

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0620 CHEMISTRY

0620/23

Paper 2 (Core Theory), maximum raw mark 80

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.

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- **OR** gives alternative marking point
- **R** reject
- **I** ignore mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- **COND** indicates mark is conditional on previous marking point
- owtte or words to that effect (accept other ways of expressing the same idea)
- max indicates the maximum number of marks that can be awarded
- ecf credit a correct statement that follows a previous wrong response
- () the word / phrase in brackets is not required, but sets the context
- **ORA** or reverse argument

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
1(a)(i)	C/N ₂ /nitrogen;	1
1(a)(ii)	A/NH ₃ /ammonia;	1
1(a)(iii)	B/NaNO ₃ /sodium nitrate;	1
1(a)(iv)	E/NaCl/sodium chloride;	1
1(a)(v)	B/NaNO ₃ /sodium nitrate;	1
1(b)(i)	sodium nitrate;	1
1(b)(ii)	gas; molecular; solid; ions; (1 mark each)	4

Question	Answer	Marks
2(a)(i)	temperature rises / heat given off;	1
2(a)(ii)	structure completed with $\begin{array}{c} \text{O} \\ \\ -\text{C}-\text{O}-\text{H} \end{array};$	1
2(a)(iii)	<i>Any three of:</i> <ul style="list-style-type: none"> • evaporation / heat solution / leave the solution; • to crystallisation point / to form crystals; • filter off crystals / pick out crystals; • dry crystals between filter papers / heat gently / heat to just above 100 °C; 	3
2(b)	3 rd and 5 th boxes ticked (one mark each);	2

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Question	Answer	Marks
2(c)	<i>Any two of:</i> <ul style="list-style-type: none"> • bubbles; • fizzing (sound); • magnesium disappears / gets smaller; • change in temperature / gets warmer; 	2

Question	Answer	Marks
3(a)(i)	4 th box down ticked (thermal decomposition);	1
3(a)(ii)	use fume cupboard / fume hood / well-ventilated area;	1
3(a)(iii)	liquid; particles close together / touching; particles randomly arranged / no fixed arrangement;	3
3(b)(i)	H ₂ SO ₄ ;	1
3(b)(ii)	pH 1;	1
3(c)	filter funnel and filter paper; either funnel or filter paper labelled;	2
3(d)(i)	reversible reaction / equilibrium;	1
3(d)(ii)	white; to blue;	2

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Question	Answer	Marks
4(a)	carbon dioxide escapes / gas escapes;	1
4(b)(i)	decreases; then levels off / remains the same / becomes steady;	2
4(b)(ii)	42–46 (s);	1
4(b)(iii)	3.5 (g);	1
4(b)(iv)	initial gradient steeper and starts at 200 g; ends up at same volume;	2
4(b)(v)	decreases / slows down;	1
4(c)(i)	zinc oxide / zinc hydroxide / zinc carbonate;	1
4(c)(ii)	anode: chlorine / Cl_2 ; cathode: zinc / Zn;	2

Question	Answer	Marks
5(a)(i)	ring around the OH group;	1
5(a)(ii)	3 / O, C and H;	1
5(a)(iii)	10;	1
5(a)(iv)	double bond / $C=C$;	1
5(b)(i)	(C), B, E, D, A = 2 marks one pair reversed = 1 mark	2
5(b)(ii)	boiling point;	1
5(c)(i)	X anywhere in top compartment; H anywhere in bottom pipe or outside bottom pipe;	2

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
5(c)(ii)	any suitable e.g. making chemicals / making ethene;	1
5(d)(i)	animal wastes / gases from animals / bacterial decay / rice paddy fields / fracking / landfill sites / decay of vegetation / melting permafrost;	1
5(d)(ii)	global warming / greenhouse gas / rise in temperature of atmosphere;	1
5(d)(iii)	alkane(s);	1

Question	Answer	Marks
6(a)(i)	A and B; (very) high melting points;	2
6(a)(ii)	A; good electrical conductor;	2
6(a)(iii)	C;	1
6(b)	<p><i>Any four of:</i></p> <ul style="list-style-type: none"> • no reaction between bromine and potassium chloride / reaction mixture remains an orange colour / no colour change; • because chlorine is more reactive than bromine ORA; • solution goes brown with potassium iodide / solution darkens with potassium iodide; • there is a reaction with potassium iodide / potassium bromide formed with potassium iodide / bromine formed with potassium iodide; • iodine less reactive than bromine ORA; 	4
6(c)	kills bacteria / kills microorganisms;	1
6(d)	pair of electrons between chlorine atoms; 6 non-bonding electrons on outer shell of right hand chlorine atom;	2
6(e)(i)	In_2Cl_6 ;	1
6(e)(ii)	49;	1

Page 7	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
7(a)	evaporates easily / vaporises readily;	1
7(b)	<p><i>Any three of:</i></p> <ul style="list-style-type: none"> • movement of particles; • diffusion; • particles collide with each other / particles bounce off each other; • spreading out of particles; • random (movement of particles); • (particles move) from higher to lower concentration; 	3
7(c)(i)	increases;	1
7(c)(ii)	no fixed pattern in melting points / melting points are irregular;	1
7(c)(iii)	third box down ticked (CH ₂);	1
7(c)(iv)	oxygen (on left); water (on right);	2
7(d)(i)	atoms with same number of protons but different number of neutrons OR atoms with same atomic number but different number of neutrons OR atoms with same number of protons but different mass number;	1
7(d)(ii)	$^{12}_6\text{C}$;	1