MARK SCHEME for the October/November 2012 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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



	Page 2			Mark Scheme	Syllabus	Paper
				IGCSE – October/November 2012	0620	23
1	(a) ((i)		argon; w: Ne / neon		[1]
	(i	ii)	S/s	sulphur;		[1]
	(ii	ii)		₂ / iodine; w: P / phosphorus		[1]
	(iv	v)	N / N	N ₂ / nitrogen;		[1]
	()	v)	He /	Ne / Ar / helium / neon / argon;		[1]
	(v	/i)	H/F	H ₂ / hydrogen;		[1]
	(b) ((i)		$Cl_2 \rightarrow 2HCl_3;$ marks not scored: Cl_2 on left / H_2 + $2Cl \rightarrow 2HCl$ (1	mark)	[2]
	(i	ii)		ect dots and cross diagram for C <i>l</i> ₂ ;; w: 1 pair of shared electrons between 2 (C <i>l</i>) atoms	s for 1 mark is 2 ma	[2] arks not scored
						[Total: 10]
2	(a) ((i)	rina	around –COOH group;		[1]
		ii)	C₂H₄			[1]
	,	,	(ator	ms can be in any order) bre: CH_3COOH / CH_2O		
		neutralisation / acid-base;			[1]	
		allow: acid-alkali reaction ignore: exothermic / endothermic				
	(c) c	diss	olves	s (in water / liquid);		[1]
				mixes / solute eacts with water		
	(d) p	hH3	.			[1]
	(u) p	5110	' ,			[']
				lioxide; water; prrect formulae		[2]
			ly: lis			
					[1]	
	a	allo	w : C			
						[Total: 8]

	Page 3			Mark Scheme	Syllabus	Paper
				IGCSE – October/November 2012	0620	23
3	(a) solvent			ne shown below the spot and above the bottom of t	he paper;	[1]
	(b)	(i)	chro	matography;		[1]
		(ii)		ots shown above position of original spot; w: one spot drawn in on base line		[1]
			spot	s vertically above the position of the original spot;		[1]
			allov	ent front as horizontal line above all the spots; w: solvent front near the top of the paper as horizon w: top spot on solvent front	tal line if no spots	[1] drawn
	(c)	uns	atura	ted and because it has a (C=C) double bond;		[1]
						[Total: 6]
4	(a)	(i) H –	H - - C - H	н		[1]
		(ii)	allo	which causes global warming / increases temperatu w: it causes the atmosphere to heat up / causes Ea s heat in		
	(iii)	allov unde	digestion of cows / sheep etc. / marshes / rice pade w: (animal or bacterial or plant) decay / from animal erground / from natural gas ore: from decomposition	-	
	(iv)	800	(g);		[1]
	(b)	(i)	allov	a double headed arrow / has ⇒ sign; w: arrows go both ways / has the reversible symbol w: can change reaction (conditions) to go from one	side or another	[1]
		(ii)	allov igno	tion which goes backwards as well as forwards / go w: goes backwards as well ore: goes backwards unqualified / a reaction that ca eversed	-	[1] eaction that can
	(iii)	heat	exhausts / car engines / product of incomplete comb ing appliance burning carbon-containing fuels / zinc pre: fuels (unqualified) / cars (unqualified)		
	(iv)	acidi	ic and because oxides of non-metals are acidic / ca	rbon is a non-met	al [1]
						[Total: 8]

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				IGCSE – October/November 2012	0620	23		
5	(a)	(i)	stea	m / water;			[1]	
	cat ign			igh temperature / heat / stated temperature 200 °C or above; atalyst; gnore: names of catalysts gnore: pressure				
	(b)	 (b) (i) glucose (on left); allow: sugar / carbohydrates ignore: starch ignore: formulae 						
		carbon dioxide (on right); ignore: formulae						
		(ii)	cata	lyst / description of catalyst;			[1]	
		biological / protein / from living things; note: second mark is dependent on the first being correct						
	(c)	(i)) increase up to 40 °C then decreases; if full marks not scored: increases then decreases / best at 40 ° and slower when cold and very hot = 2 ma maximum at 40 °C / decreases above 40 °C / maximum at 40 ° = 1 mark					
		(ii)	amo amo amo allov allov igno	two of: bunt of yeast / catalyst / enzyme bunt (or concentration) of glucose / sugar bre: amount of food available bunt (or volume) of water / amount (or volume) of sol w: temperature (during each experiment) bre: room temperature w: pH bre: particle size of sugar bre: time / size of container	lution		[2]	
	(d)	(i)	(–1 p	ts correctly plotted;; per error / omission) le gently curved line between the points and not ext	rapolated to 0		[2] [1]	
		(ii) line drawn in part (i) correctly extrapolated with correct value from the extrapolation (value if part (i) correct is 138 (°C))						
						[Total:	16]	

Page 5								Pap	ber			
					IGCSE	– Octo	ber/Nov	ember 20)12	0620	2	
6	(a)	(i)	 (i) petrol (in a few countries) / paints / (old) water pipes; allow: zinc refining / cars / fuels in cars / car exhausts / car engines 							[1]		
		(ii)	pois	sonous	: / damag	je to ner	ves / bra	in / learni	ng difficulti	es;		[1]
	(b)	(b) (i) lead(II) oxide + carbo allow: lead oxide on ignore: carbon oxide reject: wrong oxidation				on left de / sym	nbol equa		noxide;			[1]
		(ii) it loses oxygen / the <u>lead</u> decreases in oxidation number / the <u>lead</u> gains election is oxidised / lead oxide goes to lead						ins electron	s; [1]			
		 (iii) it needs heat / absorbs heat; allow: absorbs energy / products have more energy than reactants 							[1]			
	(c) filter funnel + filter paper (in drawings or words); lead iodide shown on filter paper;						[1] [1]					
	(d)	(d) 82 protons + 82 electrons;122 neutrons;							[1] [1]			
											Т	otal: 9]
7	(a)	silv	er roc	d;								[1]
	(b)			d: gets orrode		/ gets th	inner / Ic	oses mass	;			[1]
		iron spoon: gets coated with silver / increases in mass / gets thicker; allow: gets bigger					[1]					
	(c)	mal allo	ke (th)w: to	ne surf o preve	ace) moi	re resista ig / to pr	ant to ch	emicals;		make (the sur		[1]
	(d)	silv	er atc	oms lo	se electr	ons / 3 rd	box dow	vn ticked;				[1]
	(e)	allo	w: a	cidify	to the sc the soluti drochlori	on	sulfuric a	cid / phos	phoric acio	b		[1]
	(or		addit	ition of	silver nit	trate) pre	ecipitate	formed:				[1]
			(on addition of silver nitrate) precipitate formed; white (precipitate);									
						marks a	are indep	endent of	the fist ma	ark		[1]

Page 6	Mark Scheme	Syllabus	Paper				
	IGCSE – October/November 2012	0620	23				
malleable ductile / c high dens sonorous allow: hig ignore: s	(f) any 2 of: conducts heat / conducts electricity / malleable / can be beaten into different shapes / can be bent (without breaking) ductile / can be drawn into wires high density / dense sonorous / rings when hit allow: high density ignore: solid ignore: shiny / high melting point / high boiling point / hard / strong						
			[Total: 10]				
a (a) (i) A/a	the top;		[1]				
(ii) C;			[1]				
(iii) D; allov	<i>r</i> : E		[1]				
limestone coke / ca (coke) bu carbon m (this is a) iron oxide to form in limestone calcium c (to form a ignore: a note: to g marks ca correctly carbon + calcium c calcium c	 e / other named ore of iron / calcium carbonate bon / coal rns in air / oxygen onoxide formed onoxide (or carbon) converts the iron ore (or iro reduction reaction e / haematite reacts with carbon monoxide forms calcium oxide (on heating) xide reacts with impurities in ore) slag / calcium silicate ir ain the marks, the answers must be in the correct also be scored from word equations or symbol palanced) oxygen → carbon monoxide = 3 oxide + carbon → carbon monoxide = 2 arbonate → calcium oxide + carbon dioxide = 2 xide + silicon dioxide → calcium silicate / slag = e + carbon monoxide → iron + carbon dioxide = 	ect context. I equations (which do	[5] not have to be				

Page 7	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2012	0620	23
	on chloride; nore: oxidation numbers		[1]
	/drogen; o ply: listing		[1]
(ii) so	odium hydroxide;		[1]
	rey)-green precipitate; ote: second mark is dependent on the correct reage	nt	[1]
(d) steel n	nade by blowing oxygen through molten iron / last bo	ox ticked;	[1]
			[Total: 13]