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Mark Scheme (Results)

Summer 2012

GCSE Chemistry
5CH2H/01

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GCSE Chemistry 5CH2H/01 Mark Scheme – Summer 2012

Question Number	Answer	Acceptable answers	Mark
1(a)	An explanation including the following points • metal (1) • because {on left of / below} the line dividing metals and non-metals/because boron only non-metal in group 3 (1)	correct statement relating to neighbouring metallic elements surrounded by metals	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)	2.8.3	283	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	A five protons		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	An explanation including the following points • atoms of same element / same {number of protons / atomic number} (1) • different {numbers of neutrons / mass numbers} (1)	ignore electrons	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(iii)	more atoms have mass 11 (than 10) / ORA	boron 11 isotope more abundant OWTE	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	**D** electrons		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	transition (metals/ elements)	transitional ignore transient	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	An explanation linking the following points • hydrogen chloride {soluble/dissolves} (in water) (1) • forms hydrochloric acid (1)	hydrogen chloride reacts with water	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation including **two** of the following points • (orange) colour due to bromine (1) • chlorine displaces bromine (1) • (because) chlorine is more reactive (than bromine) (1)	chlorine displaces bromide (ions) a displacement reaction (occurs)OWTE	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	A description including **three** of the following points • mix solutions (1) • filter (1) • wash (precipitate / solid) with water (1) • dry (precipitate / solid) in oven /leave to dry(1)	pour (both) solutions into {beaker/other suitable container} ignore addition of hydrochloric acid if wrong things mixed allow max 2 from last three points	**(3)**

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

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	An explanation linking the following points • large(r) surface area (1) • more frequent collisions with catalyst / reaction will go faster (1)OWTE	large(r) {surface /area} more collisions	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	An explanation linking the following points • catalyst becomes warmer (1) • {reactions faster / catalyst works better} when hotter (1)	gas (particles){move faster/more energy}	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)	$2\ CO + O_2 \rightarrow 2\ CO_2$ • LHS formulae (1) • RHS formula (1) • balancing correct formulae (1)	allow multiples	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(d)	An explanation linking the following points • heat energy { given out / of reactants higher than products} / ORA (1) • (so) exothermic (1)	ignore bond making and breaking	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	**C** $CuCl_2$		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	An explanation linking the following points **Either** • the amount of product calculated (1) • using the equation (for the reaction) (1) **Or** • the maximum amount of {product / copper chloride} (1) • when all {reactant / copper} reacts (1)	using reacting masses amount of product when all {reactant / copper} reacts (2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	$2Fe(s) + 3Br_2(g) \rightarrow 2FeBr_3(s)$ reactant formulae (1) balancing correct formulae (1) state symbols (1) s and g must be lower case	**allow** state symbol mark even if other marks not awarded	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	56 + (3 x 80) (1) = 296	give full marks for correct answer with no working	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	ratio: 56/310 (1) % iron 56/310 x 100 (%) (1) (= 18 (%))	any number/310 x 100 (%) 18.06/18.1 give full marks for correct answer with no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iv)	HO	OH, O_1H_1, H_1O_1	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	shared pair of electrons (between two atoms)	two shared electrons reject between two or more atoms	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	**D** it has a low boiling point		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)	An description including **three** of the following points • cool (to about -200 °C) / liquefy (air) (1) • fractional distillation (1) • allow to warm / heat (1) • {nitrogen / lower boiling point} obtained from top of column (1) • {oxygen / higher boiling point} obtained from bottom of column (1)	mention of fractionating column/ fractionation ignore state of nitrogen ignore state of oxygen can be separated because they have different boiling points(1) alternative to last two points	**(3)**

Question Number		Indicative content	Mark
QWC	***5(c)**	An explanation linking some of the following points • carbon atoms joined by covalent bonds • each carbon atom bonded to three others • carbon atoms in hexagonal arrangement • layers • weak forces between layers • layers can slide (hence lubricant) • free electrons between layers • free electrons can move • and carry current (hence conduction of electricity)	**(6)**
Level	**0**	No rewardable content	
1	**1-2**	• a limited explanation e.g. the layers (of atoms) slide so used as lubricant • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, puncuation and grammar are used with limited accuracy	
2	**3-4**	• a simple explanation e.g. the layers slide so used as lubricant and free electrons moveso conducts • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, puncuation and grammar are used with some accuracy	
3	**5 -6**	• a detailed explanation e.g. there are free electrons between the layers and these move to carry the current and weak forces between the layers allow them to slide over one another easily hence lubricant • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, puncuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
5(d)	electrode / brush electric motor / HT leads		**(1)**

Question Number	Answer	Mark
6(a)		**(3)**

	symbol		number of electrons	
	atom	**ion**	**atom**	**ion**
chlorine				18
sodium		Na^+	11	

Question Number	Answer	Acceptable answers	Mark
6(b)(i)	$NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl$ • reactant formulae (1) • product formulae (1)	$Ag^+ + Cl^- \rightarrow AgCl$ ignore state symbols do not give (2) if incorrectly balanced	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(b)(ii)	**D** to remove other ions that would also form a white precipitate		**(1)**

Question Number		Indicative content	Mark
QWC	***6(c)**	An explanation linking some of the following points For a sample to conduct electricity • charged particles must be present • they must be free to move water does not conduct because it • is (simple molecular) covalent • exists as molecules • contains no/(very few) charged particles solid sodium chloride does not conduct because • although it contains ions / cations / anions • which are charged particles • they are not free to move • because they are held together • by strong • electrostatic forces/ ionic bonds • in lattice sodium chloride solution conducts because • ions / cations / anions are present • which are charged particles • they are free to move • because the water has cut down the forces between the ions • ions have separated • move to electrode of opposite charge	**(6)**
Level	**0**	No rewardable content	
1	**1-2**	• a limited explanation e.g. water is covalent and sodium chloride is ionic • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, puncuation and grammar are used with limited accuracy	
2	**3-4**	• a simple explanation e.g. water is covalent and does not conduct because there are no charged particles: sodium chloride is ionic therefore solution conducts because ions move • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, puncuation and grammar are used with some accuracy	
3	**5-6**	• a detailed explanation e.g. in solid sodium chloride the ions are held in a lattice by strong forces but in sodium chloride solution the ions are free to move: water is covalent so contains no charged particles • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, puncuation and grammar are used with few errors	

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