UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

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Page 2				Mark Scheme: Teachers' version	Syllabus	Paper
				IGCSE – October/November 2010	0620	22
1	(a)	ma	gnesi	um oxide / MgO		[1]
	(b)	ALL	-OW	dioxide / NO ₂ ; nitrogen oxide		[1]
				oxide / SO ₂ sulfur oxide		[1]
	(c)		bon d er / H	lioxide / CO ₂ ; I ₂ O		[1] [1]
	(d)	wat	er / H	I ₂ O		[1]
	(e)	carl	bon d	lioxide / CO ₂		[1]
						[Total: 7]
2	(a)	(i)	subs	stance containing two (or more) different atoms	/ elements joined	/ combined /
				H idea of different atoms / elements and bonded ne	eeded for 1 mark	[1]
		(ii)	it is a	npound) B; an ionic giant structure / it is ionic OW it contains ions		[1] [1]
	((iii)	С			[1]
	(b)	(i)	1st b	pox ticked (conducts when molten)		[1]
		(ii)	(ligh 2nd NOT	(aqueous) silver nitrate; t) yellow precipitate (BOTH yellow and precipitate re mark dependent on correct reagent cream precipitate OW lead nitrate (1) yellow precipitate (1)	equired)	[1] [1]
		., .				
	(C)	It is	an o	xide of a non-metal / iodine is a non-metal		[1]
						[Total: 8]

Page 3		}	Mark Scheme: Teachers' version	Syllabus	Paper	
				IGCSE – October/November 2010	0620	22
3	(a)	(i)	allov	w between 720 and 820°C (actual = 760°C)		[1]
		(ii)	rubio	sium; dium y listing rules for more than 2 elements		[1] [1]
		(iii)	incre	eases (down the group)		[1]
	(b)		t; Iting; rease	s		[1] [1] [1]
	(c)	-1 ALL IGN NO	per oi _OW IORE T: plu	+ water → sodium hydroxide + hydrogen mission or error = instead of → E: reference to states us instead of + energy		[2]
	(d)	(i)		l left; l right per omission / error		[2]
		(ii)		two atoms (in its molecule) I reference to elements / two atoms the same / a co	mpound of two at	[1]
		(iii)		ngement: random / not ordered / disordered		[1]
			moti	OW: far apart together; ion: random / (moving) fast / rapid / everywhere / mo ORE: loosely packed	ove with ease / fre	eely [1]
		(iv)	8 ele sepa	of bonding electrons; ectrons in outer shell of each chlorine arate atoms = 0 ORE: inner electrons		[1] [1]

Page 4		4	Mark Scheme: Teachers' version	Syllabus	Paper
			IGCSE – October/November 2010	0620	22
4	(a) (i)	cova	alent		[1]
	(ii)	С			[1]
	(iii)	В			[1]
	(iv)	etha	nol		[1]
	(v)	ALL turn	nine water OW: bromine / potassium permanganate; s colourless ORE: colour of bromine		[1] [1]
	(b) (i)	sam sam simi	le functional group / le <u>general</u> formula / lar <u>chemical</u> properties /		[0]
			dual change in physical properties OW: (successive members) differ by a CH ₂ group		[2]
	(ii)		ect formula (molecular or displayed) for any alkane ect name corresponding to the formula	apart from ethane	[1] [1]
	(c) (i)	X pl	aced inside the column at the top		[1]
	(ii)	B pl	aced by bottom arrow		[1]
					[Total: 12]

Page 5		Mark Scheme: Teachers' version	Syllabus	Paper
		IGCSE – October/November 2010	0620	22
(a) (i)		eases / gets smaller disappears / increases in surface area		[1]
(ii)	incre	eases		[1]
(b) (i)	•	ts plotted correctly including 0,0 per incorrect or no point plotted)		[2]
	curve	e of best fit drawn x 1 mark if graph plotted wrong way round)		[1]
(ii)		m ³ OW: 44 / correct reading from incorrect curve in par : incorrect units	t (i)	[1]
(iii)	ALL	ne zinc had been used up / one of the reagents used OW: the reaction has finished : sulfuric acid used up	d up	[1]
(iv)	(gas	ed splint;) pops / explodes / blows out flame ORE: pop test		[1] [1]
(c) (i)		s fast <u>er</u> / more hydrogen given off <u>per minute</u> / more for same amount of gas	gas given off pe	r unit time / less [1]
(ii)	_	s slow <u>er</u> / less hydrogen given off <u>per minute</u> / less for same amount of gas	gas given off per	unit time / more [1]
` '		ce which speeds up a reaction changes the rate of reaction		[1]

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[Total: 12]

Page 6	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2010	0620	22
higl higl forr forr forr	three of: n boiling point or high melting point / n density / n coloured compounds or have coloured ions n ions of more than one charge or variable valency / n complex ions / .OW: (very) hard / hardness / (good) catalysts		[3]
(b) (i)	different number of neutrons / different nucleon number	er	[1]
(ii)	57		[1]
(iii)	26		[1]
(c) (i)	water / damp / humidity; IGNORE: a little or similar when referring to damp / wair / oxygen suitable method e.g. coating with zinc / coating with use oil (or grease) / galvanising / sacrificial protection NOT: removing air / water suitable reason e.g. stops air / water reaching surface (reason must be consequential to the method chosen)	nreactive metal / pla	[1] [1] estic / [1] [1]
IGN	oxide; ses oxygen / gains electrons / <u>iron</u> decreases oxidatior IORE: wrong oxidation numbers T addition of hydrogen	n number	[1]
(e) (i)	by (incomplete) combustion of hydrocarbons / carbon ALLOW: (incomplete) combustion of fossil fuels / nan (or hydrocarbons etc) react with air (or oxygen) NOT: reacts with air unqualified (must refer to a carbo	ned carbon containi	
(ii)	poisonous / toxic / kills you / suffocates you / stops red ALLOW: binds with haemoglobin in place of oxygen NOT: harmful	d blood cells carryin	g oxygen [1]

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[Total: 14]

Page 7		,	Mark Scheme: Teachers' version	Syllabus	Paper
			IGCSE – October/November 2010	0620	22
7 (a)	(i)	ÀLL	ic acid) had dissolved OW acid had diffused / an acid is formed here ORE: boric acid is acidic / neutralisation / it is an aci	d	[1
	(ii)	pH 8	3		[1
	(iii)	ALL	dom movement of particles / mixing up of particles OW: bulk / overall movement of particles from high t ORE: particles move from high to low concentration		[1 _] on
	(iv)		of neutralisation (of acid by alkali) ORE: returned to neutral		[1
(b)	(i)		N_2H_4 OW: any order of atoms / (NH $_2$) $_2$ CO		[1]
	(ii)	60			[1]
(c)	(i)	nitro IGN	ogen ORE: nitrates		[1
	(ii)	to po	ocrease crop / plant growth / speeds up plant growth ut back nitrogen (or nutrients) into the soil / to provid OW: to supply plants with nitrogen / essential eleme ORE: makes the soil more fertile / to supply nitroger	le plants with (mor ents	[1] re) nutrients [1]
(d)	eva		of: te some of the water / heat to crystallisation point / h at or evaporate without qualification	eat a little / partial	ly evaporate;
			crystallise / leave in a warm place / leave on the win	dow sill;	
			filter paper y in oven unless it implies that the temperature is be	low 100°C / very I	[2 _.

[Total: 11]