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Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/33**

Paper 3 Core Theory **October/November 2017**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)(i)	**B**	**1**
1(a)(ii)	**C**	**1**
1(a)(iii)	**B**	**1**
1(a)(iv)	**D**	**1**
1(a)(v)	**C**	**1**
1(b)(i)	burning fossil fuels / volcanoes / high temperature furnaces / burning named fossil fuel	**1**
1(b)(ii)	breathing difficulties / irritates nose / irritates eyes / irritates throat	**1**
1(c)	number of protons: 7	**1**
	number of neutrons: 8	**1**
	number of electrons: 7	**1**

Question	Answer	Marks
2(a)	any 3 from: • no oxygen on Venus / (very) little oxygen on Venus / Earth has oxygen / Earth has 21% oxygen • greater per cent carbon dioxide on Venus / more carbon dioxide on Venus **ORA** • smaller per cent of nitrogen on Venus / (very) little nitrogen on Venus / less nitrogen on Venus / Earth has 79% nitrogen	**3**
2(b)	limewater	**1**
	turns milky / cloudy / white precipitate	**1**
2(c)(i)	labels ‘O’ and ‘H’ in the correct circles and no extra non-bonding electrons or bonding electrons	**1**
	one pair of electrons in each overlap area	**1**

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Question	Answer	Marks
2(c)(ii)	solid	**1**
	–200 °C is lower than melting point	**1**
2(c)(iii)	it has 8 electrons in its outer shell	**1**
2(d)(i)	sulfuric acid + magnesium carbonate → magnesium sulfate + carbon dioxide + water IF full credit is not awarded, award 1 mark for either magnesium sulfate **OR** carbon dioxide + water	**2**
2(d)(ii)	98 IF full credit is not awarded, award 1 mark for (S =) 32 , (O = 16) and (H =1)	**2**
2(e)(i)	bleach / treating wood pulp / preservative	**1**
2(e)(ii)	pH 2	**1**

Question	Answer	Marks
3(a)	calcium carbonate	**1**
3(b)(i)	condensation (at mouth of tube)	**1**
3(b)(ii)	add (aqueous) sodium hydroxide / (aqueous) ammonia	**1**
	green precipitate	**1**
3(c)(i)	H_2	**1**
3(c)(ii)	filtration / filter	**1**
3(d)(i)	structure completed correctly with all of the atoms and all of the bonds IF full credit is not awarded, award 1 mark for OH instead of O–H	**2**
3(d)(ii)	bubbles **OR** effervesces / magnesium decreases in size **OR** magnesium disappears	**1**

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Question	Answer	Marks
3(e)	any 3 from: • beaker with chromatography paper inside **OR** chromatography paper with spot on baseline • solvent in bottom of beaker • solvent and chromatography paper correctly labelled • spot (of dye) above level of solvent	**3**
3(f)	any 3 from: • diffusion • molecules move (from place to place) • (molecules move) randomly • molecules collide • molecules spread out / mix up • (bulk) movement of molecules from areas of where they are at higher concentration to where they are at lower concentration	**3**

Question	Answer	Marks
4(a)	electrical conductivity of solid diamond: does not conduct	**1**
	electrical conductivity of molten sulfur: does not conduct	**1**
4(b)	low boiling point	**1**
4(c)	does not conduct when solid but conducts when molten IF full credit is not awarded, award 1 mark for does not conduct when molten	**2**
4(d)(i)	low density	**1**
4(d)(ii)	electrolysis	**1**
4(e)	positive electrode (anode): bromine / Br_2	**1**
	negative electrode (cathode): potassium / K	**1**
4(f)(i)	diamond has a giant structure **AND** diamond has covalent bonds	**1**

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Question	Answer	Marks
4(f)(ii)	drill (bits) / jewellery	**1**

Question	Answer	Marks
5(a)	3 (O_2)	**1**
	2 (SO_2)	**1**
5(b)(i)	lead oxide loses oxygen / oxidation number of lead decreases / lead gains electrons	**1**
5(b)(ii)	any 2 from: • high melting points / high boiling points • high densities • conduct heat **OR** conduct electricity • shiny / lustrous • sonorous / rings when hit • malleable • ductile	**2**
5(c)	air / oxygen	**1**
	water	**1**
5(d)(i)	to oxidise impurities / to oxidise named impurities (restricted to phosphorus / sulfur / carbon / silicon)	**1**
5(d)(ii)	potassium oxide	**1**
	it is the oxide of a metal / metal oxides are basic	**1**
5(e)	mixture	**1**
	of metals / of metal with non-metal / of metals with other elements	**1**
5(f)(i)	car bodies / bridges / railings	**1**

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Question	Answer	Marks
5(f)(ii)	cutlery / chemical plant	**1**

Question	Answer	Marks
6(a)	**X** in bottom compartment of fractionating column	**1**
	B in bottom right tube or shown to the right of the arrow	**1**
6(b)	naphtha	**1**
6(c)(i)	correct structure of ethane showing all of the atoms and all of the bonds	**1**
6(c)(ii)	3 (H_2)	**1**
6(c)(iii)	takes in heat (from surroundings) / absorbs heat / absorbs thermal energy	**1**
6(d)	any 4 from: • idea of breaking down / splitting / decomposing (long-chained) hydrocarbons • example of fraction broken down, e.g. kerosene or fuel oil • shorter / smaller hydrocarbons formed • and alkenes • heat / high temperature • catalysts	**4**
6(e)(i)	(boiling point) increases	**1**
6(e)(ii)	any value between –8 and –80 (°C) inclusive of these values	**1**
6(e)(iii)	arrangement: irregular / random / no particular arrangement	**1**
	separation: close together / touching	**1**

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