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Mark Scheme (Results)

November 2012

GCSE Chemistry
5CH1H/01

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GCSE Chemistry 5CH1H/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	electrical (energy) / electricity / direct (electric) current	**Reject** {ac/ alternating current}	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	hydrogen	H_2	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	A description including (damp blue or red) litmus (paper)) (turns red and) bleached / white)	**Allow** use of any suitable indicator (1) with correct result (1) eg Universal Indicator (1) is bleached (1) starch-iodide paper (1) turns blue-black (1) **Allow** bleaches indicator (1) **Do not allow** colourless for {bleached/white} if indicator paper is used **Ignore** indicator gets lighter **Ignore** any incorrect middle colour mentioned **Ignore** smells of swimming pools	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
1(c)	carbon dioxide	CO_2	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(d)	CuO + **2** $HCl \rightarrow CuCl_2$ + $\mathbf{H_2O}$ 2 (1) H_2O (1) Maximum 1 mark if additional incorrect balancing	**Reject** obvious incorrect symbols and subscripts eg h_2O (0) H^2O (0) H_2o (0) H2O (0) **Ignore** state symbols	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)	**C** hydrocarbons		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	**D** power station furnaces		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ correct formulae on left $CH_4 + O_2$ (1) correct formulae on right $CO_2 + H_2O$ (1) balancing of correct formulae(1)	**Allow** multiples or halves **Allow** = for → **Reject** obvious incorrect symbols and subscripts once only	**(3)**

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	48 (kJ) (1) or 5472 /114 = 48 (kJ) (1) or 5472/114 (1)		**(1)**

Question	Answer	Acceptable answers	Mark

Number			
2(c)(iii)	Any two of easy to ignite / low boiling point / low viscosity (1) {burns readily/easily} / (in)flammable(1) not produce too much {soot/ash/ smoke} / burns with {clean/blue} flame / burns cleanly (1) easy to {store/contain} (1) easy to {transport/transfer} (1) high energy output per unit {mass /volume} (1) does not produce {toxic gases/carbon dioxide/sulfur dioxide/greenhouse gases} / contains a low amount of sulfur (1) fuel is {readily available/easy to obtain/will not run out/long lasting/renewable} (1) carbon neutral (1)	**Ignore** burns for a long time **Ignore** just 'releases a lot of energy' **Ignore** references to cost **Ignore** vague answers eg doesn't cause pollution/harmful gases **Ignore** answers written in the form of questions or statements that do not show a characteristic of a **good** fuel eg how easy is it to ignite the fuel? how much energy it produces **Allow** a little produces a lot of energy **Allow** produces a lot of {miles/km} per {gallon/litre}	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)	**B** large amount of carbon dioxide and small amount of oxygen		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	**Both marks must come from the same pair only, not one from each pair** An explanation linking EITHER plants (1) photosynthesis / take in carbon dioxide and release oxygen (1) OR oceans / rain /seas /water (1) {dissolve/absorb/take in} gas (1)	**Allow** convert to hydrocarbon (1) iron seeding (1) **Reject** respiration for photosynthesis **Ignore** breathe in carbon dioxide **Ignore** carbon is locked up in rocks	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	**Both marks must come from the same pair only, not one from each pair** An explanation linking burning/ (complete) combustion(1) (fossil) fuels/wood/rubbish/plastic etc (1) or plants/animals/organisms (1) respiration / gas exhaled / breathing / decaying (1) or volcanic activity/volcanoes (1) eruption (releases gas) (1)	**Ignore** just 'deforestation' **Ignore** just 'farming' **Allow** any type of fuel except hydrogen **Allow** heating limestone (2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)	A description including limewater (1) turns milky/cloudy/white ecipitate (1)	 **Ignore** heat **Reject** observation if incorrect reagent eg bromine water or water	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(d)	**All marks must come from the same section only, do not mix and match** An explanation linking: EITHER **First 2 marking points** concentration of carbon dioxide increases (steadily) (1) but the temperature {fluctuates/increases and decreases} (1) **Third marking point** dependent on at least 1 comment from a graph any 1 from: not all carbon dioxide is produced by human activity (1) none of the graphs refer to human activity (1) there is no proof that human activity causes the temperature to rise (1) other factors could cause the rise in temperature (1) OR **First two marking points** as the (mean global) temperature increases (1) concentration/amount} of carbon dioxide increases (1) **Third marking point** dependent on at least 1 comment from a graph any 1 from: human activity could be causing	**Allow** the patterns of increase in carbon dioxide and temperature are different (2)	**(3)**

	the rise in carbon dioxide (1) (world) population has increased (so the amount of carbon dioxide has increased) (1) (increase in) use of {fossil/carbon-based} fuels (produces more carbon dioxide) (1) (increase in) deforestation (decreases the amount of carbon dioxide removed by photosynthesis)		

Question Number	Answer	Acceptable answers	Mark
4(a)	**A** chalk		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	1.10 (g) (1) or 1.1 (g) (1) or 2.50 – 1.40 (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	A suggestion including heat remaining solid/ heat it for longer / heat it again (1) mass after heating stays the same / gas does not turn limewater milky (1) or add acid (1) no effervescence (1)	**Ignore** reference to repeating the whole experiment again / heating a new sample of solid **Allow** add Universal Indicator and it stays red (after adding acid)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	$CaO + H_2O \rightarrow Ca(OH)_2$ LHS formulae correct (1) RHS formula correct (1) maximum 1 mark if any incorrect balancing	**Allow** $Ca(HO)_2$ **Allow** multiples **Reject** obvious incorrect symbols and subscripts once only	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)	initial total mass = 11.00 + 10.50 (1) = 21.50/21.5 (g) total mass remaining = 21.50 – 1.00 (1) = 20.50/20.5 (g) marks are for the working	20.50/20.5 (g) with no working (2) **Allow** 11.00 + 10.50 + 1.00 = 22.5/22.50 (g) (1) 22.5/22.50 (g) with no working (0) **Allow** correct working with incorrect answers	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)	An explanation linking two of {neutralises / reacts with / removes / destroys/ gets rid of / takes in} the (waste) gases(1) acid(ic) (gases) / carbon dioxide / sulfur dioxide / oxides of nitrogen (1)	**Ignore** calcium carbonate is a base/alkali **Allow** stops (the waste gases) being released **Allow** {reduces/prevents} acid rain (1) **Ignore** toxic (gases) **Allow** acidic waste	**(2)**

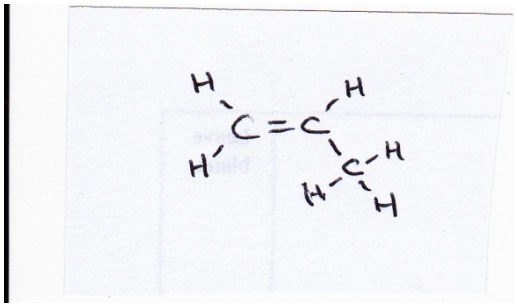
Question Number	Answer	Acceptable answers	Mark
5(a)(i)	carbon (is oxidised)	Just 'carbon dioxide' (0)	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	**Maximum 1 mark if answer only mentions one of the metals.** An explanation linking two of iron is lower in reactivity than aluminium/ORA (1) carbon can remove the oxygen from iron oxide (1) electrolysis is a more powerful method (than using carbon) / electrolysis is needed to {remove the oxygen from/reduce} aluminium oxide (1) iron compounds less stable than aluminium compounds/ORA (1)	**Allow** carbon is more reactive than iron /ORA(1) **Allow** aluminium is more reactive than carbon /ORA (1) **Ignore** carbon can reduce iron oxide **Ignore** electrolysis is used to extract aluminium	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)	An explanation linking three of atoms of gold all the same (size) (1) in pure gold {layers/rows/sheets/lines} of the {gold / metal} atoms slide over each other (when force is applied) (1) copper atoms are {smaller / different size} (1) (copper atoms) {disrupt / distort /disturb} the {structure / layers} (1) stops {layers/rows/sheets/lines} of gold atoms from sliding over each other (1)	**Reject** the use of the word molecule once only **Allow** particles If layers/rows/sheets/lines is omitted twice, you can award one mark.	**(3)**

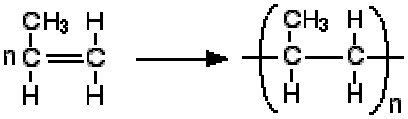
<table>
<tr><th colspan="2">Question Number</th><th>Indicative Content</th><th>Mark</th></tr>
<tr><td>QWC</td><td>*5(c)</td><td>An explanation including some of the following points
<table>
<tr><th>Use</th><th>Relevant properties</th></tr>
<tr><td>Aluminium</td><td></td></tr>
<tr><td>aeroplanes, cars, bicycles, trains, trucks, ladders, window frames, door frames, greenhouses, pylons, ship masts, walking poles, golf clubs, baseball bats</td><td>low density (allow light), strong, resistant to corrosion</td></tr>
<tr><td>(overhead) power/electricity cables</td><td>low density (allow light), good conductor of electricity, resistant to corrosion</td></tr>
<tr><td>foil, food packaging, cans, sweet wrappers, saucepans, blister packs for pills</td><td>low density (allow light), resistant to corrosion</td></tr>
<tr><td>Copper</td><td></td></tr>
<tr><td>electrical wires/cables, lightning conductors, electromagnets</td><td>good conductor of electricity</td></tr>
<tr><td>water pipes, roofing, coins, jewellery, statues, musical instruments</td><td>resistant to corrosion</td></tr>
<tr><td>Gold</td><td></td></tr>
<tr><td>jewellery, coins, in dentistry</td><td>excellent resistance to corrosion, valuable, low strength</td></tr>
<tr><td>electronic devices, circuit boards, switch contacts</td><td>excellent conductor of electricity</td></tr>
<tr><td>Silver</td><td></td></tr>
<tr><td>jewellery, cutlery, coins</td><td>very good resistance to corrosion, valuable, low strength</td></tr>
<tr><td>electronic devices, circuit boards, switch contacts</td><td>excellent conductor of electricity</td></tr>
</table>
General points
A property must be relevant to the use and from the table in the question.
Ignore additional properties.
Look for the use first, then the relevant property. Candidates who just re-write or compare the properties with no uses score no marks.
Ignore non-specific uses such as building materials/structures, making alloys</td><td>(6)</td></tr>
</table>

Level	**0**	No rewardable content
1	**1 - 2**	a limited explanation e.g. states correct uses of two metals / explains a use of one of the metals related to a property in the table 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 explanation e.g. states correct uses of three metals and relates one use to a property / explains uses of two metals related to their properties in the table 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 explanation e.g. explains uses of three metals and relates use to property in the table in each case 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)(i)	 **one** C=C in a three consecutive carbon atom molecule (1) rest of structure correct, ignore bond angles, conditional on first marking point(1)	allow methyl group written as CH_3	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	**B** C_7H_{16}		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	A description including add bromine (water) / aqueous bromine (and shake the tube)(1) stays orange / no change / does not go colourless in {propane/alkane} (1) turns colourless / decolorises in {propene/alkene} (1) Maximum 1 mark for 2 correct observations with an incorrect reagent or no reagent specified	**Allow** recognisable spelling for bromine **Allow** yellow / brown or combinations of these for orange **Ignore** just 'red' **Ignore** clear / discoloured one correct test with statement or clear implication that the other must be the other gas for full marks eg add bromine water to both gases, the one that turns it colourless is propene, scores 3 marks as it is clearly implied that the other gas does not turn it colourless	**(3)**

Question Number		Indicative Content	Mark
QWC	***6(c)**	An explanation including some of the following points **Making the polymer** many propene molecules join/react together form a long chain polymerisation reaction propene is the monomer propene is unsaturated / has a double bond poly(propene) has single bonds propene is a gas and forms poly(propene) which is a solid the C=C bond breaks / opens up  **Properties of poly(propene) with related uses** e.g. property – flexible, low density (lightweight), shatterproof, high softening point, non-toxic, strong, tough, good insulator, water proof, resistant to corrosion, long lasting, can be moulded into shape, can be made into fibres Uses of poly(propene) use – to make plastic bags, packaging, buckets, bowls, food containers, ropes, carpets, thermal underwear, Thinsulate items, toys, bottles, bottle caps, laboratory equipment, medical equipment, pipes, car bumpers, crates, furniture, tubing	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	a limited explanation of how to make the polymer or properties or uses e.g. propene molecules join together to form the polymer / polypropene can be used to make carpets 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 explanation of how to make the polymer and/or properties and/or uses e.g. propene molecules are monomers and join together to make poly(propene)/ poly(propene) is used to make buckets because it can be moulded into shape 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 explanation including reference to how to make the polymer, its uses and properties e.g. propene molecules have a double bond and poly(propene) can be used to make washing up bowls because it is strong. / propene molecules have a double bond and many of them join together to make polypropene which is used to make ropes. 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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