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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0620 CHEMISTRY

0620/21 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
- () the word or phrase in brackets is not required but sets the context
- **A** accept (a less than ideal answer which should be marked correct)
- **I** ignore (mark as if this material were not present)
- **R** reject
- ecf credit a correct statement that follows a previous wrong response
- ora or reverse argument
- owtte or words to that effect (accept other ways of expressing the same idea)

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Question	Answer	Marks
1(a)(i)	**F** / barium chloride / $BaCl_2$;	**1**
1(a)(ii)	**D** / ammonium sulfate / $(NH_4)_2SO_4$;	**1**
1(a)(iii)	**A** / Al / Al_2Cl_6 / aluminium chloride;	**1**
1(a)(iv)	**E** / HCl / hydrogen chloride;	**1**
1(a)(v)	**B** / water / H_2O;	**1**
1(a)(vi)	**C** / methane / CH_4;	**1**
1(b)(i)	arrow under the aluminium foil;	**1**
1(b)(ii)	fume cupboard;	**1**
1(b)(iii)	3 (Cl_2);	**1**

Question	Answer	Marks
2(a)	make sure temperature change is the same throughout / make sure that there are no hot spots / no local heating;	**1**
2(b)	any two from: • same amount of solid / same mass of solid; • same volume of water; • same amount of stirring;	**2**
2(c)(i)	**Q**	**1**
2(c)(ii)	**R**; **T**;	**2**
2(d)(i)	^{235}U;	**1**
2(d)(ii)	138;	**1**
2(d)(iii)	cancer treatment / tracer / test thyroid function;	**1**
2(e)(i)	kerosene;	**1**
2(e)(ii)	C_5H_{10};	**1**

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Question	Answer	Marks
3(a)	2 (Ni); CO_2 (on right);	**1** **1**
3(b)(i)	positive electrode / anode in box on left; negative electrode / cathode in upper box on right; electrolyte / named suitable electrolyte in lower box on right; 3 correct = [2] 1 or 2 correct = [1]	**1** **1**
3(b)(ii)	cathode / negative electrode;	**2**
3(c)(i)	*the positive electrode*: chlorine; *the negative electrode*: nickel;	**1**
3(c)(ii)	inert / unreactive; conducts electricity;	**1** **1**
3(d)(i)	giant structure / lots of carbon atoms joined to each other / lattice of covalent bonds; strong (covalent) bonds throughout;	**1** **1**
3(d)(ii)	weak forces between layers; layers can slide (over each other);	**1** **1**

Question	Answer	Marks
4(a)(i)	gradient / slope is greater for strontium ora;	**1**

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Question	Answer	Marks
4(a)(ii)	11 (cm^3);	1
4(a)(iii)	64–66 (s);	1
4(a)(iv)	the line was still going up / the line was still rising;	1
4(a)(v)	(rate) increases;	1
4(b)(i)	(volumetric) pipette;	1
4(b)(ii)	to show end point of titration / to show when the solution has been neutralised; litmus goes from blue to pink (at end point);	1 1
4(c)(i)	decreases slowly at first; then sudden decrease in pH; then slow decrease;	1 1 1
4(c)(ii)	26 (cm^3);	1
4(c)(iii)	strontium chloride;	1

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Question	Answer	Marks
5(a)	melting / ice melts / ice goes from solid to liquid;	1
	any four from: • in solid particles regularly arranged; • in solid particles arranged in fixed position / cannot move; • particles in solid absorb energy; • particles (in solid) vibrate more / particles start to move when heated; • forces between particles (in solid) broken; • particles in liquid slide over each other / move; • particles in liquid not regularly arranged;	4

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Question	Answer	Marks
5(b)(i)	coolant / for making ethanol / for making specified chemicals / solvent;	1
5(b)(ii)	washing / cooking / cleaning etc.;	1
5(c)(i)	lithium + water → lithium hydroxide + hydrogen;	1
5(c)(ii)	any two from: • floats on surface (of water); • bubbles of gas; • fizzes / fizzing sound; • decreases in size / disappears; • moves around;	2
5(c)(iii)	(potassium) more reactive / lithium less reactive;	1
5(d)(i)	correct structure of ethene;	1
5(d)(ii)	high temperature; catalyst / phosphoric acid;	1 1
5(e)	cobalt → iron → cerium → calcium; one pair reversed or all reversed = [1]	2

Question	Answer	Marks
6(a)	C_5H_8;	1

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Question	Answer	Marks
6(b)	bromine / bromine water / aqueous bromine; decolourised / goes from orange to colourless;	1 1
6(c)(i)	double bond;	1
6(c)(ii)	poly(ethene) / any other addition polymer;	1
6(d)	it is a molecule / covalent compound;	1
6(e)	any two from: carbon or soot / carbon monoxide / water;	2
6(f)	alcohols / first box ticked;	1

Question	Answer	Marks
7(a)	any five from: • 11 electrons; • electrons – (negatively) charged; • electrons outside nucleus in shells; • nucleus contains protons and neutrons; • protons – (positively) charged; • neutrons no charge; • 11 protons; • 12 neutrons; • electron arrangement 2,8,1 / 1 electron in outer shell;	5
7(b)(i)	2 (NaOH); 2 (H_2O);	1 1
7(b)(ii)	substance containing carbon and hydrogen only / substance containing carbon and hydrogen and no other element;	1
7(b)(iii)	70;	1

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