

Mark Scheme (Results)

Summer 2012

GCSE Chemistry
5CH1F/01

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Question Number	Answer	Acceptable answers	Mark
1(a)	oxygen	Ignore iron Reject oxide, O, O ₂ or O ₃	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	iron oxide + carbon (1) → iron + carbon dioxide(1)	iron oxide + C (1) → iron + CO ₂ (1)	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	D the iron oxide is reduced		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)	An explanation linking the following points <ul style="list-style-type: none"> • magnesium (1) • it is more reactive (than iron) / it is {higher (than iron)/highest/first/top} in the reactivity series (1) 	<p>Allow {highest / first / top /most reactive /higher than iron} (in the list) (1)</p> <p>Allow it reacts faster with {air/water/oxygen/other substances} (than iron) (1)</p> <p>Allow more things react with it (1)</p> <p>Allow 2nd marking point if a more reactive metal is chosen that is not in the list (1)</p> <p>Ignore it is high in the reactivity series</p> <p>Ignore it is reactive</p> <p>Do not allow 2nd marking point if chosen metal is less reactive than iron</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(d)(i)	Any one from {mixture of / contains / made from / formed from / addition of } AND {metals / metal and non-metal / metal and another element / metal and carbon / iron and another metal	Reject any mention of compound of metals etc Ignore metals etc combined/joined together Ignore combination of metals etc Allow put one metal into another Allow metals melted together	(1)

Question Number	Answer	Acceptable answers	Mark
1(d)(ii)	Any one from iron/ it <ul style="list-style-type: none"> • rusts / corrodes • is soft / is not strong enough / is too flexible / is too weak • {bends/breaks/snaps} easily • reacts with {air / oxygen / water / food} 	Ignore additional correct answers Do not award the mark if additional incorrect answers Allow iron would stain Allow (stainless) steel {is stronger than iron / does not rust as quickly } Ignore just 'stainless steel does not rust/corrode or react with {air/oxygen/water / food}'	(1)

Question Number	Answer	Acceptable answers	Mark
2(a)	D volcanoes erupting		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)	B carbon dioxide		(1)

Question Number	Answer	Acceptable answers	Mark
2(c)	<p>An explanation linking two of the following points</p> <ul style="list-style-type: none"> • Earth cooled (1) • {water (vapour) / steam} condensed (1) • {seas / oceans / rivers / lakes} formed (1) 	<p>Allow the Earth was warmer when the early atmosphere formed (1)</p> <p>Allow water (vapour) / steam turned into rain (1)</p> <p>Allow water vapour / steam turned into water (1)</p> <p>Ignore photosynthesis uses water</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(d)	<p>An explanation linking two of the following points</p> <ul style="list-style-type: none"> • amount of oxygen decreases / methane {uses / reacts with / combines with} oxygen (1) • amount of carbon dioxide increases / {produces /forms /makes/lets out/gives off /releases} carbon dioxide(1) • amount of water (vapour) increases / {produces /forms /makes/lets out/gives off /releases} water (vapour) (1) 	<p>Ignore references to other gases</p> <p>Ignore changes the amounts of gases</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(e)	<p>Any two from the following points</p> <ul style="list-style-type: none"> • farming / animals release methane (1) • deforestation / cutting down trees (1) • burning anything that is not a fossil fuel eg wood / rubbish / waste / plastic (1) • living things {breathing / respiration / taking in oxygen and releasing carbon dioxide} (1) • plants {photosynthesising / taking in carbon dioxide and releasing oxygen} (1) • {plants / animals} {decaying / decomposing} (1) • rotting waste (in landfill) (1) • processing limestone (1) 	<p>Ignore additional correct answers Penalise additional incorrect answers</p> <p>Ignore acid rain / cars / planes / pollution / global warming / factories / quarries / power plants</p> <p>Ignore just 'human activities' unless specified</p> <p>Allow volcanoes (erupting) (1)</p> <p>Allow gases dissolving in oceans (1)</p> <p>Allow iron seeding (1)</p> <p>Allow people smoking / use of aerosol sprays (1)</p> <p>Allow growing crops (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)	D copper sulfate		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	(i) hydrochloric acid (1) (ii) carbon dioxide (1)		(2)

Question Number	Answer	Acceptable answers	Mark
3(c)	<p>An explanation linking the following points</p> <p>First marking point tablet chosen with any one correct qualitative statement</p> <p>tablet A</p> <ul style="list-style-type: none"> because it neutralises more acid (than B) (1) <p>OR tablet B</p> <ul style="list-style-type: none"> because it is cheaper (than A) (1) <p>Second marking point any one correct quantitative statement eg.</p> <ul style="list-style-type: none"> need {3/more than 2} tablets of B to neutralise the same amount of acid as A (1) tablet A neutralises {three/more than two} times as much acid as B (1) it costs 3.6 p of B to neutralise the same amount of acid as {1 tablet/2.5p} of A (1) <p>Tablet A costs twice as much as tablet B but neutralises three times as much acid scores 2 marks</p>	<p>Allow answers based on analysis of numbers, e.g. tablet A because 1p of tablet A neutralises 12.24 cm³ of acid (1)</p> <p>1p of tablet B neutralises 8.5 cm³ of acid (1)</p> <p>Allow A neutralises more acid than B for the (same) amount of money (2)</p> <p>Ignore just A is more effective</p> <p>Allow it costs 0.08p to neutralise 1 cm³ of acid with tablet A (1) it costs 0.12p to neutralise 1 cm³ of acid with tablet B (1)</p> <p>Ignore A neutralises acid faster than B</p> <p>Ignore money units eg. pounds instead of pence</p> <p>Reject A contains more acid than B</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)(i)	A description including the following points <ul style="list-style-type: none"> • (damp blue or red) litmus (1) • turns (red then) white / bleached (1) 	<p>Allow use of any suitable indicator (1) with correct result (1) e.g. universal indicator is bleached (2) starch iodide paper turns blue/black (2)</p> <p>Allow bleaches indicator (1)</p> <p>Ignore indicator gets lighter</p> <p>Ignore any incorrect middle colour mentioned</p> <p>Reject goes clear</p> <p>Ignore smells of swimming pools (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)(ii)	hydrogen	<p>Allow H₂</p> <p>Reject H, 2H, H₂, H²</p>	(1)

Question Number	Answer	Acceptable answers	Mark
3(e)	A description including two of the following points <ul style="list-style-type: none"> • chlorine could leak out (1) • (it is) toxic / poisonous / irritant / corrosive (1) • an effect on people eg. death / injury / burn skin / damage lungs / bad for you if breathed in / make you ill / {irritates/damages} eyes (1) 	<p>Ignore just 'chlorine is dangerous'</p> <p>Ignore other effects eg. flammable / explosive</p> <p>Allow {harms / harmful} to people</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	$ \begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \\ & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{H} \\ & & & & \\ & \text{H} & \text{H} & \text{H} & \end{array} $	<p>Allow h for H</p> <p>Reject an extra bond (=) between any of the carbon atoms</p>	(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	<p>A description including the following points</p> <p>First marking point an active mixing of carbon dioxide with limewater eg.</p> <p>{bubble /pass gas through / put gas into /add gas to /mix gas with /shake gas with} limewater (1)</p> <p>Second marking point how the limewater changes milky/cloudy/white (precipitate) (1)</p>	<p>Reject blow through a straw</p> <p>Reject heat the limewater</p> <p>Allow pass gas etc through the water (1)</p> <p>Allow '{the water/it} turns milky/cloudy/white (precipitate)' (1)</p> <p>Do not allow changes colour</p> <p>Do not allow this mark if an incorrect gas/reagent is used</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	<p>Both marks must come from the same pair only, not one from each pair</p> <p>An explanation linking one of the following pairs</p> <p>EITHER</p> <ul style="list-style-type: none"> carbon monoxide formed (1) toxic /poisonous /can {kill / harm/suffocate} people /is {fatal /lethal} /restricts the amount of oxygen carried by the blood (1) <p>OR</p> <ul style="list-style-type: none"> smoke/soot formed (1) damages lungs /chokes people /makes things dirty (1) 	<p>Ignore additional answers</p> <p>Ignore dangerous</p> <p>Allow the second mark if an incorrect gas is stated eg methane (1)</p> <p>Allow less energy released (1)</p> <p>Allow blocks fuel jets (1)</p> <p>Allow less energy released (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	A ethanol		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	<p>An explanation linking two of the following points</p> <ul style="list-style-type: none"> • biofuels are {renewable /will not run out} / fossil fuels are {non-renewable / will (eventually) run out} (1) • biofuels can be obtained from {plants / animals /animal droppings} (1) • biofuels are produced more quickly (than fossil fuels) / fossil fuels take longer to produce (than biofuels) (1) • fossil fuels are used faster than being formed / finite resource (1) • fossil fuels are extracted from crude oil (1) 	<p>Ignore additional answers</p> <p>Allow 'it' or 'they' for 'biofuels'</p> <p>Allow biofuels have a lower carbon footprint / use carbon dioxide whilst growing / are carbon neutral (1)</p> <p>Allow biofuels contain biological material/made from living things Ignore biofuels can be reused</p> <p>Ignore releases less carbon dioxide</p> <p>Ignore biodegradable</p> <p>Ignore coal is a fossil fuel</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(c)	<p>Both marks must come from the same pair only, not one from each pair</p> <p>If no comparison is made, maximum is 1 mark</p> <p>An explanation linking a chosen fuel to two of the following points</p> <p>fuel A</p> <ul style="list-style-type: none"> • higher energy (per kg of fuel) / B produces less energy (1) • but {higher cost /only costs 18 p more /limited availability /difficulty in storing gas} (1) <p>OR</p> <p>fuel B</p> <ul style="list-style-type: none"> • is a liquid so easier to {handle/ store/transfer} (1) • cheaper (1) • greater availability (1) 	<p>If both fuels are discussed, select the fuel that gives the higher mark.</p> <p>Allow more energy per £/cost (2)</p>	(2)

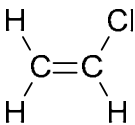
Question Number	Answer	Acceptable answers	Mark
5(a)	D sedimentary		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)	B cement		(1)

Question Number	Answer	Acceptable answers	Mark
5(c)(i)	<p>An explanation including two of the following points</p> <ul style="list-style-type: none"> • (calcium carbonate) decomposes / breaks down (1) • carbon dioxide / CO₂ (1) • {gas/carbon and two oxygen atoms} {escapes /is lost /given off /released / removed /produced/made} (1) 	<p>Ignore burning</p> <p>Allow O has less mass than CO₃ (1)</p> <p>Allow oxygen gas escapes etc (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(c)(ii)	<p>calcium oxide + water (1) → calcium hydroxide (1)</p> <p>the '+' and '→' must be present for 2 marks, but allow = for →</p> <p>LHS (1) RHS (1) Do not allow these marks if additional reactants and/or products are included</p>	<p>Allow CaO + H₂O (1) → Ca(OH)₂ (1)</p> <p>Allow a mixture of words and correct formulae</p> <p>If words and formulae are given, ignore formulae</p> <p>Ignore heat</p>	(2)

Question Number	Indicative Content	Mark
QWC	<p>*5 (d) A discussion including some of the following points</p> <p>Advantages</p> <ul style="list-style-type: none"> quarrying creates new jobs benefits the local economy/community limestone is useful as a building material / neutralising acid soils / removing acid gases from power station chimneys /making iron etc {calcium oxide / lime or calcium hydroxide / slaked lime} can be made from it and used to neutralise acid soils limestone can be made into other useful substances eg cement / concrete / glass educational visits <p>Do not allow just 'limestone is a raw material for the chemical industry' as this is in the question</p> <p>Disadvantages</p> <ul style="list-style-type: none"> quarrying scars the landscape/is an eyesore/ruins the view/is ugly quarrying takes a lot of land quarrying destroys the habitats of birds / animals quarrying is noisy quarrying creates dust the dust can cause health problems (asthma/breathing difficulties) there will be extra traffic / lorries on local roads house prices will be reduced less tourism 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> a limited description e.g. creates jobs the answer communicates ideas using simple language and uses limited scientific terminology spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> a simple description e.g. creates jobs but spoils the landscape / damages the landscape and creates dust the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accuracy
3	5 - 6	<ul style="list-style-type: none"> a detailed description e.g. creates jobs which benefits the local community but there will be extra traffic which is noisy the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)	ethene (1) poly(propene) (1)  (1)	Allow polypropene (1) Reject 'h' 'cl' 'CL' 'cL' Reject 5 bonds on either C Ignore bond angles	(3)

Question Number	Answer	Acceptable answers	Mark
6(b)	Any one from <ul style="list-style-type: none"> • does not contain hydrogen • only carbon and fluorine present • has fluorine instead of hydrogen • it does not contain carbon and hydrogen only 	Ignore molecules / particles Allow hydrocarbons contain carbon and hydrogen only	(1)

Question Number	Answer	Acceptable answers	Mark
6(c)	A description including two of the following points <ul style="list-style-type: none"> • rigid (1) • tough / strong / does not break easily (1) • long-lasting / durable / hardwearing (1) • does not {rot / corrode} / non-biodegradable(1) • light(weight) / low density (1) • insoluble / waterproof / water resistant / does not react with {water/any substance} / is unreactive (1) 	Ignore additional answers Ignore cheap / malleable Allow is smooth so {water can run along easily / harder to block} (1) Allow does not rust (1)	(2)

Question Number	Indicative Content	Mark
QWC	<p>*6 (d) A discussion including some of the following points</p> <p>Landfill</p> <p>Advantages</p> <ul style="list-style-type: none"> • requires no processing / easy to do • (almost) all waste can be sent to landfill <p>Disadvantages</p> <ul style="list-style-type: none"> • uses valuable land • loss of animal habitats • polymers do not rot • smell • attracts {vermin /gulls} • releases gases (as the waste rots) <p>Burning</p> <p>Advantages</p> <ul style="list-style-type: none"> • produces useful energy • solves the problem of landfill • quicker than rotting in landfill <p>Disadvantages</p> <ul style="list-style-type: none"> • produces harmful / toxic products / named gas eg. carbon dioxide, carbon monoxide, hydrogen cyanide <p>Recycling</p> <p>Advantages</p> <ul style="list-style-type: none"> • reuses the polymer /bottle • makes new articles e.g. insulation blocks • solves the problems of landfill and burning • conserves natural resources <p>Disadvantages</p> <ul style="list-style-type: none"> • difficult to sort and clean • uses energy • coloured plastics have limited new uses • not all items can be recycled • requires public cooperation <p>Disadvantage of any one of the methods</p> <ul style="list-style-type: none"> • extra traffic / lorries / noise <p>Explanation of disposal method</p> <ul style="list-style-type: none"> • statement of chosen method of disposal 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited discussion e.g. bottles do not rot / recycling is the best method for disposing of plastic bottles • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> • a simple discussion e.g. bottles do not rot and produce toxic products when burnt, recycling is best • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	<ul style="list-style-type: none"> • a detailed discussion e.g. landfill uses valuable land, burning produces useful energy, recycling reuses the material and is best method of disposing of bottles • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

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