



# **Mark Scheme (Results)**

Summer 2017

Pearson Edexcel GCSE

In Chemistry (5CH1F) Paper 1F



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Publications Code 5CH1F\_01\_1706\_MS

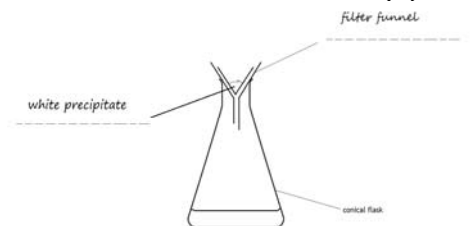
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## General Marking Guidance

- 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.

Question number	Answer	Marks
1 (a)(i)	<input checked="" type="checkbox"/> <b>B</b> calcium hydroxide  The only correct answer is B  <b>A</b> is not correct because limewater is calcium hydroxide solution, not HCl(aq)  <b>C</b> is not correct because limewater is calcium hydroxide solution, not NaCl(aq)  <b>D</b> is not correct because limewater is calcium hydroxide solution, not NaOH(aq)	(1)

Question number	Answer	Acceptable answers	Marks
1(a)(ii)	<ul style="list-style-type: none"> <li>(filter) <b>funnel</b> (1)</li> <li>precipitate / residue / solid / calcium carbonate (1)</li> </ul> 	Reject filter paper Allow filter funnel <b>AND</b> paper  Ignore any named forms of CaCO <sub>3</sub> (eg limestone)	(2)

Question number	Answer	Acceptable answers	Marks
1 (b) (i)	{dissolving in/ absorbed by} the {oceans/seas} / <b>photosynthesis</b>	No alternatives to photosynthesis	(1)

Question number	Answer	Acceptable answers	Marks
1 (b) (ii)	volcanoes/ forest fires/ <b>respiration</b> / decomposition <u>of plant matter</u>	Ignore breathing	(1)

Question number	Answer	Acceptable answers	Marks
1 (c) (i)	methane + oxygen → carbon dioxide + water  fully correct equation (2)  If not correct, allow (1) for : water as a product / methane <b>and</b> oxygen on LHS <b>and</b> carbon dioxide on RHS of equation (1)	ignore formulae allow = for → reject any equations with >1 →  ignore heat on RHS If heat on LHS – mark as 'if not correct'	(2)

Question number	Answer	Marks
1 (c) (ii)	<input checked="" type="checkbox"/> <b>B</b> diesel oil  The only correct answer is B  <b>A</b> is not correct because bitumen is not used as a fuel  <b>C</b> is not correct because hydrogen is used in much lower amounts than diesel  <b>D</b> is not correct because oxygen is not a fuel	(1)

(Total for Question 1 = 8 marks)

Question number	Answer	Marks
2 (a)	<p><b>A</b> gold</p> <p>The only correct answer is A</p> <p><b>B</b> is not correct because iron is too reactive to be found uncombined</p> <p><b>C</b> is not correct because potassium is too reactive to be found uncombined</p> <p><b>D</b> is not correct because zinc is too reactive to be found uncombined</p>	(1)

Question number	Answer	Acceptable answers	Marks
2 (b) (i)	<p>(lead oxide +) <b>carbon</b> → (1)</p> <p>(lead +) <b><u>carbon dioxide</u></b> / <b><u>carbon monoxide</u></b> (1)</p>	<p>ignore formulae</p> <p>No alternatives</p>	(2)

Question number	Answer	Acceptable answers	Marks
2 (b) (ii)	oxygen (1)	<p>O<sub>2</sub></p> <p>ignore O</p>	(1)

Question number	Answer	Acceptable answers	Marks
2 (c)	<p>an explanation to include two of the following</p> <ul style="list-style-type: none"> <li>• aluminium oxide is (too) stable/ aluminium higher in the <u>reactivity series</u> than carbon / aluminium "more reactive <u>than carbon</u>"/ aluminium is too reactive / aluminium is a (very) reactive metal / aluminium high in <u>reactivity series</u> (1)</li> <li>• carbon cannot reduce aluminium (oxide)/ aluminium cannot be extracted using carbon / no reaction would occur (1)</li> <li>• <b>electrolysis</b> {is a strong / powerful method for reduction / can extract reactive metals / can extract a metal from a stable compound} (1)</li> </ul>	<p>Ignore references to energy Ignore 'needs electrolysis' 'must use electrolysis' etc</p>	(2)

Question number	Answer	Acceptable answers	Marks
2 (d)	<p>An explanation including</p> <p>Aluminium has....</p> <ul style="list-style-type: none"> <li>• {low / lower} density (1)</li> <li>• (so) fewer pylons needed /easier to support (1)</li> </ul> <p>OR</p> <p>Aluminium has....</p> <ul style="list-style-type: none"> <li>• {greater / good} resistance to corrosion (1)</li> <li>• (so) cables {will not need frequent replacement / will not be affected by weather / will not corrode / will last longer} (1)</li> </ul>	<p>Allow "lighter" / "weighs less"</p> <p>Ignore "will not rust"</p> <p>Allow</p> <ul style="list-style-type: none"> <li>• {low / lower} density (1)</li> <li>• {greater / good} resistance to corrosion (1)</li> </ul> <p>If listing lots of properties from table with no explanations, <b>apply list principle: If 3 properties, max 1; if 4/5 properties = 0</b></p>	(2)

(Total for Question 2 = 8 marks)

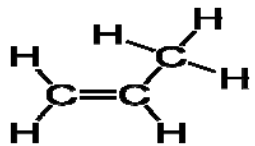


Question number	Answer	Acceptable answers	Marks
3 (a) (i)	<p>both points correctly plotted +/- half a small square (1)</p> <p>best-fit single line including at least the 4 pre-plotted carbons reasonably close to points (1)</p>	<p>Reject dot-to-dot Could be ruled line or curve (the points should not all be on one side of the best fit line)</p>	(2)

Question number	Answer	Acceptable answers	Marks
3 (a) (ii)	<p>A description to include</p> <ul style="list-style-type: none"> <li>the <b>boiling point</b> increases (1)</li> <li>as the number of (carbon) atoms (in one molecule) increases (1)</li> </ul>	<p>Mark independently</p> <p>Ignore 'the temperature increases'</p> <p>Allow 'positive correlation <b>between boiling point and number of carbon atoms</b>' for 2</p> <p>Just 'positive correlation' scores 1</p>	(2)

Question number	Answer	Acceptable answers	Marks
3 (a) (iii)	<p>answer from their graph +/- 2 (1)</p> <p>°C (1)</p>	<p>ONLY accept answer from (any) extrapolated graph line (whether line correct or not) – no line, no <b>first</b> mark</p> <p>Mark independently</p>	(2)

Question number	Answer	Marks
3 (a) (iv)	<p><b>C</b> can burn in a limited supply of air to form carbon monoxide</p> <p>The only correct answer is C</p> <p><b>A</b> is not correct because alkanes are hydrocarbons</p> <p><b>B</b> is not correct because bromine does not react with alkanes</p> <p><b>D</b> is not correct because alkanes have single bonds only</p>	(1)

Question number	Answer	Acceptable answers	Marks
3 (b)	<p>hydrogen (1)</p>  <p>(2)</p> <p>If incorrect, allow 3 carbon chain C=C-C or C-C=C with any number of H for (1)</p>	<p>Ignore H<sub>2</sub>/ H</p> <p>Do not penalise small letters here</p> <p>Ignore bond angles</p>	(3)

(Total for Question 3 = 10 marks)

Question number	Answer	Marks
4 (a)	<p><b>D</b> sedimentary</p> <p>The only correct answer is D</p> <p><b>A</b> is not correct because limestone is sedimentary</p> <p><b>B</b> is not correct because magma forms igneous rocks</p> <p><b>C</b> is not correct because limestone is sedimentary</p>	(1)

Question number	Answer	Acceptable answers	Marks
4 (b)	(making) cement / concrete / glass / steel / iron / (farmers use to) neutralise acidic soil / scrubbers on power stations	allow construction/ building materials / bricks / toothpaste / road making / statues/ monuments	(1)

Question number	Answer	Acceptable answers	Marks
4 (c)	<p>An explanation to include <b>two</b> of the following</p> <ul style="list-style-type: none"> <li>• noisy (1)</li> <li>• dusty /smoke (1)</li> <li>• (dust causes) breathing problems (1)</li> <li>• {extra traffic/ lorries} on roads (1)</li> <li>• damages tourist industry (1)</li> <li>• adverse effect on property values (1)</li> <li>• destroys habitats / landscapes (1)</li> <li>• eyesore/ ugly etc (1)</li> </ul>	<p>Ignore all incorrect responses</p> <p>Ignore refs to CO<sub>2</sub></p> <p>Ignore vague answers such as: bad for environment / (air) pollution / causes health problems / destroys wildlife / takes up space / destroys land etc</p>	(2)

Question number	Answer	Acceptable answers	Marks
4 (d) (i)	calcium carbonate → calcium oxide + carbon dioxide  calcium carbonate ONLY on LHS <b>(1)</b>  calcium oxide, carbon dioxide (any order) ONLY on RHS <b>(1)</b>	ignore formulae  allow = for →  ignore 'heat' 'energy' on LHS or on arrow but not on RHS  reject any equations with >1 →	<b>(2)</b>

Question number	Answer	Acceptable answers	Marks
4 (d) (ii)	5.0 – 2.8 (1) (=2.2) (g)	2.2 (g)	<b>(1)</b>

Question number	Answer	Acceptable answers	Marks
4 (e) (i)	<b>IN ALL THREE:</b> carbon dioxide is detected / produced / limewater goes milky (OWTTE)		<b>(1)</b>

Question number	Answer	Acceptable answers	Marks
4 (e) (ii)	<p>An explanation linking one pair from</p> <ul style="list-style-type: none"> <li>• copper carbonate takes shortest time, then zinc carbonate, then calcium carbonate</li> <li>• the order of ease of decomposition of carbonates was copper (least stable), zinc, calcium (most stable) (1)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• copper carbonate takes <b>shortest</b> time (for limewater to turn milky) (1)</li> <li>• copper carbonate is least stable / easiest to decompose (1)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• calcium carbonate took the <b>longest</b> time (for limewater to turn milky) (1)</li> <li>• calcium carbonate is most stable/ hardest to decompose (1)</li> </ul>	NOTE: ignore direct quotes from data unless explained	<b>(2)</b>

**(Total for Question 4 = 10 marks)**

Question number	Answer	Marks
5 (a)	<input checked="" type="checkbox"/> <b>C</b> the mass of solid waste is reduced  The only correct answer is C  <b>A</b> is not correct because carbon dioxide release is a disadvantage due to climate change  <b>B</b> is not correct because toxic gas release is a disadvantage  <b>D</b> is not correct because the solid waste is not recycled	(1)

Question number	Answer	Acceptable answers	Marks
5 (b) (i)	chloroethene / vinyl chloride	<b>No alternatives Reject ChloroethAne</b>	(1)

Question number	Answer	Acceptable answers	Marks
5 (b) (ii)	A description including any two of <ul style="list-style-type: none"> <li>double bond breaks (1)</li> <li>(monomer molecules/ named monomer/ alkenes) join/ bond/ link together (1)</li> <li>to form large / long chain molecules (1)</li> </ul>	Idea for second mark is connecting monomers (ignore 'react')	(2)

Question number	Answer	Acceptable answers	Marks
5 (c)	An explanation linking <ul style="list-style-type: none"> <li>(compound of) <u>hydrogen</u> and <u>carbon</u> (atoms) <b>only</b> (1)</li> <li>no (C=C) double bonds/ single (C-C) bonds <b>only</b> (1)</li> </ul>	Must name elements  Ignore 'max no. of H bonded'/ it is alkane	(2)

Question Number	Indicative Content	Mark
<p><b>QWC</b></p>	<p><b>* 5d</b></p> <p>A description to include some of the following points</p> <p><b>Exp</b></p> <p>A good fuel</p> <ul style="list-style-type: none"> <li>• burns easily</li> <li>• produces little ash</li> <li>• produces little smoke</li> <li>• produces a lot of heat energy</li> <li>• is easy to store</li> <li>• is easy to transport</li> <li>• is readily available</li> <li>• makes no toxic waste products</li> <li>• is renewable</li> <li>• is flammable</li> </ul> <p>ETHANOL</p> <ul style="list-style-type: none"> <li>• (highly) flammable</li> <li>• liquid – easy to store/ transport</li> <li>• renewable</li> <li>• requires land to grow sugar crops</li> <li>• carbon dioxide absorbed in growing crops = that released on combustion/ carbon neutral</li> </ul> <p>METHANE</p> <ul style="list-style-type: none"> <li>• (highly) flammable</li> <li>• gas – hard to store</li> <li>• fossil fuel – non-renewable</li> <li>• gives off carbon dioxide when burnt</li> <li>• carbon dioxide causes global warming</li> <li>• can be produced as biofuel – renewable</li> </ul> <p>PETROL</p> <ul style="list-style-type: none"> <li>• (highly) flammable</li> <li>• liquid – easy to store and transport</li> <li>• fossil fuel – non-renewable/ supplies will be exhausted</li> <li>• gives off carbon dioxide when burnt</li> <li>• can release CO</li> <li>• which is toxic</li> <li>• carbon dioxide causes global warming</li> <li>• easily available in petrol stations</li> <li>• can release sulfur dioxide / NOx</li> <li>• which can lead to acid rain</li> </ul>	<p>(6)</p>

<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• A limited description of at least one factor making a good fuel OR advantages and / or disadvantages of a fuel</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• A simple description of some factors making a good fuel AND a description of the fuel considering advantages and/or disadvantages</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• A detailed description of factors making a good fuel AND advantages AND disadvantages of a fuel</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

**(Total for Question 5 = 12 marks)**



Question number	Answer	Marks
6 (a)	<p><b>D</b> zinc sulfate</p> <p>The only correct answer is D</p> <p><b>A</b> is not correct because the carbonate reacts</p> <p><b>B</b> is not correct because the hydroxide reacts</p> <p><b>C</b> is not correct because the oxide reacts</p>	(1)

Question number	Answer	Acceptable answers	Marks
6 (b) (i)	<p>A description to include</p> <ul style="list-style-type: none"> <li>kills {bacteria / microorganisms / pathogens} (1)</li> <li>helps digestion / breaks down food / digests food (1)</li> </ul>	<p>must be kills/ destroys OWTTE ignore germs allow viruses</p> <p>allow enables enzyme function</p>	(2)

Question number	Answer	Acceptable answers	Marks
6 (b) (ii)	<p>aluminium hydroxide + hydrochloric acid → aluminium chloride + water</p> <p>aluminium hydroxide, hydrochloric acid (any order) ONLY on LHS <b>(1)</b></p> <p>aluminium chloride, water (any order) ONLY on RHS <b>(1)</b></p>	<p>ignore formulae allow = for →</p> <p>reject any equations with &gt;1 →</p>	(2)

Question number	Answer	Acceptable answers	Marks
6 (c)	Cl <sub>2</sub>	Capital C Small l Subscript 2  Reject: CL <sub>2</sub> , cL <sub>2</sub> , Cl <sup>2</sup> , Cl2	<b>(1)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>* 6d</b>  <b>Exp</b>	<p>A description to include some of the following points</p> <p>uses of the gases</p> <ul style="list-style-type: none"> <li>• chlorine for sterilizing/ treating tap/ drinking water</li> <li>• chlorine kills bacteria/microorganisms</li> <li>• chlorine used to treat / disinfect water in swimming pools (ignore 'cleans' etc)</li> <li>• chlorine for making bleach</li> <li>• chlorine for making polymers</li> <li>• chlorine for making poly(chloroethene) / PVC</li> <li>• hydrogen as a fuel for cars</li> <li>• hydrogen in fuel cells</li> <li>• hydrogen making ammonia/ in Haber process</li> <li>• hydrogen in weather balloons</li> </ul> <p>hazards of the gases</p> <ul style="list-style-type: none"> <li>• chlorine is <b><u>toxic/ poisonous</u></b></li> <li>• inhaling chlorine can lead to death / breathing difficulties</li> <li>• hydrogen explodes / catches fire</li> </ul> <p>test for chlorine</p> <ul style="list-style-type: none"> <li>• for chlorine add (damp) litmus paper</li> <li>• (blue turns red then) bleached / turns white; (red) bleached / turns white</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• A limited description of uses or hazards (of chlorine, of hydrogen or one for each gas) OR description of test for chlorine</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• A simple description involving two of : uses of chlorine/hydrogen and hazards of chlorine/hydrogen and test for chlorine</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• A detailed description of uses and hazards of chlorine/hydrogen and the test for chlorine</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

**(Total for Question 6 = 12 marks)**

