

CAMBRIDGE INTERNATIONAL EXAMINATIONS**Cambridge International General Certificate of Secondary Education****MARK SCHEME for the October/November 2015 series****0620 CHEMISTRY****0620/23**

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)

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
1(a)(i)	B / Cl_2 / chlorine;	1
1(a)(ii)	C / N_2 / nitrogen;	1
1(a)(iii)	E / Ar / argon;	1
1(a)(iv)	A / ethene / C_2H_4 ;	1
1(a)(v)	A / ethene / C_2H_4 ;	1
1(a)(vi)	F / CO_2 / carbon dioxide;	1
1(b)	substance containing (two or more) different atoms bonded / substance containing (two or more) different atoms combined;	1
1(c)	in light bulbs / as an inert atmosphere / welding;	1
1(d)	3 (Mg) <u>and</u> N_2 ;	1

Question	Answer	Marks
2(a)(i)	plastics;	1
2(b)	third box ticked / exothermic;	1
2(c)	4;	1
2(d)(i)	speed up the reaction / increase reaction rate;	1
2(d)(ii)	carbon dioxide; water;	1 1
2(e)	any two from: - sulfur (oxidises / burns) to form sulfur dioxide; - acid rain / acidic gas formed; - effect of acid rain, e.g. kills animals in ponds (or lakes) / kills plants / soil demineralisation / erodes limestone buildings / iron structures corroded;	2
2(f)(i)	alkane(s);	1
2(f)(ii)	colourless / liquid at room temperature / low melting point;	1

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Question	Answer	Marks
2(f)(iii)	$\begin{array}{c} \text{O} \\ \\ \text{C} - \text{O} - \text{H}; \end{array}$	1

Question	Answer	Marks
3(a)	flask; Bunsen burner / Bunsen / burner;	1 1
3(b)	sodium sulfate;	1
3(c)(i)	3 correctly labelled = [2] 1 or 2 correctly labelled = [1];	2
3(c)(ii)	X = chlorine / Cl_2 ; Y = hydrogen / H_2 ;	1 1
3(c)(iii)	calcium chloride; carbon dioxide; water;	3
3(d)(i)	1.6;	1
3(d)(ii)	idea that pH increases slowly at first ; idea of sudden increase at around 18 cm^3 ; idea of pH increasing at a slower rate in the more alkaline region;	1 1 1

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Question	Answer	Marks
4(a)	measure the volume of gas; in a (measuring) cylinder; at different times;	1 1 1
4(b)(i)	increases then decreases; comment on the curve, e.g. rate not constant at first/peak (or maximum) at 60 hours /rate of decrease less than rate of increase (around the maximum);	1 1
4(b)(ii)	0.29 (cm ³ CO ₂ per hour);	1
4(b)(iii)	any two from: - higher temperature (R: temperatures above 40 °C); - increase concentration of <u>glucose</u>; - increase amount of yeast;	2
4(c)	M1 correct method, e.g. add litmus /add sodium hydroxide /add sodium carbonate /measure pH; M2 correct outcome, e.g. litmus turns red with acid /no change of litmus with ethanol /pH below 7 with acid /pH 7 with ethanol /acid reacts with sodium hydroxide or sodium carbonate / ethanol does not react with sodium hydroxide or sodium carbonate;	1 1

Question	Answer	Marks
5(a)	any four from: - particles in the liquid slide over each other /move slowly /restricted movement; - particles in the liquid not regularly arranged /randomly arranged; - particles close together in liquid; - in the gas particles arranged randomly /are anywhere; - in the gas particles move from place to place /move freely /move fast; - particles far apart in the gas;	4
5(b)(i)	liquid; temperature above melting point but below boiling point;	1 1
5(b)(ii)	copper and iron; both have <u>high</u> melting points;	1 1

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Question	Answer	Marks
5(b)(iii)	resistant to corrosion;	1
5(c)(i)	oxygen / air; water;	1 1
5(c)(ii)	idea of layer stopping air or water getting to the surface / idea of blocking reaction with the surface of the iron, e.g. stops air or oxygen getting to surface / blocks water or moisture getting to the iron;	1
5(d)(i)	iron chloride / iron(II) chloride; hydrogen;	1 1
5(d)(ii)	M1 (aqueous) sodium hydroxide / (aqueous) ammonia; M2 green precipitate / grey-green precipitate;	1 1
5(e)	any suitable use, e.g. cutlery / chemical plant / surgical instruments / saucepans;	1

Question	Answer	Marks
6(a)	fractional distillation / fractionation / fractionating; differences in boiling point(s);	1 1
6(b)(i)	refinery gas;	1
6(b)(ii)	kerosene / paraffin;	1
6(c)(i)	B and C / ethene and propene;	1
6(c)(ii)	H ₂ ; C ₃ H ₆ ;	1 1
6(d)(i)	copper;	1
6(d)(ii)	it is cooler / temperature lower;	1

Page 7	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
7(a)	any five from: • 17 protons; • 18 neutrons; • 17 electrons; • protons positively charged; • neutrons no charge • electrons negatively charged; • electrons outside the nucleus in shells; • nucleus contains protons and neutrons; • electron arrangement 2, 8, 7/7 electrons in the outer shell;	5
7(b)	sodium atoms each lose an electron/sodium has one more proton than electrons; chlorine atoms each gain an electron/chlorine has one more electron than protons;	1 1
7(c)(i)	iodine formed;	1
7(c)(ii)	chlorine is more reactive than <u>iodine</u> /chlorine is higher in the reactivity series than <u>iodine</u> ;	1
7(d)(i)	C_2ClF_5 ;	1