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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 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
- () 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)	**E** / NO_2 / nitrogen dioxide;	**1**
1(a) (ii)	**B**;	**1**
1(a)(iii)	**C** / NaI / sodium iodide;	**1**
1(a)(iv)	**E** / NO_2 / nitrogen dioxide;	**1**
1(a)(v)	**D** / F_2 / fluorine;	**1**
1(a)(vi)	**C** / NaI / sodium iodide;	**1**
1(b)	substance containing only one type of atom / substance which cannot be broken down further by chemical means;	**1**
1(c)	O_2; 4 (HF);	**1** **1**

Question	Answer	Marks
2(a)	any two from: • (same) volume of water; • (same) distance of flame from beaker; • (same) height of flame;	**2**
2(b)	exothermic and heat released / heat given out;	**1**
2(c)(i)	hexane;	**1**
2(c)(ii)	hexane;	**1**
2(d)(i)	correct structure of methane;	**1**
2(d)(ii)	natural gas;	**1**
2(e)(i)	both end in –ane;	**1**
2(e)(ii)	compounds; properties; functional;	**3**

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Question	Answer	Marks
3(a)(i)	gives off bubbles rapidly / fast / many bubbles; disappears quickly;	**1** **1**
3(a)(ii)	zinc;	**1**
3(a)(iii)	too reactive / high in the electrochemical / reactivity series;	**1**
3(b)	oxygen removed from barium oxide / it loses oxygen;	**1**
3(c)(i)	use pH meter **and** pH above 7 / (red) litmus turns blue;	**1**
3(c)(ii)	barium chloride; water;	**1** **1**
3(d)(i)	burette;	**1**
3(d)(ii)	any two from: • starts off at high / alkaline pH / pH above 7; • pH decreases / gets more acidic / less alkaline / becomes neutral; • ends up at acidic pH / pH below 7;	**2**
3(e)	two electrodes dipping into the electrolyte; electrodes correctly connected to battery / power supply; correct labels for electrodes and power supply battery;	**1** **1** **1**

Question	Answer	Marks
4(a)(i)	measure volume of gas / measure amount of gas; gas collected in the measuring cylinder; at different times / use of stopclock to measure time;	**1** **1** **1**
4(a)(ii)	faster reaction / rate increases;	**1**
4(b)(i)	same concentration of acid; same mass of iron; same size of iron pieces;	**1** **1** **1**

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Question	Answer	Marks
4(b)(ii)	rate increases with increase in temperature rate increases with temperature = [1]	**2**
4(c)	any three from: • filter (off the iron); • evaporate water / heat gently; • to crystallisation point / leave to cool (after heating); • filter off / pick out crystals; • dry crystal between filter papers;	**3**

Question	Answer	Marks
5(a)	any four from: • in solid particles regularly arranged; • in solid particles arranged in fixed position / cannot move or vibrate; • particles close together in solid; • particles in liquid slide over each other / move; • particles in liquid not regularly arranged; • particles close together in liquid;	**4**
5(b)(i)	any two from: • fossil fuels contain sulfur / named fossil fuel contains sulfur; • burning fossil fuel; • sulfur reacts with oxygen / sulfur reacts with air; • sulfur dioxide is a gas (so escapes into air);	**2**
5(b)(ii)	acidic / acid;	**1**
5(b)(iii)	calcium oxide / calcium carbonate; reacts with (moist) sulfur dioxide / reacts with acidic gas / forms calcium sulfite;	**1** **1**
5(b)(iv)	2 (H_2O) on right; 2 (H_2SO_4) on left;	**1** **1**

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Question	Answer	Marks
5(c)	any two from: • conducts heat / conducts electricity; • malleable; • ductile; • lustrous / shiny surface;	**2**
5(d)(i)	aluminium is good conductor; steel is strong / core is strong;	**1** **1**
5(d)(ii)	copper is cheap(er) (than silver) / silver is (more) expensive;	**1**

Question	Answer	Marks
6(a)(i)	ring around OH group;	**1**
6(a)(ii)	unsaturated **and** has double bonds;	**1**
6(b)(i)	condenser;	**1**
6(b)(ii)	any characteristic of a mixture, e.g. can be separated by physical means / has variable composition / properties are the average of those of the components;	**1**
6(b)(iii)	geraniol floats on top of the water;	**1**
6(c)(i)	structure of ethanol drawn correctly with all atoms and bonds;	**1**
6(c)(ii)	carbon dioxide; water;	**1** **1**
6(d)	21%;	**1**

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Question	Answer	Marks
7(a)	any five from: • four electrons; • electrons negatively charged; • electrons outside nucleus in shells; • nucleus contains protons and neutrons; • protons positively charged; • neutrons no charge; • four protons; • five neutrons; • electron arrangement [2,2] / two electrons in outer shell;	**5**
7(b)	$BeCl_2$;	**1**
7(c)(i)	43 correct atomic masses only = [1]	**2**
7(c)(ii)	global warming / greenhouse effect / effect of global warming, e.g. rise in sea level / desertification / more extreme weather / climate change;	**1**

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