## MARK SCHEME for the October/November 2010 question paper

## for the guidance of teachers

## 0620 CHEMISTRY

0620/21

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	21	
1 (a)	(peri	od) 2 / period II		[1]	
(b)	(i) (	D / O <sub>2</sub> / oxygen		[1]	
(	(ii) I	F / F <sub>2</sub> / fluorine		[1]	
(i	iii) l	_i / lithium		[1]	
<b>(</b> i	iv) (	C / carbon		[1]	
(	( <b>v</b> ) I	3e / beryllium		[1]	
()	vi) I	N / N <sub>2</sub> / nitrogen		[1]	
(c)	(c) atoms; protons				
				[Total: 9]	
2 (a)	thern	nal decomposition		[1]	
(b)	(i) (	carbon dioxide		[1]	
(	• •	colourless) to white / milky GNORE: goes cloudy		[1]	
(c)	r f	calcium oxide blown onto surface of iron / mixed with iro nixed in furnace with iron; forms slag / removes impurities (or named impurities) in reacts with phosphorus oxides / reacts with acidic oxide	iron / reacts with	[1]	
(	( <b>ii)</b> 1	nixture of metal with other metals or mixture of metal(s)	) with non-metals	[1]	
<b>(</b> i	I	neutralising acid soils / neutralising acidic lakes / <u>making</u> imewash for buildings	g cement / <u>making</u>		
	/	ALLOW: paint		[1]	
(i	iv) 2	2; H <sub>2</sub> O		[2]	
(	( <b>v</b> ) (	calcium chloride		[1]	
				[Total: 10]	

	Page 3			Mark Scheme: Teachers' version	Syllabus	Paper		
				IGCSE – October/November 2010	0620	21		
			balloons / diving / cryogenics / coolant / arc welding / protective atmosphere / lasers [1] NOT: hot air balloons					
	(b)	(i)	nucleus					
	(	ii)	3 <sup>rd</sup> b	ox down ticked (helium has complete outer shell)		[1]		
	(i	ii)	18			[1]		
	(i	v)	<sup>34</sup> Ar			[1]		
		NO	T: ato	ose together; oms on average more than ½ an atom's diameter fro	om each other			
	i	ator	ms ra	ndomly arranged		[2]		
						[Total: 7]		
			oride; T: chl	orino		[1]		
		sulf		onne		[1]		
	(b)					[4]		
		IGN	IORE	: wrong units		[1]		
	(c)	(i)		sodium hydroxide and aluminium (foil); n gently;				
			IGN	ORE: any results given				
				OW: add iron(II) sulfate concentrated sulfuric acid		[2]		
	(	ii)	amm	nonia		[1]		
	(d)	(i)	flack	IGNORE incorrect type;				
	(u)	(י)	conc	lenser ALLOW: condensing tube; water / <u>distilled</u> water;		[3]		
	(	ii)		two of:		[0]		
	·		•	distillation				
				water (in round bottomed flask) boiled NOT: water heated / water evaporates				
			•	water has a lower boiling point (than ions) steam (or water vapour) condenses in condenser / liquid in condenser	steam or water va	pour goes to		
				ALLOW: gas goes to liquid in condenser solid / ions remain in flask		[2]		
	(i	ii)	med	icines / drugs / foodstuffs / (drinking) water		[1]		
						[Total: 12]		

Page 4		Mark Scheme: Teachers' version	Syllabus	Paper
		IGCSE – October/November 2010	0620	21
(a)	pН	11		[
( <b>b)</b> 4 <sup>th</sup> box o		box down ticked (slaked lime)		[
(c)	(i)	plants can't grow well if soil too acidic / crop yields lo ALLOW: plants die if soil acidic ALLOW: plants grow best in neutral soil / plants like		[
	(ii)	any three of: fossil fuels (or correctly named fuel) contain sulfur / sulfur burns / to form sulfur dioxide / sulfur dioxide reacts with oxygen in air / sulfur dioxide (or sulfur trioxide) reacts (or dissolves)	with rain	[;
(d)	(i)	neutralisation ALLOW: neutralising		['
	(ii)	add indicator to flask ALLOW: any named acid-base	indicator;	[
		<ul> <li>any two of:</li> <li>add <u>measured amount</u> of calcium hydroxide to put the calcium hydroxide in the flask)</li> <li>add <u>acid</u> (from burette) into flask</li> <li>until indicator changes colour.</li> </ul>	flask (or use a volu	metric pipette t
		<ul> <li>until indicator <u>changes colour</u></li> <li>record volume of acid added</li> </ul>		[,
				[Total: 10
(a)	(i)	bauxite / any other ore of aluminium		[
	(ii)	removal of oxygen (from compound or substance) / g oxidation number / addition of hydrogen	ain of electrons / de	crease in [
	(iii)	too reactive / requires too high a temperature		[
(b) from left to right: lead, nickel, zinc, magnes		n left to right: d, nickel, zinc, magnesium		[;
(c)	(i)	(volume) decreases		[
	(ii)	(volume) increases		[
(d) copper $\rightarrow$ electrical wiring; aluminium $\rightarrow$ aircraft bodies ALLOW car bodies or electrical wiring;				
mild steel $\rightarrow$ car bodies; stainless steel $\rightarrow$ chemical plant		[4		
				[Total: 11

Page 5		;	Mark Scheme: Teachers' version	Syllabus	Paper	
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7	(a)	mole		up of) molecules with similar boiling points / (group o ecular masses / molecules with limited range of boili le of molecular masses / molecules coming off at th mn	ng points / molecu	ules with limited
				ORE: division of petroleum components		[1]
		(11)	C <sub>10</sub> F ALL(	H₂₂ OW reasonable mixtures e.g. C <sub>7</sub> H <sub>16</sub> + C₃H <sub>6</sub>		[1]
	(b)	refinery gas: (fuel) for heating / (fuel) for cars / (fuel) for cooking; gasoline: (fuel) for cars / mowers etc				[2]
	(c)	con con	[2]			
	(d)	(i)	1 <sup>st</sup> b	ox down ticked (catalytic addition of steam)		[1]
		(ii)		ect structure with all atoms and bonds shown instead of O-H = 1 mark only		[2]
	(e)	mo poly	[2]			
						[Total: 11]
8	(a)	ele	ctrode	es		[1]
	(b)			; / Br <sub>2</sub> / Br ad ions, bromide ions		[1] [1]
	(c)	<b>c)</b> 2 <sup>nd</sup> and		<sup>rd</sup> boxes down ticked (1 each)		[2]
	(d)	PbBr <sub>2</sub>			[1]	
	(e)	(i)		formed when two solutions mixed : solid formed at bottom of solution		[1]
		(ii)	3			
		(iii)	6			[2]
		(iv)	brair	n damage in children / affects nervous systems or ne	erves / poisonous	[1]
						[Total: 10]