

Mark Scheme (Results)

November 2011

GCSE Chemistry
5CH1H/01

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Question Number	Answer	Acceptable answers	Mark
1 (a) (i)	<p>Any one from</p> <ul style="list-style-type: none"> • steel {corrodes/rusts} • prevents {corrosion/rusting} • (copper) does not {corrode/rust} • (copper) oxidises slower • kills bacteria (1) 	<p>copper is less reactive than {iron/steel}</p> <p>does not oxidise/does not react with {oxygen/water}</p> <p>prevents germs spreading</p> <p>cheaper than (using) pure copper</p> <p>Ignore to make it less reactive and references to appearance and erosion</p>	(1)

Question Number	Answer	Acceptable answers	Mark
1 (a) (ii)	zinc	Zn	(1)

Question Number	Answer	Acceptable answers	Mark
1 (b)	<p>An explanation linking three of the following:</p> <ul style="list-style-type: none"> • in pure metal {layers/sheets} (of particles){slide/slip/move} (over one another easily) (1) • second (metal) particles larger (1) • disrupt {layers/structure} (1) • prevent {layers/particles} slipping (1) 	<p>Accept ions or atoms for particles but reject molecules</p> <p>different sized particles</p> <p>{lock/hold} layers together</p> <p>Ignore glue</p>	(3)

Question Number	Answer	Acceptable answers	Mark
1 (c) (i)	D		(1)

Question Number	Answer	Acceptable answers	Mark
1 (c) (ii)	<p>An explanation linking two of the following</p> <ul style="list-style-type: none"> • (aluminium) more reactive (1) • forms more stable compounds (1) • more difficult {to remove oxygen /split (compound)} (1) • electrolysis is more powerful method of reduction (1) 	<p>too reactive/{above carbon/higher up} in reactivity series forms compounds with stronger bonds</p> <p>carbon {cannot remove oxygen/displace aluminium}</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	iron + oxygen → iron oxide (1) oxygen + iron → iron oxide (1)	= instead of → $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$ (symbol equation must be fully correct)	(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	An explanation linking two of the following <ul style="list-style-type: none"> the iron {reacts/combines} with the oxygen (in the air) /iron oxide formed(1) oxygen removed (from air) (1) volume of gas decreases / water rises to fill space (1) 	Ignore absorbs/takes in Accept oxygen used up {volume/amount} of air decreases	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	% oxygen in air = 21 / % air remaining = 79 (1) volume of air remaining = $\frac{10 \times 79}{100}$ (1) = 7.9 (cm ³)	% oxygen in air = 20 / % air remaining = 80 Allow 2 marks for 7.9 to 8 on its own Allow ecf from incorrect % oxygen if clear	(2)

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

Question Number	Answer	Acceptable answers	Mark
2(b)	An explanation linking two of the following <ul style="list-style-type: none"> burning/combustion (1) removes oxygen (1) adds carbon dioxide (1) adds water vapour (1) 	Allow 1 mark for adds sulphur dioxide if clear from sulphur impurities	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)	C		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	<ul style="list-style-type: none"> • correct repeating unit(1) • two correct units shown with continuation bonds (1) 	any answer with double bonds = 0 Allow if correct and more than two units shown	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)	A description including two of the following points <ul style="list-style-type: none"> • bromine (water) (1) • (bromine water) turns (from orange) to colourless/or is decolourised (1) 	Ignore clear/discoloured	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)(i)	17 (g)	seventeen (g)	(1)

Question Number	Answer	Acceptable answers	Mark
3(d)(ii)	An explanation linking two of the following <ul style="list-style-type: none"> • break down of hydrocarbons / large molecules / alkanes (1) • into small(er) molecules (1) • into alkanes and alkenes (1) 	Reject 'chains of molecules' /polymers Ignore chains	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)(iii)	<p>An explanation linking two of the following:</p> <ul style="list-style-type: none"> • less demand for (fractions containing) large molecules ORA (1) • large molecules are less useful ORA (1) • specific use of product fractions e.g. petrol / fuel for cars(1) • to make alkenes (1) • specific use of alkenes produced e.g. as monomers / to make polymers / to make plastics (1) 	<p>Reject are useless</p> <p>named alkenes</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	$2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ <ul style="list-style-type: none"> reactant formula (1) product formulae (1) balancing correct formulae (1) 	Allow 1 mark for $2\text{H}^2\text{O} \rightarrow 2\text{H}^2 + \text{O}^2$ Ignore state symbols Ignore word equations	(3)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	A description including the following: <ul style="list-style-type: none"> lighted splint / ignite gas / gas burns(1) with (squeaky) pop (if air present) (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	A description including the following <ul style="list-style-type: none"> glowing splint (1) relights (1) 	smouldering splint Ignore blown out splint lighted splint burns brighter = 2	(2)

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

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	use a fume cupboard/open all the windows /(good) ventilation/wear a gas mask	Ignore do not breathe in	(1)

Question Number	Answer	Acceptable answers	Mark
4(c)	hydrochloric (acid)	Ignore HCl	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)	C		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)	<p>advantage (brings in) money / employment (1)</p> <p>disadvantage dust / noise pollution /extra traffic /destroys (wildlife) habitat /damages landscape /damages natural beauty / less tourists (1)</p>	<p>provides (local) building material</p> <p>Ignore pollution</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(c)	<p>A description linking three of the following</p> <ul style="list-style-type: none"> • heat/thermally decompose (calcium carbonate)(1) • to form calcium oxide (1) • {react (calcium oxide) with / add} water (1) • to form (solid) calcium hydroxide (1) • add (more) water / dissolve (calcium hydroxide) in water (1) • filter (1) 	<p>word/symbol equations could score marks</p> <p>Reject burning</p> <p>Allow quicklime</p> <p>Allow slaked lime</p>	(3)

Question Number	Indicative Content	Mark
QWC	*5(d)	
	<p>A description to include some of the following points:</p> <ul style="list-style-type: none"> • formed from sediments / shells • sediments fall to the bottom of the sea • layers of sediment build up on top of one another • over (very) long time period • rock formed / compaction • (caused by)pressure (from the layers above and minerals) • (cause) the sediment to 'stick together' • (to form)layers • rock movement/change in sea level • (more recently) rock has been weathered / eroded (by sea) • because it is a soft rock 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description e.g. sediments fell to the bottom of the sea in layers • 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. limestone is formed from sediments building up at the bottom of the sea in layers and is squashed to form rock • 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. Sediments fall to the bottom of the sea and are compacted to form layers of rock , more rock builds up on top. Limestone is a soft rock and has been eroded by the sea. • 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)	Any two from the following: <ul style="list-style-type: none"> • fuels can be in different states / specific example • different sized molecules(1) • different viscosities (1) • different boiling point / vaporisation temperatures (1) • different ease of ignition /some fuels more flammable (1) • different amounts of air / oxygen needed (1) 	different { thickness/runniness} some burn easier than others	(2)

Question Number	Answer	Acceptable answers	Mark
6(b)	C		(1)

Question Number	Answer	Acceptable answers	Mark
6(c)	$2\text{C}_2\text{H}_6 + 7\text{O}_2 \rightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$ <ul style="list-style-type: none"> • reactant formulae (1) • product formulae (1) • balancing correct formulae (1) 	Ignore state symbols balancing multiples	(3)

Question Number	Indicative Content	Mark
QWC	<p>* 6(d)</p> <p>An evaluation including some of the following:</p> <p>Advantages</p> <ul style="list-style-type: none"> • plenty of water / raw material • limited supplies of crude oil • hydrogen produces only water as waste • petrol produces carbon dioxide • carbon dioxide (emissions) may cause global warming <p>Disadvantages</p> <ul style="list-style-type: none"> • hydrogen has to be produced • requires energy / electricity to produce it • producing electricity from non-renewable sources produces carbon dioxide • expensive to produce • problems of storage of large volumes of flammable gas • stronger / heavier / bigger tanks needed • hydrogen a gas, petrol a liquid, hydrogen leaks more likely • limited outlets / conversion costs • shorter distance between refuelling 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description e.g. using petrol produces carbon dioxide which is a greenhouse gas. The only waste product from hydrogen is water • 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. hydrogen is produced by electrolysis of water but electricity is expensive and its production damages the environment unless it is produced from renewable resources. Hydrogen only produces water when it is burnt. • 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. hydrogen is produced by electrolysis of water which is readily available but electricity is expensive and its production damages the environment unless it is produced from renewable resources. Hydrogen only produces water when it is burnt but petrol also produces carbon dioxide. Petrol is obtained from crude oil which is non-renewable. Hydrogen is a flammable gas which is difficult to store • 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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