



Mark Scheme (Results)

Summer 2013

GCSE Chemistry (5CH1H)
Paper 01

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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.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- 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.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	<p>an explanation linking the following</p> <ul style="list-style-type: none"> decomposition (of compound/substance /electrolyte)(1) using (direct) current (1) 	<p>splitting up/breaking down/breaking up</p> <p>ignore separating</p> <p>reject splitting of atoms/elements/molecules for M1</p> <p>using {electrical energy /electricity}</p> <p>reject alternating current/ac</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	<ul style="list-style-type: none"> (damp blue) litmus (paper) (1) (turns red then) {bleaches / goes white} (1) 	<p>allow bleaches indicator for 1 mark</p> <p>ignore indicator goes lighter</p> <p>ignore smells of chlorine/swimming pools</p> <p>ignore any incorrect middle colour mentioned</p> <p>use of suitable named indicator with correct result</p> <p>e.g.</p> <p>(damp) universal indicator paper (1)</p> <p>(turns red then) bleaches (1)</p> <p>starch-iodide paper(1)</p> <p>turns blue-black(1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(a) (iii)	poly(chloroethene)	PVC/polyvinylchloride/ polychloroethene/poly(chlorethene)	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	D AgCl(s)		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	same/no change		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(iii)	$\text{HCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{HNO}_3$ <ul style="list-style-type: none"> • reactant formulae (1) • product formulae (1) 	$\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$ <p>max 1 if any incorrect attempt to balance</p> <p>reject incorrect use of cases and non-subscripts</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)	remove delivery tube from water <u>before stopping heating</u>	other words which make sequence clear use of (Bunsen) valve	(1)

Question Number	Answer	Acceptable answers	Mark
2(b)	B C ₄ H ₈		(1)

Question Number	Answer	Acceptable answers	Mark
2(c)	contains a {double/multiple} bond	ignore "spare bonds" ignore reference to number of hydrogen atoms attached.	(1)

Question Number	Answer	Acceptable answers	Mark
2(d)	A description to include <ul style="list-style-type: none"> • bromine water is orange (1) • propane: (remains) orange / no colour change (1) • propene: becomes colourless /decolourises (1) 	red / yellow / brown any combination of these ignore clear /discolours	(3)

Question Number	Answer	Acceptable answers	Mark
2(e)	<p>An explanation linking any two of</p> <ul style="list-style-type: none">• shorter chain molecules are more useful ORA (1)• demand for shorter chain molecules ORA (1)• meets demand• reduces the excess of longer chain molecules (1)• (cracking) produces alkenes (1)• alkenes used to make polymers (1)	<p>reject long chain molecules are useless</p> <p>named fraction/use/fuel</p> <p>named fraction /use/fuel</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	D less than 0.5%		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	A explanation linking any two of <ul style="list-style-type: none"> • dissolves /is absorbed (1) • in the oceans (1) • incorporated into marine organisms (1) • formed carbonate rocks (1) • increase in (green) plants/plants start growing • photosynthesis /plants remove carbon dioxide 	reject references to plants respiring/breathing	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	traps <u>heat</u>	reflects <u>heat back to Earth</u> reject references to the ozone layer	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	A description to include <ul style="list-style-type: none"> • glowing splint (1) M1 • relights (1) M2 	smouldering splint reject unlit splint ignore blown out splint M2 dependent on M1 but lighted splint burns brighter (2)	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	<p>An explanation linking</p> <ul style="list-style-type: none"> • volume of gas in bell jar decreases/water rises to fill the space (1) • oxygen is removed from the air (1) 	<p>{volume/amount} of air decreases</p> <p>accept oxygen is used up</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	<p>(amount of gases remaining) 79% (1)</p> <p>(volume remaining) = $\frac{1000 \times 79}{100}$ (1)</p> <p>= 790 (cm³)</p>	<p>ecf for incorrect percentage of volume of gases remaining in M1</p> <p>correct answer or valid calculation alone scores (2)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)	magnesium sulphate	accept magnesium sulphate	(1)

Question Number	Answer	Acceptable answers	Mark
4(a)	<ul style="list-style-type: none"> tin {<u>more</u> expensive/costs <u>more</u>} (than aluminium/steel) ORA (1) amount of tin in Earth <u>smaller</u> (than aluminium/steel) ORA (1) 	rarer	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)	C - reduction		(1)

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	an explanation linking the following <ul style="list-style-type: none"> a mixture of (1) metals (1) 	reject compound ignore combined/joined specific examples reject reference to non-metals metals melted together (2)	(2)

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	<p>an explanation linking any three of</p> <ul style="list-style-type: none"> • in pure metal /aluminium atoms are all same size (1) • in pure metal /aluminium {layers/sheets/atoms} {slide/slip/move} (over one another) easily(1) • magnesium atoms larger (1) • disrupt {layers/structure/arrangement} of aluminium atoms (1) • prevent {layers/sheets/atoms} {slip/slide/move} (1) 	<p>ions or particles for atoms reject molecules once only</p> <p>different sized particles</p> <p>{lock/hold/jam} layers together</p>	(3)

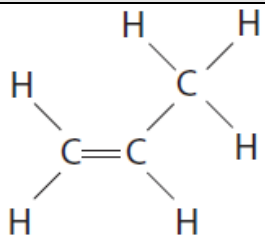
Question Number	Answer	Acceptable answers	Mark
5(a)	an explanation linking any three of <ul style="list-style-type: none"> • (removes waste) gases that are acidic • contain sulfur dioxide (1) • (produced from) sulfur impurities in coal (1) • (limestone/calcium carbonate) {reacts with/neutralises} (gases)(1) 	{limestone/calcium carbonate} is a base (1) ignore limestone/calcium carbonate is an alkali	(3)

Question Number	Answer	Acceptable answers	Mark
5(b)	$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ <ul style="list-style-type: none"> • reactant formula (1) • product formulae (1) 	max 1 if any incorrect attempt to balance reject incorrect use of cases and non-subscripts	(2)

Question Number	Answer	Acceptable answers	Mark
5(c)	C – the lump of calcium oxide cools down		(1)

Question Number	Indicative content	Mark
QWC	<p>*5(d)</p> <p>An explanation linking some of the following</p> <p>limestone</p> <ul style="list-style-type: none"> • formed from sediments/shells • sediments fall to bottom of sea • layers of sediments build up • long time period • compaction • by pressure • rocks appear out of the sea <p>granite</p> <ul style="list-style-type: none"> • magma /molten rock • forced up • cools • solidifies • intrusive rock • forms crystals <p>marble</p> <ul style="list-style-type: none"> • limestone {changed/metamorphosed} • by heat • (from) magma/molten rock • and pressure 	(6)
Level	0	No rewardable content
1	1-2	<ul style="list-style-type: none"> • a limited explanation e.g. limestone formed from sediments on the sea bed. • 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 explanation e.g sediments compacted to form limestone which is changed by heat and pressure into marble. • 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 explanation e.g. limestone formed from sediments . Molten rock /magma cools to form granite. The heat and pressure change the limestone into marble. • 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)	C – CH ₃ CH ₃		

Question Number	Answer	Acceptable answers	Mark
6(b)		<p>carbon skeleton correct including double bond (1)</p> <p>rest of molecule correct (1)</p> <p>allow CH₃</p>	(2)

Question Number	Answer	Acceptable answers	Mark
6(c)	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ <ul style="list-style-type: none"> • reactant formulae (1) • product formulae (1) • balancing of correct formulae (1) 	<p>accept multiples</p> <p>reject incorrect use of cases and non-subscripts</p>	(3)

Question Number		Indicative content	Mark
QWC	*6(d)	<p>advantages</p> <ul style="list-style-type: none"> • renewable / sustainable • more plants can be grown • crops use up carbon dioxide and produce oxygen when growing /photosynthesising • carbon neutral because the carbon produced during combustion is used when growing the plants • does not use up crude oil/non-renewable resources <p>disadvantages</p> <ul style="list-style-type: none"> • crops grown for bio-fuels use up land • land could otherwise be used to provide homes / less farmland available for growing food crops • lots of crops required to provide a small amount of bio-methane • bad season reduces availability • carbon emissions due to transport and production if qualified 	(6)
Level I	0	No rewardable content	
1	1-2	<ul style="list-style-type: none"> • a limited description e.g. using bio-methane conserves fossil fuels and uses up carbon dioxide when plants are grown • 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. growing plants to produce bio-methane is sustainable and conserves fossil fuels but uses up lots of farm land which could be used to grow plants for food • 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"> • detailed description e.g growing plants remove carbon dioxide from the air during photosynthesis and conserves fossil fuels but lots of crops are required to make bio-methane and this uses up farm land which could otherwise be used to grow crops for food • 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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