CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0620 CHEMISTRY

0620/22 Paper 2 (Core Theory), maximum raw mark 80

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Abbreviations used in the Mark Scheme

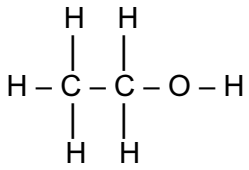
- ; separates marking points
- / separates alternatives within a marking point
- **OR** gives alternative marking point
- **R** reject
- **I** ignore mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- **COND** indicates mark is conditional on previous marking point
- owtte or words to that effect (accept other ways of expressing the same idea)
- max indicates the maximum number of marks that can be awarded
- ecf credit a correct statement that follows a previous wrong response
- ( ) the word / phrase in brackets is not required, but sets the context
- ora or reverse argument

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Question	Answer	Marks	Guidance
1(a)(i)	E / XeO_4;	1	
1(a)(ii)	C / NH_4NO_3;	1	
1(a)(iii)	A / CaO;	1	
1(a)(iv)	D / CO_2;	1	
1(a)(v)	A and C / CaO and NH_4NO_3;	1	Both required for mark
1(a)(vi)	A and F / CaO and H_2SO_4 ;	1	Both required for mark
1(b)	H_2O on right; **COND** 2 on left;	2	Second mark depends on H_2O on right
1(c)	atoms (in first space); combined (in second space);	2	

Question	Answer	Marks	
2(a)	temperature goes down / temperature decreases / temperature falls OWTTE;	1	
2(b)	*Any 3 of (1 mark each)* • add citric acid from burette to sodium hydroxide / titrate citric acid with sodium hydroxide; • use of indicator / titrate until indicator changes colour; • repeat without indicator / remove indicator with charcoal; • evaporate to crystallisation point / leave to crystallise / partially evaporate; • dry crystals with filter paper / heat gently / put in an oven;	3	**A** Wash crystals with a little water **R** heat to dryness
2(c)	1st and 5th boxes ticked (1 mark each);	2	APPLY: listing if more than two boxes ticked

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Question	Answer	Marks	Guidance
2(d)		1	
2(e)	steam (in first space); catalyst (in second space);	2	

Question	Answer	Marks	
3(a)(i)	2 (on left); H_2O on right;	2	NOTE: marks are independent
3(a)(ii)	4th box down ticked (thermal decomposition);	1	
3(b)	pH 8 circled;	1	
3(c)(i)	salt; water / H_2O;	2	NOTE: either order in the spaces
3(c)(ii)	idea of carbon dioxide trapped / idea of gas trapped in bread / idea that gas cannot escape / idea that carbon dioxide cannot escape ORA;	1	
3(c)(iii)	so it doesn't harm you (effect on person);	1	**A** so it doesn't poison you **I** to make sure there are no contaminants
3(d)	liquid; particles close together; particles randomly arranged / no fixed arrangement / irregular arrangement;	3	NOTE: if solid for 1st marking point, can get the 2nd marking point NOTE: if gas for 1st marking point, can get the 3rd marking point

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Question	Answer	Marks	Guidance
4(a)	(left box) flask / Erlenmeyer; (right box) (gas) syringe;	2	**I** type of flask
4(b)(i)	increases; then levels off / rate of increase less / stops / slows down / stays constant;	2	
4(b)(ii)	values between 4.6 and 4.9 (min);	1	
4(b)(iii)	35 (cm^3);	1	**A** values between 34.5 and 35
4(b)(iv)	initial gradient steeper; levelling off to same final volume;	2	**R** lines stopping at final volume which clearly would be still increasing in volume
4(c)	(rate) decreases / slower / less / takes more time;	1	
4(d)(i)	(anode) chlorine; (cathode) zinc;	2	**A** Cl_2 / Cl **A** Zn
4(d)(ii)	inert / unreactive;	1	**I** cheaper

Question	Answer	Marks	
5(a)	COOH group ringed;	1	
5(b)(i)	contains (carbon-carbon) double bonds;	1	**R** contains C=O bond
5(b)(ii)	add bromine water / aqueous bromine / bromine; decolourises / goes colourless	2	**I** goes clear / discolourises (second mark dependant on getting bromine)
5(c)	sodium carbonate; water;	2	**A** layout as water + sodium carbonate

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Question	Answer	Marks	Guidance
5(d)	idea of monomer as small molecule / monomers join (to make polymer) / monomers (ethene) polymerises; ethene is the monomer; addition polymerisation / idea of addition reaction / monomers (or ethene) add together to form polymer;	3	NOTE: ethene monomers add together to form polymer = 3 marks
5(e)(i)	grind flowers / grind them / crush / blend / use a mortar and pestle; extract with solvent / add solvent / add water; filter (the solution through glass wool);	3	NOTE: grind with solvent = 2 marks **A** filter / filter through filter paper
5(e)(ii)	A and C (both needed for the mark);	1	APPLY: listing

Question	Answer	Marks	
6(a)	copper and iron / Cu and Fe; (very) high density / (very) high melting point;	2	**A** very strong
6(b)(i)	aluminium is a very good conductor / aluminium is a better conductor / aluminium has a low density; aluminium (on its own) is not strong enough / aluminium is (only) fairly strong / iron is very strong / iron gives the cable extra strength / iron is stronger than aluminium;	2	
6(b)(ii)	low melting point / weak / not strong;	1	**I** statements about reactivity
6(c)	cobalt chloride is coloured / calcium chloride is not coloured;	1	
6(d)	silver, aluminium, magnesium lithium;	1	
6(e)(i)	reversible (reaction) / equilibrium (reaction);	1	
6(e)(ii)	lighted splint / flame; **COND** pops / explodes;	2	second mark dependant on getting lighted splint NOTE: glowing splint = 0

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Question	Answer	Marks	Guidance
6(f)	*Any 4 of:* • mixture of metals / mixture of metal with non-metal / mixture of metal with another element; • example of alloy e.g. Fe + Cr / Fe + Ti / Fe + C / mild steel / stainless steel etc.; • alloy is more resistant to corrosion / less likely to rust / does not rust / less reactive; • alloy is harder / stronger ; • example of use of an alloy of IRON e.g. car bodies / chemical plant / utensils / buildings / kitchen equipment;	**4**	**I** melting points / boiling points

Question	Answer	Marks	
7(a)	*Any 3 of:* • diffusion; • (bulk) movement of particles from high to low concentration; • particles are in constant motion; • (movement of particles is) random; • bromine particles spread (throughout the solvent particles) / bromine particles mix up (with solvent);	**3**	**A** particles move (from place to place) **A** particles collide with each other / particles hit into each other
7(b)(i)	liquid;	**1**	
7(b)(ii)	increases / higher / goes up;	**1**	
7(b)(iii)	values between 1.6 – 4.9 (Actual = 3.12);	**1**	NOTE: if range given both figures must be within this range
7(b)(iv)	2;	**1**	
7(c)(i)	I_2;	**1**	
7(c)(ii)	chlorine is more reactive than bromine / bromine is less reactive than chlorine;	**1**	**I** reference to bromide / chloride / relative positions of bromine or chlorine in the Group

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Question	Answer	Marks	Guidance
7(d)	137;	**2**	NOTE: if answer is incorrect allow 1 mark for both correct atomic masses (Br = 80 and F = 19) **A** ecf from ONE incorrect atomic mass for 1 mark

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