks)** • sodium atoms lose electrons • each sodium atom loses one electron • to obtain electronic configuration 2.8 • which is that of sodium ions, Na^+ • electrons transfer to chlorine atoms • chlorine atoms gain electrons • each chlorine atom gains one electron • to obtain electronic configuration 2.8.8 • which is that of chloride ions, Cl^- • sodium ions attract chloride ions • because of opposite charges • ions pack close together • ratio of ions 1:1 • ions arranged in lattice • giant (ionic) (structure)	**(6)**

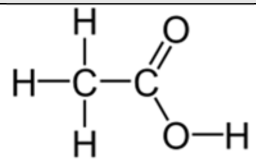
Level	Mark	Descriptor
	0	• No awardable content
Level 1	1–2	• Interpretation and evaluation of the information attempted but will be limited with a focus on mainly just one variable. Demonstrates limited synthesis of understanding. (AO3) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Interpretation and evaluation of the information on both variables, synthesising mostly relevant understanding. (AO3) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Interpretation and evaluation of the information, demonstrating throughout the skills of synthesising relevant understanding. (AO3) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Level	Mark	Additional Guidance	General additional guidance – the decision within levels Eg - At each level, as well as content, the scientific coherency of what is stated backed up by use of the information will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	<u>Additional guidance</u> Describes how ions are formed by loss or gain of electrons **OR** identifies structure type of sodium chloride	<u>Possible candidate responses</u> • atoms {lose / gain} electrons • sodium chloride has a giant structure • loose description of a solid ionic structure
Level 2	3–4	<u>Additional guidance</u> Describes formation of sodium ions by loss of electrons **or** describes formation of chloride ions by gain of electrons **OR** Describes formation of one ion using electron configurations **OR** Describes structure type of sodium chloride **OR** Basic description of ion formation and identifies sodium chloride structure	<u>Possible candidate responses</u> • sodium loses electrons and chlorine gains electrons to form ions • sodium loses {electrons / 1 electron} to form sodium ions [incorrect number of electrons lost puts this at the bottom of the level] • chlorine gains {electrons / 1 electron} to form **chloride** ions [incorrect number of electrons gained or '**chlorine** ions' puts this at the bottom of the level] • electron shell diagram showing atoms forming ions for either sodium or for chlorine
Level 3	5–6	<u>Additional guidance</u> Describes formation of sodium and chloride ions by loss or gain of electrons **AND** describes formation of ions using electron configurations. **or** Describes structure of sodium chloride	<u>Possible candidate responses</u> • {sodium / Na} atoms lose 1 electron to form {sodium ions / Na^+ (ions)} and {chlorine / Cl} atoms gain 1 electron to form {chloride ions / Cl^- (ions)} AND • Na : 2.8.1 becomes Na^+ : 2.8 and Cl : 2.8.7 becomes Cl^- : 2.8.8 OR as electron shell diagrams showing electron transfer or • sodium and chloride ions have opposite charges and attract each other (to make a giant structure) (could be shown in a diagram)

Total for Question 9 = 13 marks

Question number	Answer	Additional guidance	Mark
10 (a)	An explanation linking • yeast provides enzymes (1) • (at 80°C) the enzymes {not effective / denatured} (1)	 allow yeast provides a biological catalyst allow yeast provides zymase allow yeast {contains/is} an enzyme allow yeast is denatured ignore enzyme is killed allow yeast grows well at 30°C but yeast cells are killed at 80°C .	**(2)**

Question number	Answer	Mark
10 (b)(i)	**B** oxidised is the only correct answer **A**, **C** and **D** are factually incorrect	**(1)**

Question number	Answer	Additional guidance	Mark
10 (b)(ii)	 (2) or correct carboxylic acid group (1) correct methyl group (1)	allow correct dot and cross diagram ignore incorrect bond angles allow OH for O-H reject methyl group with additional carbons max 1 mark if double bond present 2 carbons	**(2)**

Question number	Answer	Additional guidance	Mark
10 (c)(i)	A description to include • heat water to increase temperature by 30°C (1) **AND** any two from • extinguish flame (1) • (re-)determine mass of burner containing ethanol (1) • subtract final from initial mass / calculate the change in mass (1)	ignore references to timing allow watch thermometer until the temperature increases 30°C / wait for temperature to rise 30°C allow put a cap on the burner (to extinguish flame) allow '(re-)weigh the burner'	**(3)**

Question number	Answer	Additional guidance	Mark
10 (c)(ii)	vertical axis with linear scale that uses more than half of the edge of the grid (1) all points correctly plotted to +/- ½ small square (1) single line of best fit drawn (1)	allow axis not starting at 0 allow points joined by straight lines / dot to dot ignore the line after points reject tramlines correct bar chart can gain MP1 and MP2	**(3)**

Total for Question 10 = 11 marks