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

0620/31

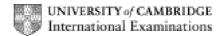
Paper 3 (Extended Theory), maximum raw mark 80

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		2	Mark Scheme: Teachers' version	Syllabus	Paper		
			IGCSE – October/November 2010	0620	31		
1	(a) (i)	same number of protons and electrons					
	(ii)	all have the same number of protons / same proton number / same atomic number					
	(iii)		more electrons than protons number of protons and electrons not equal ONLY [1]				
	(iv)	same number of protons (and electrons) / same proton number / same atomic number different number of neutrons / different mass number / nucleon number					
	(b) (i)	2 + 8	3 + 5		[1]		
	(ii)	3 / 5			[1]		
	(iii)	/ nee	metal because it accepts electrons eds 3e to complete outer energy level cause it is in Group V or 5e in outer shell e need both non-metal and reason for [1]		[1]		
					[Total: 9]		
2	(a) (i)		er / stronger / any sensible suggestion which relates stays sharp longer / cuts better / more corrosion res		ties for purpose [1]		
	(ii)	zinc			[1]		
	(b) (i)	lattic	pe		[1]		
	(ii)	with	lar pattern of one type of atom different atom interspersed show the difference – size, shading, label etc.		[1] [1]		
	(iii)		change its shape by force / plastically deform / car d etc.	n be hammered i	nto sheets / can [1]		
	(iv)	(iv) particles / ions / atoms / layers cond can slide past each other or metallic bond is non-directional particles can move past each other					

Page 3		Mark Scheme: Teachers' version	Syllabus	Paper
		IGCSE – October/November 2010	0620	31
(c) (no acc no	IV) oxide + carbon → tin + carbon dioxide t carbon monoxide as a reductant cept carbon monoxide as a product t tin(IV) cept correct symbol equation		[1]
(i	i) wa car	ter bon dioxide		[1] [1]
(ii	(pu imp ele	rect labels for re) copper cathode <u>oure copper anode</u> ctrolyte copper(II) sulfate / any soluble copper(II) sal bels on electrodes reversed [0]	t / Cu ²⁺	[1] [1] [1]
(iv	•	es / pipes / jewellery / nails / roofing / ammunition Ilpture	n / coins / cookw	vare / catalyst / [1]
				[Total: 15]
3 (i) che	emical		[1]
(i	•	n right to left t through salt bridge		[1]
(ii	•	+ 2e → 2Br- Br- as product [1]		[2]
(iv	/ be	uction because <u>electron gain</u> ecause oxidation number decreases ed both points		[1]
(\	/) Fe ³	! +		[1]
(v	e.g	correct discussion of the reactivity of the halogens the more reactive the halogen the higher the voltage better conductor	е	[1]
				[Total: 7]

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Page 4		•	Ма	ırk Scheme:	Teachers	version	Syllabus	S Paper	
				IG	CSE – Octob	er/Novem	nber 2010	0620	31
4	(a)	(i)	nitro	gen 2+5					[1]
		(ii)		ds three ele omplete en					[1] [1]
	(b)	(i)	expe	ensive meta	al / iron chea _l	per / bette	r catalyst		[1]
		(ii)	_	•	avours side v d side / prod		er volume / fewer onia side	moles	[1] [1]
		(iii)	-	cled / sent ept used a	over catalyst gain	again			[1]
		(iv)		antage dvantage	high yield slow reactio	n rate etc			[1] [1]
									[Total: 9]
5	(a)	(i)		y (simple) mer molec		orm one	(large) molecule	e / monomer	molecules form one [1]
		(ii)			ner is the only	y product			[1]
							lecules formed		[1]
	(b)	(i)		$H_{26} ightarrow C_8 H_1$ other cori	₈ + 2C ₂ H ₄ rect version				[1]
		(ii)	/ eth / was	ene more i ste half chl	orine give rar eadily availa orine as hydr eactive than	ble than e ogen chlo	thane		[1]
		(iii)		trolysis eous sodiu	m chloride				[1] [1]
		(iv)	con	d continuat					[1] [1]
			acce	ept –(CH	2–CH(C <i>l</i>))n–				[Total: 9]

Page 5		5	Mark Scheme: Teachers' version	Syllabus	Paper
			IGCSE – October/November 2010	0620	31
6	(a) (i)		s not form compounds / does not accept and does l/has 8e in outer shell / it is a Noble Gas / it is in Gro		s / has full outer [1]
	(ii)		Il number of outer electrons / lose electrons then po e number of outer electrons / gain electrons then ne		[1] [1]
	(iii)		two from nitrogen, oxygen and fluorine ept symbols / molecular formulae		[1]
	(b) (i)	zinc	/ aluminium / lead / tin / chromium		[1]
	(ii)		e precipitate		[1]
			ipitate dissolves / colourless solution forms / forms a uble in excess	a clear solution	[1]
	(c) (i)	LiF NF ₃			[1] [1]
	(ii)	LiF is / LiF as lic LiF is	nas higher mp / bp s a (crystalline) solid, NF ₃ is probably a gas / a liquid is less volatile quids only LiF conducts s soluble in water, NF ₃ is not n both solids LiF is harder	d	
		any			[2]
	(iii)	NF_3	s an ionic compound is a covalent/molecular compound tating that one is ionic and the other covalent [1] wit	hout specifying w	[1] [1] hich is which
					[Total: 13]
7	(i)	ozor	nane / water vapour / oxides of nitrogen / hydroflune sulfur dioxide	uorocarbons / pe	rfluorocarbons / [1]
	(ii)	prod	g organisms / plants and animals / cells luce energy (from food / glucose / carbohydrates) forms carbon dioxide (could be in an equation)		[1] [1] [1]
	(iii)	/ cro	n growing the crop removed carbon dioxide from atr p photosynthesised and used carbon dioxide bustion returned the carbon dioxide	nosphere	[1] [1]
	(iv)		eased combustion ssil fuels / named fossil fuel		[1] [1]
		less	eforestation photosynthesis greater population		[1] [1]

[Total: 8]

Page 6		ge 6	Mark Scheme: Teachers' version	Syllabus	Paper		
			IGCSE – October/November 2010	0620	31		
8	(a)	(partially allow to dry cryst "dry" on evaporat	ntrifuge / decant) evaporate / heat / boil crystallise / cool / let crystals form als / dry between filter paper / leave in a warm place its own must be a verb le to dryness only marks 1 and 2 scuss residue only mark 1	e to dry	[1] [1] [1]		
	(b)	number of number of mass of maximur accept 9 mark ecf	of moles of HC l used = 0.04 × 2 = 0.08 of moles CoC l_2 formed = 0.04 of moles CoC l_2 .6H $_2$ O formed = 0.04 one mole of CoC l_2 .6H $_2$ O = 238 g in yield of CoC l_2 .6H $_2$ O = 9.52g i.5 g it to moles of HC l mark ecf to integers		[4]		
		to show that cobalt(II) carbonate is in excess					
		mass of number of	of moles of HC l used = 0.08 must use value above one mole of CoCO $_3$ = 119g of moles of CoCO $_3$ in 6.0g of cobalt(II) carbonate = l /hy cobalt(II) carbonate is in excess 0.05 > 0.08/2		[1] [1]		

[Total: 10]