Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/32**

Paper Theory (Core) **May/June 2017**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)(i)	**A**	**1**
1(a)(ii)	**B**	**1**
1(a)(iii)	**B**	**1**
1(a)(iv)	**E**	**1**
1(a)(v)	**C**	**1**
1(b)	number of electrons in O^{2-} ion = 10	**1**
	number of neutrons in S = 18	**1**
	number of protons in S = 16 **AND** in O^{2-} ion = 8	**1**

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Question	Answer	Marks
2(a)(i)	chloride	**1**
2(a)(ii)	sodium / Na^+	**1**
2(a)(iii)	0.4 (mg)	**1**
2(a)(iv)	34 (mg)	**1**
2(a)(v)	sodium hydrogencarbonate	**1**
2(b)	flame test	**1**
	lilac colour	**1**
2(c)	KNO_3	**1**
2(d)	negative electrode: potassium / K	**1**
	positive electrode: bromine / Br	**1**

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Question	Answer	Marks
3(a)	any 5 of: **X** has ionic bonding / ionic **X** particles are regularly arranged / lattice / in rows / uniformly arranged **X** particles (only) vibrate / do not move from place to place **Y** has covalent bonding **Y** has irregular arrangement of particles / random arrangement **Y** particles are sliding over each other / moving slowly **Z** has covalent bonding **Z** particles are randomly arranged / irregularly arranged **Z** particles moving randomly / moving rapidly / moving freely / moving quickly / moving fast	**5**
3(b)	volume increases / volume gets larger	**1**
	particles get further apart	**1**
3(c)	white	**1**
	to blue	**1**
3(d)	it has (two different types of) atoms bonded / joined	**1**

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Question	Answer	Marks
4(a)(i)	bauxite	**1**
4(a)(ii)	it is (very) reactive / too reactive / above carbon in the reactivity series / more reactive than carbon	**1**
4(b)(i)	hydrogen/ H_2	**1**
4(b)(ii)	gas syringe connected to a flask **OR** this described in words	**1**
	closed apparatus / workable apparatus **OR** this described in words	**1**
	timer or stopwatch **OR** this described in words	**1**
4(c)	for aircraft / car bodies	**1**
	low density	**1**
4(d)	any 2 advantages: saves energy saves mining of ore saves other finite resources saves transport costs of bringing ore to factory reduces pollution(due to dust or exhaust fumes etc.)	**2**
4(e)(i)	(zinc oxide) loses oxygen	**1**
4(e)(ii)	reactant level below product level / reactants have less energy than products / products have more energy than reactants	**1**

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Question	Answer	Marks
5(a)(i)	circle around carboxylic acid group	**1**
5(a)(ii)	alcohol	**1**
5(b)	$C_3H_6O_3$	**1**
5(c)	alcohol group shown as O–H	**1**
	rest of the structure correct	**1**
5(d)(i)	how easily it evaporates / boils	**1**
5(d)(ii)	butanol	**1**
5(d)(iii)	any value between 65 and 98 (°C) (exclusive of these values)	**1**
5(d)(iv)	gas / vapour	**1**
	120 °C is above the boiling point	**1**
5(e)(i)	2 (H_2O)	**1**
	O_2	**1**
5(e)(ii)	32 **IF** full credit is not awarded, allow 1 mark for (C =) 12, (O =) 16 and (H =) 1	**2**

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Question	Answer	Marks
6(a)	**M**	
	(good) resistance to corrosion	**1**
	high(est) relative strength	**1**
6(b)	**Q**	**1**
6(c)	any 3 from: high melting point / high boiling point high density forms coloured compounds / compounds are coloured / ions are coloured has more than one oxidation state / forms ions with different charges forms complex ions catalyst hard / strong sonorous / rings (when hit)	**3**
6(d)	2 (HCl)	**1**
	H_2	**1**
6(e)	gold < copper < iron < potassium **IF** full credit is not awarded, allow 1 mark for either a correct sequence apart from a consecutive pair reversed **OR** for the whole sequence reversed	**2**
6(f)(i)	the higher the concentration the faster the rate / the lower the concentration the slower the rate / as the concentration increases the rate of reaction increases	**1**
6(f)(ii)	phosphoric	**1**
6(f)(iii)	any value between 45 and 102 hours (exclusive of these values)	**1**
6(f)(iv)	pH 2	**1**

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Question	Answer	Marks
7(a)	(substance containing) only one type of atom	**1**
7(b)	underground / volcanoes / crude oil / petroleum	**1**
	suitable use, e.g. (making) sulfuric acid / making SO_2 / dusting plants / vulcanising rubber	**1**
7(c)	sublimation / subliming / sublime	**1**
7(d)	any 2 sources: sulfur dioxide: from volcanoes / burning fossil fuels oxides of nitrogen: from car <u>exhausts</u> / high temperature furnaces / lightning any 3 effects: sulfur dioxide: acid rain / named effects of acid rain sulfur dioxide: irritates eyes or skin oxides of nitrogen: acid rain / named effect of acid rain oxides of nitrogen: breathing difficulties / breathing problems / irritates eyes / skin / photochemical smog	**5**
7(e)	add hydrochloric acid to the mixture	**1**
	filter off the <u>sulfur</u> / <u>sulfur</u> on filter paper	**1**
	wash sulfur (with water or other solvent) **AND** dry in an oven / air dry / leave to dry (in air)	**1**

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