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Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/32**

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

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)(i)	**A**	**1**
1(a)(ii)	**C**	**1**
1(a)(iii)	**D**	**1**
1(a)(iv)	**D**	**1**
1(a)(v)	**E**	**1**
1(b)	any 3 from: • metals conduct electricity / heat **ORA** • metals are malleable **ORA** • metals are ductile **ORA** • metals are sonorous / ring when hit **ORA** • metals are shiny / lustrous **ORA**	**3**
1(c)	substance contain two (or more different) elements which are bonded together / which are chemically combined	**1**

Question	Answer	Marks
2(a)	any 3 from: • greater percentage of helium (on Saturn) / less helium on Earth • greater percentage of hydrogen (on Saturn) / little hydrogen on Earth • no oxygen on Saturn / oxygen on Earth / Earth has 1/5 oxygen • lower percentage of other gases (on Saturn) / more of other gases on Earth • greater percentage of argon on Earth / less argon on Saturn • no **OR** very little nitrogen on Saturn / Earth has about 80% nitrogen / Earth has a lot of nitrogen	**3**
2(b)(i)	hydrogen is less dense than helium	**1**
2(b)(ii)	gas	**1**
	–250 °C is above the boiling point	**1**

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Question	Answer	Marks
2(c)(i)	(damp) red litmus	**1**
	turns blue	**1**
2(c)(ii)	labels ‘N’ and ‘H’ in the correct circles	**1**
	one pair of electrons in each overlap area and no non-bonding electrons or extra bonding electrons added	**1**
2(d)	51 IF full credit is not awarded, allow 1 mark for (S =) 32, (N =) 14 and (H =) 1	**2**
2(e)(i)	carbon dioxide / CO_2	**1**
2(e)(ii)	global warming / effect of global warming, e.g. melting ice caps / desertification / more extreme weather / death of corals / more risk of flooding	**1**

Question	Answer	Marks
3(a)(i)	functional group shown as –COOH / $–CO_2H$ or displayed formula	**1**
3(a)(ii)	pH 4	**1**
3(a)(iii)	neutralisation	**1**
3(a)(iv)	releases heat / heat given out	**1**
3(b)	$C_3H_8O_3$	**1**
3(c)	2 (CO)	**1**
	3 (H_2O)	**1**

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Question	Answer	Marks
3(d)(i)	distillation	**1**
	water is the distillate / water collects in the condenser / sodium chloride remains in the flask	**1**
	idea of different boiling points (of water and sodium chloride)	**1**
3(d)(ii)	boiling point / melting point	**1**
3(d)(iii)	(aqueous) silver nitrate (acidified with nitric acid)	**1**
	white precipitate	**1**

Question	Answer	Marks
4(a)	electrical conductivity of zinc: conducts	**1**
	solubility in water of sodium chloride: soluble	**1**
4(b)	low boiling point / does not conduct when solid or molten	**1**
4(c)	does not conduct when solid but conducts when molten IF full credit is not awarded, allow 1 mark for conducts when molten	**2**
4(d)	positive electrode (anode): iodine	**1**
	negative electrode (cathode): calcium	**1**
4(e)	number of protons: 15	**1**
	number of neutrons: 16	**1**
4(f)	acidic because phosphorus is a non-metal	**1**
4(g)	goes (directly) from solid to vapour / gas (without liquid state being formed)	**1**

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Question	Answer	Marks
5(a)	nickel(II) oxide loses oxygen / oxidation number of nickel decreases / nickel gains electrons	**1**
5(b)	reversible reaction	**1**
5(c)(i)	carbon monoxide is a gas / carbon monoxide escapes from the mixture	**1**
5(c)(ii)	toxic / poisonous	**1**
5(d)(i)	any 2 from: • nickel has a high melting / boiling point **ORA** • nickel has a high density **ORA** • nickel is hard / strong **ORA**	**2**
5(d)(ii)	nickel(II) chloride is coloured **ORA** / nickel(II) chloride can be a catalyst **ORA**	**1**
5(e)(i)	boiling point: any value between 680–750 °C inclusive	**1**
	relative reactivity of rubidium with water: reacts explosively / bigger flame (than potassium) / forms bubbles extremely rapidly / faster that potassium but slower than caesium / rapidly bursts into flame	**1**
5(e)(ii)	density increases down the group **ORA**	**1**

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Question	Answer	Marks
6(a)	any 5 from: *from ethene*: • steam • high temperature • catalyst *by fermentation*: • yeast / zymase / enzymes • absence of oxygen / anaerobic • water / aqueous (suspension) • suitable temperature quoted (10–40 °C)	**5**
6(b)(i)	saturated hydrocarbon: no change / aqueous bromine remains orange	**1**
	unsaturated hydrocarbon: aqueous bromine decolourised	**1**
6(b)(ii)	a large molecule formed from many monomers	**1**
6(b)(iii)	clothing / named article of clothing	**1**

Question	Answer	Marks
7(a)	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**

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Question	Answer	Marks
7(b)	Cl_2	**1**
	2 (SCl_2)	**1**
7(c)	**P**: freezing	**1**
	Q: condensing / condensation	**1**

Question	Answer	Marks
8(a)	89.6 (g)	**1**
8(b)(i)	220 (cm^3)	**1**
8(b)(ii)	49 (min)	**1**
8(b)(iii)	goes faster / increases (rate)	**1**
8(c)(i)	16%	**1**
8(c)(ii)	any 2 from: • neutralise soil • reduce acidity of soils • so plants grow properly / so plants grow well	**2**

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