Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/33**

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

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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**

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**

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**

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**

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**