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Mark Scheme (Results)

November 2012

GCSE Chemistry
5CH2H/01

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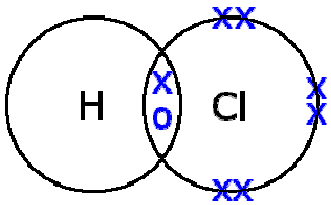
GCSE Chemistry 5CH2H/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)	C : copper sulfate and sodium chloride		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)	copper sulfate (1) blue-green (1) or sodium chloride (1) yellow (1) colour mark consequential on correct metal (compound)	allow blue or green or green-blue reject orange and yellow-orange	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	An explanation linking weak **inter**molecular forces /weak forces between **molecules** (1) little {heat / energy} needed to separate (molecules) (1)	 bonds / attractions in place of forces intermolecular forces between {atoms / bonds} loses 1st marking point any answer in terms of covalent or ionic bonding scores zero	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	A description linking use separating funnel (1) run off lower {layer / liquid} / OWTTE (1)	 alternative description of separating funnel eg funnel with a tap at the bottom suitable labelled diagram burette allow layers / liquids to separate ignore fractional distillation	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(d)	 shared pair in molecule (1) rest of molecule consequent on first mark (1)	Allow a diagram without labels for 2 marks any symbols shown must be correct for the 2nd mark allow any combination of dots and crosses for electrons wrong compound = zero marks	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	soft / low melting point / low boiling point	**easily** cut with a knife = soft low density malleable solid at room temp. ignore float on water reject chemical properties	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	An explanation linking (all have) one electron in outer shell (2)	 one outer electron = 2 marks group number shows number of electrons in outer shell = 2 marks same number of electrons in outer shell = 1 mark incorrect number of electrons in the outer shell = 1 mark accept outer orbit / highest energy level in place of outer shell	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	A description including any two of effervescence / fizzing / bubbles (1) potassium floats (1) moves (on surface) (1) potassium forms ball / melts (1) potassium decreases in size / disappears / dissolves (1) (lilac) flame / catches fire (1) spits / explodes / sparks (1)	 ignore ignites ignore smoke	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	D : $2K + 2 H_2O \rightarrow 2KOH + H_2$		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation linking any two of increasing {size /radius (of atom) / number of shells} (1) increased shielding (of outer electron) (1) less attraction for (outer) electron (1)	 easier to remove (outer) electron	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	A, B and C	Mg Ca Au (any order) magnesium calcium gold (any order)	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	A and B	Mg Ca (any order) magnesium calcium (any order)	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)	8 (protons)		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	A : 10		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	(in 100 atoms) mass of mass number 20 atoms = 20 x 90 (1) mass of mass number 22 atoms = 22 x 10 (1) relative atomic mass = {(22 x 10) + (20 x 90)}/100 (=20.2) (1) OR 20 contributes = 90/100 x20(1) 22 contributes = 10/100 x22(1) relative atomic mass 90/100 x 20 + 10/100 x 22 (= 20.2) (1)	20.2 = 3 marks 21.8 = 2 marks (only 1 error made)	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(d)	An explanation linking any two of (the element is) group 0 / noble gas /unreactive / inert / does not react (1) {(has) 8 electrons / full} outer shell (1) prevents filament from reacting (1)	 ignore ‘not very reactive’ does not {gain / lose / share} electrons	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)	to allow air/oxygen in	to ensure magnesium reacts/burns / combusts	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	all points correctly plotted to half a small square (2) line of best fit (1)	Allow one mark for four or five correctly plotted points ecf their points	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	Any one from not all magnesium {burned / reacted} / some left / incomplete reaction not enough air/oxygen some magnesium oxide / smoke lost	 lid not lifted / not enough times lid left off too long (so loses MgO)	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)	$2Mg + O_2 \rightarrow 2MgO$ left hand formulae (1) right hand formula (1) balancing correct formulae (1)	 correct multiples	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(d)	0.414 / 207 or 0.064 / 16 (1) 0.002 : 0.004 or 1 : 2 (1) empirical formula PbO_2 (1)	if 207 / 0.414 and 16 / 0.064 ratio 500 : 250 or 2 : 1 (1) empirical formula Pb_2O (1) allow 3 marks for 0.414 / 207 or 0.064 / 32 ratio 1 : 1 empirical formula PbO_2 allow 2 marks for if 0.414 / 207 and 0.064 / 32 ratio 1 : 1 empirical formula PbO	**(3)**

Question Number	Answer	Acceptable answers	Mark
5(a)	An explanation linking two of the following temperature decreases (1) {heat / energy} taken in (1) (so process) endothermic (1)	ignore references to bond breaking / making heat given out / exothermic = 1 max.	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)	Shown correctly on diagram: horizontal line to right of reactant (1) product line below reactant line (1)	ignore any connecting lines product label not needed	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(c)	D : heat energy is required heat energy is released		**(1)**

Question Number		Indicative Content	Mark
QWC	***5(d)**	An explanation including some of the following points **smaller pieces of solid** of same mass larger surface area more frequent collisions higher rate of reaction **higher temperature** particles move faster more frequent collisions particles have more energy more collisions have required energy to react / activation energy more collisions successful higher rate of reaction ORA	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	a limited explanation of one of factors e.g. at higher temperature higher rate e.g. when particles smaller size higher rate 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. at higher temperature particles move faster, more collisions so higher rate e.g. smaller sized particles (of same mass) have greater surface area so higher rate 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. (when particles collide they) only react when they have sufficient energy/activation energy and at a higher temperature more of the particles have sufficient energy/activation energy so more collisions will be successful and when particles smaller size higher rate 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)	D : $Ca(NO_3)_2$		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	C : 8		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(c)	Description including four of the following sodium - 2.8.1 / 1 electron in outer shell (1) sodium (atoms) lose electrons (1) one per atom (1) (forms) Na^+ (1) sulphur - 2.8.6 / 6 electrons in outer shell (1) sulfur (atoms) gain electrons (1) two per atom (1) (forms) S^{2-} (1) two sodium atoms / ions combine with one sulfur atom / ion (1) formula is Na_2S (1)	Marks can be gained using diagrams mention of shared electrons / covalent bonding in words or diagram = max 2 marks	**(4)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	A description including some of the following points **solid** {regular arrangement/ lattice} (of ions) sodium/Na^+ ions chloride /Cl^- ions (held together by) strong (ionic) bonds strong (electrostatic) forces of attraction between oppositely charged ions / positive and negatively charged ions closely packed together (when solid) does not conduct because ions cannot move **molten** heat energy {overcomes/breaks} (strong ionic) bonds strong (electrostatic) forces of attraction between oppositely charged ions / positive and negatively charged ions ions can move (therefore) conducts when molten	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	a limited explanation e.g. does not conduct when solid e.g. does conduct when molten 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. does not conduct when solid, does conduct when molten because {ions / particles / atoms} can move 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. solid has strong ionic bonds (between oppositely charged ions), does not conduct when solid because ions cannot move, does conduct when molten because ions can move 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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