UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

0620 CHEMISTRY

0620/32

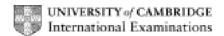
Paper 32 (Extended Theory), maximum raw mark 80

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.

CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2009	0620	32

GENERAL INSTRUCTIONS FOR MARKING

- Error carried forward may be allowed in calculations. This will be discussed in the mark scheme. This is not applied when the candidate has inserted incorrect integers or when the answer is physically impossible.
- COND the award of this/these mark(s) is conditional upon a previous mark being awarded.
 Example Is the reaction exothermic or endothermic? Give a reason for your choice.
 Mark scheme exothermic [1]
 - **COND** a correct reason given [1]. This mark can only be awarded if the candidate has recognised that the reaction is exothermic.
- When the name of a chemical is demanded by the question, a **correct** formula is usually acceptable. When the formula is asked for, the name is not acceptable.
- When a word equation is required a **correct** symbol equation is usually acceptable. If an equation is requested then a word equation is not usually acceptable.
- An incorrectly written symbol, e.g. NA **or** CL, should be penalised once in a question.
- In the mark scheme if a word **or** phrase is underlined it (**or** an equivalent) is required for the award of the mark.
 - (.....) is used to denote material that is not specifically required.
- OR designates alternative and independent ways of gaining the marks for the question.
 or indicates different ways of gaining the same mark.
- Unusual responses which include correct Chemistry which answer the question should always be rewarded even if they are not mentioned in the marking scheme.

Page 3			Mark Scheme: Teachers' version	Syllabus	Paper
			IGCSE – October/November 2009	0620	32
1	(a) (i)	[1]			
	(ii)	wate	er and carbon dioxide		[2]
	(b) (i)		oon monoxide or lead compounds or CFCs or methand nburnt hydrocarbons or ozone	e or particulates	[1]
	(ii)		n a fossil fuel contains sulfur		[1] [1]
	(iii)		igh temperature or inside engine ogen and oxygen (from the air) react		[1] [1]
	(c) liq		ul distillation		[1] [1]
					[Total: 10]
2	(a) p⊢ ex	l < 7 ample			[1] [1]
	ex	l > 7 ample)T am	photeric oxides Be, A <i>l</i> , Zn, Pb, Sn etc.		[1] [1]
	pH ex the N ([1] [1]			
	(b) (i)	shov	ws both basic and acidic properties		[1]
	(ii)		ic reacts with sodium hydroxide only shoteric reacts with both reagents		[1] [1]
		OR	only amphoteric oxide reacts with hydrochloric acid		[2]
					[Total: 9]
3	(a) (i)		t/roast/burn <u>in air</u> d both points for mark		[1]
	(ii)	or 2	$0 + C \rightarrow Zn + CO$ $ZnO + C \rightarrow 2Zn + CO_2$ alanced ONLY [1]		[2]

Page 4			Mark Scheme: Teachers' version	Syllabus	Paper	
				IGCSE – October/November 2009	0620	32
	(b)	zinc is more reactive it loses electrons and forms ions in preference to iron zinc corrodes not iron NOT zinc rusts				[1] [1] [1]
		OR zinc loses electrons and forms ions the electrons move on to the iron the iron cannot be oxidised or it cannot rust or it cannot lose electrons CREDIT correct Chemistry that includes the above ideas				
	(c)	c) (i) zinc atoms change into ions, (the zinc dissolves) copper(II) ions change into atoms, (becomes plated with copper)			[1] [1]	
		(ii)	ions elect	rons		[1] [1]
						[Total: 10]
4	(a)	 diffusion different M_r or ozone molecules heavier than oxygen molecules or different densities or oxygen molecules move faster than ozone molecules NOT oxygen is lighter or ozone heavier OR fractional distillation 			[1] [1] [1]	
	(b)	(i)	from to br	e different boiling points colourless (solution) own (solution) ses electrons (it is oxidised)		[1] [1]
		(iii)		are accepted by ozone zone is an electron acceptor		[1]
	(c)	(i)	sulfu all th	on dioxide r dioxide		[2]
		(ii)	CON	ect structural skeleton ID 4bp around both carbon atoms and 2nbp around sulfur atom		[1] [1] [1]
						[Total: 11]

	ı age c		Mark General: reactions version	Cynabas	i apci
			IGCSE – October/November 2009	0620	32
5	(a) (strong hard light or low density high melting point or high fixed points Accept high strength to weight ratio for [2] it includes marks 1 and 3 any THREE		[3]
	(i		diagram 1 four silicons around one carbon		[1]
			diagram 2 four carbons around one silicon either diagram looks or stated to be tetrahedral "tetrahedral" scores mark even if diagram does not look tet independent marking of three points	rahedral	[1] [1]
			ram to include		
			germanium atom bonded 4 oxygen atoms oxygen to 2 germanium atoms		[1] [1]
		, , ,	oxygen to 2 germaniam atomo		[.,]
	(c) ((i)	structural formula of Ge ₃ H ₈ all bonds shown		[1]
	(i	•	germanium oxide		[1]
		,	water		[1]
					[Total: 11]
6	(a) (. ,	USA or Texas or Louisiana, Japan volcanoes, natural gas, petroleum		[1]
	(i		bleach for wood pulp/cloth/straw or preserve food or sterili or making wine or fumigant or refrigerant Accept making paper	sing	[1]
	(ii	ii)	vanadium(V) oxide or vanadium oxide or vanadium pentox	ide	
			or V_2O_5 NB oxidation state not essential but if given has to be (V)		[1]
	(iv		rate too slow or rate not economic		[1]
	`.				
	()	v)	reaction too violent or forms a mist		[1]
	(b) (add water to yellow powder or anhydrous salt it would go green		[1] [1]
	(i		change from purple or pink to colourless NOT clear		[1] [1]
	(ii	ii)	reacts with <u>oxygen</u> in air		[1]

Syllabus

Paper

Page 5

	Page 6		;	Mark Scheme: Teachers' version	Syllabus	Paper
				IGCSE – October/November 2009	0620	32
((c)	number of moles of FeSO ₄ used = $12.16/152 = 0.08^*$ number of moles of Fe ₂ O ₃ formed = 0.04 mass of one mole of Fe ₂ O ₃ = $160 \mathrm{g}$ mass of iron(III) oxide formed = $0.04 \times 160 = 6.4 \mathrm{g}$ number of moles of gases formed = $0.08 \times 24 = 1.92 \mathrm{dm}^3$				
		lf m	ass o	of iron(III) oxide greater than 12 g, then only marks 1 a	nd 2 available	
				f to number of moles of FeSO₄* when calculating volumer pply ecf to integers	me of sulfur triox	ide.
						[Total: 16]
7 ((a)	(i)	heat catal			[1] [1]
		(ii)	•	ation that gives: ne + alkane or alkene + alkene + hydrogen		[1]
			a coi	rrect and balanced equation for the cracking of decane,	C ₁₀ H ₂₂ but not b	ut-1-ene [1]
	((iii)	wate	er or steam		[1]
((b)	(i)		$_{9}OH + 6O_{2} \rightarrow 4CO_{2} + 5H_{2}O$ ly error is balancing the oxygen atoms [1]		[2]
		(ii)		nol + propanoic acid → butyl propanoate + water ect products or reactants ONLY [1]		[2]
((c)	(i)	pena	ect structural formulae [1] each alise once for CH ₃ type diagrams C ₃ H ₈ O [0]		[2]
		(ii)	to co	onserve petroleum or reduce greenhouse effect		[1]
((d)	hav	e san	ne boiling point		[1]
						[Total: 13]