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Mark Scheme (Results)

Summer 2012

GCSE Chemistry
5CH1F/01

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Summer 2012
Publications Code UG033039

GCSE Chemistry 5CH1F/01 Mark Scheme – Summer 2012

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 • magnesium (1) • it is more reactive (than iron) / it is {higher (than iron)/highest/first/top} in the reactivity series (1)	**Allow** {highest / first / top /most reactive /higher than iron} (in the list) (1) **Allow** it reacts faster with {air/water/oxygen/other substances} (than iron) (1) **Allow** more things react with it (1) **Allow** 2nd marking point if a more reactive metal is chosen that is not in the list (1) **Ignore** it is high in the reactivity series **Ignore** it is reactive **Do not allow** 2nd marking point if chosen metal is less reactive than iron	**(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 • 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)	An explanation linking **two** of the following points • Earth cooled (1) • {water (vapour) / steam} condensed (1) • {seas / oceans / rivers / lakes} formed (1)	**Allow** the Earth was warmer when the early atmosphere formed (1) **Allow** water (vapour) / steam turned into rain (1) **Allow** water vapour / steam turned into water (1) **Ignore** photosynthesis uses water	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	An explanation linking **two** of the following points • 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)	**Ignore** references to other gases **Ignore** changes the amounts of gases	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(e)	Any **two** from the following points • 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)	**Ignore** additional correct answers **Penalise** additional **incorrect** answers **Ignore** acid rain / cars / planes / pollution / global warming /factories / quarries / power plants **Ignore** just 'human activities' unless specified **Allow** volcanoes (erupting) (1) **Allow** gases dissolving in oceans (1) **Allow** iron seeding (1) **Allow** people smoking / use of aerosol sprays (1) **Allow** growing crops (1)	**(2)**

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

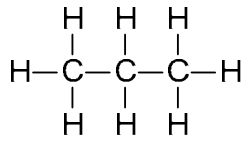
Question Number	Answer	Acceptable answers	Mark
3(b)	(i) hydrochloric acid (1) (ii) carbon dioxide (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)	An explanation linking the following points **First marking point** tablet chosen with any one correct qualitative statement tablet A • because it neutralises more acid (than B) (1) OR tablet B • because it is cheaper (than A) (1) **Second marking point** any one correct quantitative statement **eg.** • 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) Tablet A costs twice as much as tablet B but neutralises three times as much acid scores 2 marks	**Allow** answers based on analysis of numbers, e.g. tablet A because 1p of tablet A neutralises 12.24 cm^3 of acid (1) 1p of tablet B neutralises 8.5 cm^3 of acid (1) **Allow** A neutralises more acid than B for the (same) amount of money (2) **Ignore** just A is more effective **Allow** it costs 0.08p to neutralise 1 cm^3 of acid with tablet A (1) it costs 0.12p to neutralise 1 cm^3 of acid with tablet B (1) **Ignore** A neutralises acid **faster** than B **Ignore** money units eg. pounds instead of pence **Reject** A **contains** more acid than B	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(d)(i)	A description including the following points • (damp blue or red) litmus (1) • turns (red then) white / bleached (1)	**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) **Allow** bleaches indicator (1) **Ignore** indicator gets lighter **Ignore** any incorrect middle colour mentioned **Reject** goes clear **Ignore** smells of swimming pools (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(d)(ii)	hydrogen	**Allow** H_2 **Reject** H, 2H, H2, H^2	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(e)	A description including **two** of the following points • 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)	**Ignore** just 'chlorine is dangerous' **Ignore** other effects eg. flammable / explosive **Allow {**harms / harmful} to people	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)		**Allow** h for H **Reject** an extra bond (=) between any of the carbon atoms	**(1)**

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

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	**Both marks must come from the same pair only, not one from each pair** An explanation linking **one** of the following pairs **EITHER** • carbon monoxide formed (1) • toxic /poisonous /can {kill / harm/suffocate} people /is {fatal /lethal} /restricts the amount of oxygen carried by the blood (1) **OR** • smoke/soot formed (1) • damages lungs /chokes people /makes things dirty (1)	Ignore additional answers **Ignore** dangerous **Allow** the second mark if an incorrect gas is stated eg methane (1) **Allow** less energy released (1) **Allow** blocks fuel jets (1) **Allow** less energy released (1)	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	An explanation linking **two** of the following points • 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)	**Ignore** additional answers **Allow '**it' or 'they' for 'biofuels' **Allow** biofuels have a lower carbon footprint / use carbon dioxide whilst growing / are carbon neutral (1) **Allow** biofuels contain biological material/made from living things **Ignore** biofuels can be reused **Ignore** releases less carbon dioxide **Ignore** biodegradable **Ignore** coal is a fossil fuel	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)	**Both marks must come from the same pair only, not one from each pair** **If no comparison is made, maximum is 1 mark** An explanation linking **a chosen fuel** to **two** of the following points fuel A • 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) **OR** fuel B • is a liquid so easier to {handle/ store/transfer} (1) • cheaper (1) • greater availability (1)	If both fuels are discussed, select the fuel that gives the higher mark. **Allow** more energy per £/cost (2)	**(2)**

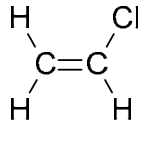
Question Number	Answer	Acceptable answers	Mark
5(a)	**D** sedimentary		**(1)**

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

Question Number	Answer	Acceptable answers	Mark
5(c)(i)	An explanation including **two** of the following points • (calcium carbonate) decomposes / breaks down (1) • carbon dioxide / CO_2 (1) • {gas/carbon and two oxygen atoms} {escapes /is lost /given off /released / removed /produced/made} (1)	**Ignore** burning **Allow** O has less mass than CO_3 (1) **Allow** oxygen gas escapes etc (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(c)(ii)	calcium oxide + water (1) → calcium hydroxide (1) the '+' and '→' must be present for 2 marks, but allow = for → LHS (1) RHS (1) Do not allow these marks if additional reactants and/or products are included	**Allow** $CaO + H_2O$ (1) → $Ca(OH)_2$ (1) **Allow** a mixture of words and correct formulae If words and formulae are given, ignore formulae **Ignore** heat	**(2)**

Question Number		Indicative Content	Mark
QWC	***5 (d)**	A discussion including some of the following points **Advantages** • 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 **Do not allow** just 'limestone is a raw material for the chemical industry' as this is in the question **Disadvantages** • 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**	• 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**	• 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**	• 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 • 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 • 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	***6 (d)**	A discussion including some of the following points **Landfill** Advantages • requires no processing / easy to do • (almost) all waste can be sent to landfill Disadvantages • uses valuable land • loss of animal habitats • polymers do not rot • smell • attracts {vermin /gulls} • releases gases (as the waste rots) **Burning** Advantages • produces useful energy • solves the problem of landfill • quicker than rotting in landfill Disadvantages • produces harmful / toxic products / named gas eg. carbon dioxide, carbon monoxide, hydrogen cyanide **Recycling** Advantages • reuses the polymer /bottle • makes new articles e.g. insulation blocks • solves the problems of landfill and burning • conserves natural resources Disadvantages • difficult to sort and clean • uses energy • coloured plastics have limited new uses • not all items can be recycled • requires public cooperation Disadvantage of any one of the methods • extra traffic / lorries / noise **Explanation of disposal method** • statement of chosen method of disposal	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• 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**	• 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**	• 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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Order Code UG033039 Summer 2012

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