

Mark Scheme (Results)

March 2013

GCSE Chemistry
5CH2F/01

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Question Number	Answer	Acceptable answers	Mark
1(a)(i)	solution		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	precipitate		(1)

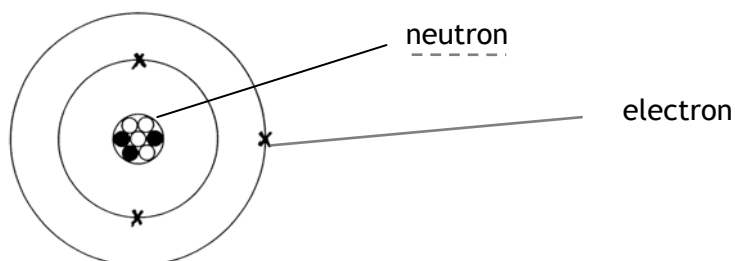
Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	filtered		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(iv)	dried		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	<p>A description including any two from</p> <ul style="list-style-type: none"> effervescence/fizzing/bubbles (1) {solid/zinc (carbonate)/it} {becomes smaller/disappears}(1) {solution/liquid} remains colourless (1) 	<p>ignore cloudy/precipitate/misty/gets warm/{gas/carbon dioxide} produced</p> <p>{solid/zinc carbonate} dissolves / a (clear) solution forms (1)</p> <p>colourless solution formed (2)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	<p>A description including</p> <ul style="list-style-type: none"> limewater (1) becomes {milky/cloudy/white (precipitate)} (1) <p>second mark conditional on limewater</p> <p>if other substances added to limewater eg zinc carbonate maximum 1</p>	<p>ignore test with lighted splint</p> <p>ignore any mention of how the carbon dioxide is produced eg blow through a straw</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	neutron (1) electron (1)	neutrons electrons	(2)



Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	A 3		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	D proton positive, electron negative		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	1		(1)

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	<p>An explanation linking</p> <ul style="list-style-type: none"> (both have) one electron (1) in the outer {shell/orbit/energy level} (1) <p>do not award first mark if proton/neutron/atom (in outer shell)</p>	<p>both have one outer electron (2)</p> <p>both need to lose 1 electron to have a full outer shell (2)</p> <p>fully correct diagrams of lithium and sodium showing electronic configurations (1)</p> <p>have the same number of electrons in the outer shell (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	<p>An explanation linking</p> <ul style="list-style-type: none"> lithium has 2 {shells/orbits/energy levels} (1) sodium has 3 {shells/orbits/energy levels} (1) <p>max 1 mark if {outer/full} shells max 1 mark if rings/circles/layers</p>	<p>If no marks awarded from 'answer' column, allow any one from</p> <p>sodium is more reactive than lithium ORA (1) sodium has more electrons than lithium ORA (1) sodium has more shells than lithium ORA (1) ignore reactivity increases down the group</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)	<p>zinc + hydrochloric acid → zinc chloride + hydrogen</p> <p>ignore dilute</p> <p>if any additional reactants or products eg water (0)</p> <p>ignore formulae in addition to word equation, even if incorrect</p> <p>ignore state symbols, even if incorrect</p>	<p>= for → do not allow 'and' for '+'</p> <p>correct formulae even if equation unbalanced mixture of correct formulae and words but, do not allow incorrect formulae, including h, H₂</p>	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	<p>A description including three of the following:</p> <ul style="list-style-type: none"> • remove/replace bung (1) • put {zinc and acid/reactants/chemicals} in flask (1) • start {timing/stop watch/stop clock} (1) • {measure/record} (volume/amount) {gas/hydrogen} (1) • every minute (1) <p>maximum 2 marks if zinc/hydrochloric acid in (gas) syringe</p>	<p>allow the solution for acid</p> <p>allow 'see how much gas is produced'</p> <p>ignore any description of the apparatus as it is set up in the diagram eg connect the syringe to the bung/make sure the syringe is empty</p> <p>ignore time until {reaction is complete/a stated volume of gas is collected}</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	C collide		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	B cooling the hydrochloric acid		(1)

Question Number	Answer	Acceptable answers	Mark
3(d)	<p>An explanation linking two of the following</p> <ul style="list-style-type: none"> • {(zinc) powder/it} has smaller {particles/pieces/bits} (1) • {(zinc) powder/it} has a larger surface area (1) • (there are) more (frequent) collisions (between the particles/acid and zinc) (1) <p>ORA</p>	<p>ignore more particles</p> <p>collisions are more likely/greater chance of collisions (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(e)	<p>A description including two of the following</p> <ul style="list-style-type: none"> • use thermometer (1) • measure temperature {before and after/change/during the reaction} (1) • temperature rises/gets hotter (1) <p>maximum 1 mark if temperature falls/gets colder</p>	<p>use hand (1) feel it getting hotter (1)</p> <p>if no other mark awarded 'heat (energy) is given out' (1)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)	C 3.6 g		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)	3.6 – 3.2 (1) (= 0.4) correct working with no answer or wrong answer (1)	0.4	(1)

Question Number	Answer	Acceptable answers	Mark
4(c)	<u>3.6</u> (1) 4(.0) their fraction x 100 (1)	90 (%) (2)	(2)

Question Number	Answer	Acceptable answers	Mark
4(d)	2 Cu (1) + O ₂ → 2 CuO (1)		(2)

Question Number	Answer	Acceptable answers	Mark
4(e)	relative formula mass = 64 + 16 (1) $\frac{16}{\text{their relative formula mass}} \times 100$ (1)	20(%) without working (2) 80 seen in answer(1) allow $\frac{16}{64} \times 100$ (1) if no other mark	(2)

Question Number	Answer	Acceptable answers	Mark
4(f)	An explanation linking <ul style="list-style-type: none"> {gains/takes} electrons (1) two (electrons) (1) maximum 1 mark if electrons lost	electrons shared/protons/neutrons (0) for this question	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	Y and Z both must be given with no additional substances		(1)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	<p>An explanation linking two of</p> <ul style="list-style-type: none"> only one coloured substance in drink/ only one spot (at 4) in drink (1) this is not present in Y/ no spot at 4 in Y/ no corresponding spot in Y (1) the spots would rise to the same point if they were the same substance / the drink is X (1) two coloured substances in Y/ Y has 2 spots (at 2.5 and 7) (1) drink does not have spot(s) corresponding to spot(s) in Y (1) 	<p>allow values ± 0.5 of those given here</p> <p>Y has more than 1 coloured substance/spot do not allow a specified number greater than 2</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	<p>(spot moved) 4 ± 0.5 / solvent (moved) 8 (1)</p> <p>$R_f = 4/8$ (2) (=0.5) consequential on their value for spot moved</p>	<p>4/8 OR 0.5 on its own (2)</p> <p>8/4 (1)</p>	(2)

Question Number	Indicative Content	Mark
QWC	<p>*5(b) A description including some of the following points</p> <p>Preparing the paper</p> <ul style="list-style-type: none"> • use of {filter/chromatography/absorbent} paper • pencil line (as start line) • put {spots/dots/drop} of colourings on (start) line • well apart / widely spaced • small spots • allow spots to dry • second spot to concentrate <p>Setting up the chromatography tank</p> <ul style="list-style-type: none"> • place {solvent/water/named solvent/liquid} in {beaker/container} • level below (start) line • {place/hold/support} paper in {beaker/solvent/water/named solvent/liquid} <p>Producing the chromatogram</p> <ul style="list-style-type: none"> • allow solvent to rise (towards top of paper)/wait for solvent to rise • wait for the colours to {rise/separate} • lift paper out of beaker before solvent reaches the top/mark solvent front • allow to dry <p>give credit for correct points on a labelled diagram</p>	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description e.g. put spots of colours on filter paper e.g. put paper in a beaker of water e.g. wait for the colours to separate • 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. put spots of colours on filter paper and put into beaker containing solvent e.g. draw a pencil line on the paper, add the colours and hold it in a beaker of solvent e.g. put dots of colours on filter paper and wait for the colours to separate • 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. put spots on a pencil line on paper and put into beaker containing solvent so that spots not in solvent, wait a few minutes for the solvent to rise e.g. put small spots of colours on a piece of filter paper, put some water in a beaker and hold the paper in the beaker until the colours separate • 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
5(c)	<p>2 electrons to be drawn in, one between each hydrogen and oxygen atom in the overlap region or on the overlapping circles</p> <p>Ignore an inner shell on the oxygen if it has 2 electrons</p> <p>Do not award the mark if additional atoms or electrons added to the diagram</p>	dots/crosses/circles/ e/e ⁻ for electrons	(1)

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	D noble gases		(1)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	<ul style="list-style-type: none"> correct plotting of all points (2) or correct plotting of two points (1) suitable line dot to dot (1) consequential on their points 	<p>$\pm 1/2$ small square</p> <p>smooth curve / best fit straight line(1)</p> <p>if a bar chart is drawn, allow 1 mark if all bars are correct height</p>	(3)

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)	correct value read from candidate graph $\pm 1/2$ small square	<p>if no line drawn on graph but at least two points plotted, allow value between 1.25-2.15</p> <p>if no points on graph (0)</p>	(1)

Question Number	Indicative Content	Mark
QWC	<p>*6(b)</p> <p>A description including some of the following points</p> <p>similarities both</p> <ul style="list-style-type: none"> • float/on the surface • move around • effervesce / bubble / fizz • decrease in size / disappear / dissolve • produce hydrogen / H₂ • produce (metal) hydroxide / LiOH and NaOH • produce alkaline solution / solution with pH greater than 7 / add named indicator to the solution and correct colour change <p>give credit to correct products in equations</p> <p>differences sodium</p> <ul style="list-style-type: none"> • more vigorous / more effervescence / moves faster (ignore reaction lasts longer) ORA for lithium • melts • forms ball / sphere • produces a flame / catches fire / sparks <p>ignore any statements about atomic structures</p>	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description e.g. both metals float e.g. both cause fizzing • 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. both metals float, both metals fizz e.g. both metals fizz but sodium fizzes more • 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 including similarities and differences • e.g. both metals float and both produce hydrogen but sodium fizzes more • e.g. both metals fizz but sodium is more reactive so it fizzes more and it melts • 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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