

MARK SCHEME for the May/June 2013 series

0620 CHEMISTRY

0620/22

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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Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Image: Interpret text of the system of th	Page 2		Mark Scheme	Syllabus
 (i) D / chlorine / Cl₂ E / carbon / graphite IGNORE: C REJECT: diamond (ii) E / carbon / graphite IGNORE: C REJECT: diamond (iii) C / ammonia / NH₃ (ri (iv) A / ethanol IGNORE: alcohol (r) E / graphite / carbon IGNORE: alcohol (r) E / graphite / carbon IGNORE: alcohol (a) atom; combined; molecules; ionic (1 mark each) (f) E / graphite / carbon IGNORE: alcohol (g) atom; combined; molecules; ionic (1 mark each) (g) atom; combined; molecules; ionic (1 mark each) (g) atom; combined; molecules; ionic (1 mark each) (g) 5.2–6.6 (actual = 5.96) (g) 5.2–6.6 (actual = 5.96) (g) Any three of: (g) kubstance which) speeds up chemical reaction / increases reaction rate / lowers activatio energy (g) Any three of: (g) high belling point / high melting points (high density / they are very dense IGNORE: they are dense (f) form complex ions (g) ALLOW: they are hard(er)/ strong (g) 3 (Fe) (g) 4 (H₂O) 			IGCSE – May/June 2013	0620
E / carbon / graphite IGNORE: C REJECT: diamond [1] (ii) E / carbon / graphite IGNORE: C REJECT: diamond [1] (iii) C / ammonia / NH ₃ [1] (iv) A / ethanol IGNORE: alcohol [1] (iv) A / ethanol IGNORE: carbon REJECT: diamond [1] (v) E / graphite / carbon IGNORE: C REJECT: diamond [1] (a) increases [1] (b) atom; combined; molecules; ionic (1 mark each) [2] (a) increases [1] (c) (substance which) speeds up chemical reaction / increases reaction rate / lowers activatio energy [1] (c) (substance which) speeds up chemical reaction / increases reaction rate / lowers activation energy [1] (d) Any three of: [2] (i) Any three of: [3] (i) high boiling point / high melting points (ii) high density / they are very dense IGNORE: they are dense (iii) m coloured <u>compounds REJECT: they are coloured</u> (iii) have different oxidation states / form ions with different charges (iii) form complex ions [4] (iii) ALLOW: they are hard(<u>ery</u> strong (e) 3 (Fe) [1]	(a) (i) D/a	chlorine / Cl ₂	Philip.
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 (b) 5.2–6.6 (actual = 5.96) [1] (c) (substance which) speeds up chemical reaction / increases reaction rate / lowers activatio energy [1] (d) Any three of: [3] (e) high boiling point / high melting points high density / they are very dense IGNORE: they are dense form coloured <u>compounds</u> REJECT: they are coloured have different oxidation states / form ions with different charges form complex ions ALLOW: they are hard(<u>er)</u> strong 				
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(d) Any three of:[3]• high boiling point / high melting points•• high density / they are very dense IGNORE: they are dense• form coloured compounds REJECT: they are coloured• have different oxidation states / form ions with different charges• form complex ions• ALLOW: they are hard(er)/ strong(e) 3 (Fe)4 (H ₂ O)	e	energy		[1]
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 high density / they are very dense IGNORE: they are dense form coloured <u>compounds</u> REJECT: they are coloured have different oxidation states / form ions with different charges form complex ions ALLOW: they are hard(<u>er)</u>/ strong 	•	high	boiling point / high melting points	
 ion coorded <u>compounds</u> REJECT: they are coorded have different oxidation states / form ions with different charges form complex ions ALLOW: they are hard(<u>er)</u>/ strong 	•	high	density / they are very dense IGNORE : they are d	lense
 form complex ions ALLOW: they are hard<u>(er)/</u> strong (e) 3 (Fe) 4 (H₂O) 	•	have	e different oxidation states / form ions with different	charges
(e) 3 (Fe) [1 4 (H ₂ O)	•	form	n complex ions	
(e) 3 (Fe) [1 4 (H ₂ O)		ALL	andy are mara <u>ter //</u> surong	
4 (H ₂ O)	(e) 3	6 (Fe)		[1
	4	. (H₂O)		[1

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(f)	iror IGN IGN hyc	n sulfate IORE: incorrect oxidation number of iron IORE: formula	annbrie [1	
			[Total: 10]	
(a)	A = B =	(volumetric) pipette burette	[1] [1]	
	0 = AL D =	L OW: Erlenmeyer (flask) (filter) funnel	[1] [1]	
(b)	(i)	13.2	[1	
	(ii)	10 (cm ³)	[1]	
	(iii)	(pH) 7	[1]	
(c)	(i)	2 nd and 3 rd boxes ticked (calcium carbonate and calcium oxide) (one mark each) APPLY: listing	[2	
	(ii)	so that crops grow well / so crops grow better / allows maxin grow as well in too acidic conditions/plants killed/plants die IGNORE: plants can grow	num growth/ plants don' [1	
			[Total: 10	
(a)	(i)	correct structure of methane showing all atoms and bonds	[1	
	(ii)	name of any alkane other than methane IGNORE: formulae	[1	
	(iii)	Any one of:	[1	
		(waste product from digestion in) cows / other suitable animals/ marshes / paddy fields / bacterial decay / decomposition of vege IGNORE: industrial sources / leaking from the Earth	etation	
	(iv)	CO ₂ on right	[1]	
		2 on left NOTE: second mark dependent on the first being correct	[1	



[Total: 12]

Page 5	Mark Scheme	Syllabus Syllabus
	IGCSE – May/June 2013	0620
a) zinc → r	nagnesium \rightarrow calcium \rightarrow rubidium	andr
1 mark fo ALLOW	or 1 pair reversed : all reversed for 1 mark	10
) zinc/ iror REJEC1	n : if K / Na / Al included = 0 marks	[1]
c) (i) 2 ele	ectrons in outer shell	[1]
8 ele ALL	ectrons in middle shell .OW: 2,8,2 in numbers for 2 marks	[1]
(ii) 14		[1]
		[Total: 6]
(a) <u>ions</u> can IGNORE REJEC1	<u>move</u> / <u>ions</u> are <u>mobile</u> : it has an ionic structure : if mention of atoms/ molecules	[1]
b) it is a mo IGNORE	blecular structure / it has <u>no ions</u> : electrons can't move	[1]
c) add wate	er and shake / stir / mix	[1]
filter		[1]
d) (i) C		[1]
(ii) grap	phite	[1]
(iii) nega	ative electrode: zinc / Zn	[1]
posi IGN REJ	tive electrode: chlorine / Cl ₂ ORE: Cl IECT: Chloride / Cl	[1]
(iv) acid REJ	ify / add nitric acid I ECT: add sulfuric acid / add hydrochloric acid	[1]
add	(aqueous) silver nitrate	[1]
whit	e precipitate	[1]
3 rd r	narking point dependent on correct reagent (silve	r nitrate)
		[Total: 11]

Page 6	Mark Scheme	Syllabus 2.8 r
•	IGCSE – May/June 2013	0620
(a) Any	y four of:	Cannon.
•	sugar dissolves	36
•	sugar particles become separated or water molecule	es get in between sugar particles
•	diffusion	-On
•	movement of particles (in solution)	1
•	random (movement)	

- (a) Any four of: 8
 - sugar dissolves
 - sugar particles become separated or water molecules get in between sugar particles
 - diffusion
 - movement of particles (in solution)
 - random (movement)
 - (sugar) particles constantly collide with (water) molecules
 - particles (in solution) spread out / seperate
 - ALLOW: particles move from concentrated to dilute (sugar) solution
 - (b) (i) 3 [1] (ii) 12 [1] (iii) any OH group ringed / all OH groups ringed [1] (iv) carbon dioxide [1] **IGNORE:** CO₂ [1] (v) yeast [1] no air / oxygen present IGNORE: reference to temperatures between 5-45 °C (vi) solvent / fuel / making a named chemical e.g. making ethanoic acid and esters /
 - antiseptic / medical wipes / cleaning fluid / vodka sauce / paints/ disinfectant / preservatives [1] IGNORE: unqualified uses e.g. in cars / food / cooking

[Total: 11]

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