#### **Location Entry Codes**

www.papaCambridge.com As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

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The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers. Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

#### Mark Scheme **Question Paper** Principal Examiner's Report Introduction Introduction Introduction **First variant Question Paper** First variant Mark Scheme First variant Principal Examiner's Report Second variant Question Paper Second variant Mark Scheme Second variant Principal Examiner's Report

#### Who can I contact for further information on these changes?

Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

# www.papacambridge.com MARK SCHEME for the October/November 2008 question paper

### 0620 CHEMISTRY

0620/31

Paper 31 (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.

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CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2	Mark Scheme Sylla	abus & er									
	IGCSE – October/November 2008 06	20 23									
Yage 2       Mark Scheme       Syllabus         Page 2       Mark Scheme       Syllabus       er         IGCSE – October/November 2008       0620       0620         red litmus paper blue       OR white fumes/smoke with HCl (g) or (aq)       0620       0620         chlorine       "pop" with a lighted splint or burn with a pop or goes pop and extinguishes flame       [1]											
chlorine											
	h a lighted splint <b>or</b> burn with a pop <b>or</b> goes pop and extinguishes wing splint	s flame [1]									
oxygen		[1]									
carbon d ACCEP	lioxide I correct formulae	[1]									
		[Total: 5]									
corre	: 1N correct ratio ect charges iround N	[1] [1] [1]									
if co igno if the	symbols then must have correct key valent only mark 1 re electrons around sodium e response includes both a correct and an incorrect answer not select correct one, mark = [0]										
	positive ions <b>or</b> cations	[1]									
	<b>NOT</b> atoms <b>or</b> cores <b>or</b> nuclei layers <b>or</b> lattice <b>or</b> regular pattern delocalised <b>or</b> free <b>or</b> mobile electrons <b>or</b> sea	[1] [1]									
	OR <u>positive</u> ions or cations	[1]									
	<b>NOT</b> atoms <b>or</b> cores <b>or</b> nuclei attraction between ions and electrons delocalised <b>or</b> free <b>or</b> mobile electrons <b>or</b> sea the attraction/electrostatic bonding must be between ions and delocalised electrons, between cations and anions does not score <b>ACCEPT</b> bond if qualified - electrostatic bond, etc. if molecular <b>or</b> molecules then cannot score cation mark	[1] [1]									
• •	delocalised/free/mobile electrons or electrons can move	[1]									
	layers or ions or atoms or particles	[1]									
	NB more flexible than 2(b)(i)										
	can <u>slip</u> or move past each other or bonding non-directional	[1]									

-	ge 3			Scheme	Syllabus	· A er
		!	IGCSE – Octob	per/November 2008	0620	Der 1
(c)	(i)	1Si	hedral : 4O bonded/surrounded : 2 Si	d, etc.		W. Papacambrid
		NOT	molecules of oxygen, e intermolecular forces Y tetrahedral can score			
		-	bite what the question st ve three points.	states, <b>ACCEPT</b> a clear a	ccurate diagram whic	ch shows the
	(ii)	colou non/ brittle	mp <b>or</b> bp urless ( <b>NOT</b> clear) <b>or</b> sh poor conductor (of elect e			
			uble <b>TWO</b> <sup>·</sup> crystalline <b>or</b> strong			[2]
						[Total: 14]
(a)	(i)		r <b>or</b> moisture <b>ACCEPT</b> <b>r</b> oxygen	salty water		[1] [1]
	(ii)	tin pl chroinicke coba copp cove anoc cathe cove alloy any	mium plate el plate alt plate per plate er with aluminium lic protection <b>or</b> sacrifici odic protection er with plastic ing (ignore any named r <b>TWO</b> ' just plate <b>or</b> electroplat	ial protection	suitable metal	[2]
	(1)	ACC	EPT both galvanising a	and sacrificial protection oon monoxide <b>or</b> methane	9	
(b)	(I)	nyui				
(b)	(1)		ore reactive metal <b>NOT</b>			[1]

t var	iant	Mark	Scheme			4	52
Pa	age 4	l I		lark Scheme ctober/November 2	000	Syllabus	* Day er
(c)		= 57 marł <b>ONL</b>	196 × 100 (.1)% <b>ACCEPT</b> 5 <sup>-</sup>	7 to nearest whole n ided percentage not	umber	<b>0620</b> 100%	ww.papaCambrid.
(d)	(i)	form	s carbon dioxide/ca	rbon monoxide (whi	ch escapes)		[1]
	(ii)		s silicon(IV) oxide <b>c</b> CaO reacts with SiC	or silicon oxide or sil	lica		[1]
		to fo igno	rm slag <b>or</b> calcium : re an incorrect form				[1]
							[Total: 13]
(a)	(i)		5000H <b>or</b> C <sub>6</sub> H5CO2 C7H6O2 /C6H6COC				[1]
	(ii)	corre	um hydroxide + ben ect spelling needed EPT correct symbo		benzoate + w	rater	[1]
	(iii)		TWO	ide <b>or</b> hydrogencarb	oonate		[2]
(b)	(i)	7.7%					[1]
	(ii)		ny number: equal n xample 1:1 <b>or</b> 6:6	umber ratio			[2]
	(iii)	mole	irical formula is CH cular formula is C <sub>6</sub> I .c.f., award of mark	H <sub>6</sub> s not dependent on	(ii)		[1] [1]
(c)	(i)	C <sub>6</sub> H <sub>8</sub>	0 <sub>6</sub>				[1]
	(ii)	alcol NOT	on – carbon double nol <b>or</b> hydroxyl <b>or</b> h <sup>'</sup> hydroxide oxide and alcohol =	ydroxy			[1] [1]
							[Total: 12]

Pag	ge 5	Mark Scheme	Syllabus
		IGCSE – October/November 2008	0620
(a)	(i)	$2H^+ + 2e \rightarrow H_2$	Syllabus 0620 Phacamphiage [1]
	(ii)	$2Cl^ 2e \rightarrow Cl_2$ or $2Cl^- \rightarrow Cl_2 + 2e$	3
	(iii)	Na <sup>+</sup> and OH <sup>-</sup> are left	
		OR C1 <sup>-</sup> removed OH <sup>-</sup> left	
		NB ions by name or formula essential NOT any reaction of Na or Na <sup>+</sup>	
		<b>NOT</b> $\text{Not}^{+}$ and $\text{OH}^{-}$ combine	
(b)	(i)	sterilise/disinfect water <b>or</b> kill microbes/germs bacteria, etc <b>NOT just</b> to make it safe to drink <b>or</b> purify it <b>or</b> clean it treat above as neutral they do not negate a correct respon	
	(ii)	ammonia <b>or</b> methanol <b>or</b> hydrogen chloride <b>or</b> margarine <b>NOT</b> nylon	[1]
	(iii)	fat <b>or</b> lipid <b>or</b> triester <b>or</b> named fat <b>or</b> glyceryl stearate	[1]
		or vegetable oil heat	[1]
			[Total: 7]

### 6 (a) (i)

(a)	(i)						
		aqueous	tin	manganese	silver	zinc	
		solution	Sn	Mn	Ag	Zn	
		tin(II) nitrate		R	NR	R	
		manganese(II) nitrate	NR		NR	NR	
		silver(I) nitrate	R	R		R	
		zinc nitrate	NR	R	NR		
		[1] for each row					[3]
		ignore anything written ir	n blank spac	e			
	(ii)	$\operatorname{Sn} + 2\operatorname{Ag}^+ \rightarrow \operatorname{Sn}^{2+} + 2\operatorname{Ag}^+$					[2]
		all species correct [1]	+				
		accept equation with Sn <sup>4</sup>					
	/:::)	Mn to Mn <sup>2+</sup> need both sp	acias				[1]
	(111)	electron loss <b>or</b> oxidation		rreases			[1]
				0100303			[']
	(iv)	covered with oxide layer					[1]
	()	makes it unreactive or p		uminium oxide u	unreactive		[1]
		•					
(b)	(i)	potassium has one valer	ncy electron				[1]
		or loses one electron					
		calcium has two valency	electrons				
		or loses two electrons					[1]
	<i></i>						F 4 7
	(11)	potassium hydroxide $\rightarrow$					[1]
		calcium hydroxide $\rightarrow$ cal	cium oxide a	and water			[1]
		ACCEPT metal oxide					

irst v	vari	ant	Mark Scheme	4242
	Pa	ge 6		Syllabus 2. er
			IGCSE – October/November 2008	0620
			2KNO <sub>3</sub> → 2KNO <sub>2</sub> + O <sub>2</sub> [1] for <b>formula</b> of either product	Syllabus 0620 BBC BBC BBC BBBC BBBC BBB BBC BBB BB BB
			2Ca(NO <sub>3</sub> ) <sub>2</sub> → 2CaO + 4NO <sub>2</sub> + O <sub>2</sub> [1] for <b>formulae</b> of any <b>TWO</b> products	Se.com
				[Total: 17]
(;	(a)		35 cm <sup>3</sup> 40 cm <sup>3</sup>	[1] [1]
		(ii)	forms carbon monoxide	[1]
			poisonous <b>or</b> toxic <b>or</b> lethal <b>or</b> prevents blood carrying c <b>or</b> effect on haemoglobin <b>NOT</b> just harmful	oxygen [1]
(	(b)		chlorobutane <b>or</b> butyl chloride number not required but if given must be 1, it must be in	[1] n correct position
		(ii)	light or UVor 200°C or lead tetraethyl	[1]
		• •	any correct equation for example 2-chlorobutane <b>or</b> dichlorobutane	[1]
("	(c)		correct repeat unit <b>COND</b> continuation -(CH(CH <sub>3</sub> )-CH <sub>2</sub> )-	[1] [1]
		. ,	butan-1-ol <b>or</b> butan-2-ol <b>or</b> butanol if number given then formula must correspond for secon correct position	[1] nd mark and number must be in
			structural formula of above $CH_3-CH_2-CH_2-CH_2OH$ or $CH_3-CH(OH)-CH_2-CH_3$ <b>NOT</b> $C_4H_9OH$ if first mark not awarded then either formula will gain ma <b>ACCEPT</b> either formula for "butanol"	[1] ark [1]
	ï		$CH_3$ - $CH(Cl)$ - $CH_3$ or $CH_3$ - $CH_2$ - $CH_2$ - $Cl$ <b>NOT</b> $C_3H_7Cl$ response must not include $HCl$ if equation given look at RHS only	[1]

[Total: 12]

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

# www.papacambridge.com MARK SCHEME for the October/November 2008 question paper

## 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.

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	Pag	e 2	Mark Scheme	Syllabus 🔗	er
			IGCSE – October/November 2008	0620	
I	NOT religh turns	ine ' with a l glowing its a glo limewa	ighted splint <b>or</b> burn with a pop <b>or</b> goes pop and ex splint wing splint ter milky/cloudy/chalky/white rrect formulae	Syllabus 0620 ttinguishes flame	mbrides [1]
				[To	tal: 5]
2	Ć	2Na : 1S correct c 3e arour			[1] [1] [1]
	i i c	gnore el f the res do not se	nt only mark 1 lectrons around sodium ponse includes both a correct and an incorrect ans elect correct one, mark = [0] tive ions <b>er</b> ections	wer	[1]
	(b) (		<u>tive</u> ions <b>or</b> cations l atoms <b>or</b> cores <b>or</b> nuclei		[1]
			rs <b>or</b> lattice <b>or</b> regular pattern calised <b>or</b> free <b>or</b> mobile electrons <b>or</b> sea		[1]
		ueio	callsed of free of mobile electrons of sea		[1]
			<u>positive i</u> ons <b>or</b> cations l atoms <b>or</b> cores <b>or</b> nuclei		[1]
		attra delo the a	action between ions and electrons icalised <b>or</b> free <b>or</b> mobile electrons <b>or</b> sea attraction/electrostatic bonding must be between ior		[1] [1]
		ACC	calised electrons, between cations and anions does CEPT bond if qualified e.g. electrostatic bond, etc. oles or molecular cannot score cation mark	s not score	
	(		calised/free/mobile electrons lectrons can move		[1]
		•	rs <b>or</b> ions <b>or</b> atoms <b>or</b> particles more flexible than <b>2(b)(i)</b>		[1]
			slip or move past each other or bonding non-direct	innal	[1]

			ark Scheme	My .
۲a	age 3	<u>,</u>	Mark Scheme S IGCSE – October/November 2008	Syllabus Providence Pr
				0020
(c)	) (i)	1Si :	ahedral : 40 bonded/surrounded, etc. : 2 Si	Syllabus 0620 Banacambridg
		NOT	T molecules of oxygen, etc. T intermolecular forces LY tetrahedral can score for either of the above	
		-	spite what the question states, <b>ACCEPT</b> a clear accurate over three points.	diagram which shows the
	(ii)	colou non/p brittle	n melting point <b>or</b> boiling point ourless ( <b>NOT</b> clear) <b>or</b> shiny <b>or</b> translucent /poor conductor (of electricity) le	
		any 1	oluble TWO T crystalline <b>or</b> strong	[2]
				[Total: 14]
3 (a)	(i)		er <b>or</b> moisture <b>ACCEPT</b> salty water or oxygen	[1] [1]
	(ii)	tin pla chror nicke coba copp covel anod catho covel alloyi any 1 NOT	vanising <b>or</b> coat with zinc blate brium plate kel plate alt plate per plate er with aluminium dic protection <b>or</b> sacrificial protection hodic protection er with plastic ying (ignore any named metal) <b>TWO</b> <b>T</b> just plate <b>or</b> electroplate need electroplate with suitable <b>T</b> oil	[2] metal
		-	<b>CEPT</b> both galvanising and sacrificial protection	
(b)	(i)	ACC hydro	<b>CEPT</b> both galvanising and sacrificial protection rogen <b>or</b> carbon <b>or</b> carbon monoxide <b>or</b> methane nore reactive metal <b>NOT</b> Group I	[1]

Pa	ge 4		Mark Scheme	Syllabus or
			IGCSE – October/November 2008	0620
(c)	(i)	196		amb
	(ii)	= 18 mark ONL	<ul> <li>196 × 100</li> <li>3(.4)% ACCEPT 18 to nearest whole number</li> <li>k e.c.f. to (c)(i) provided percentage not greater than</li> <li><b>ACCEPT</b> 36/answer (c)(i) × 100</li> <li>erwise [0]</li> </ul>	Syllabus 0620 100%
(d)	(i)	form	ns carbon dioxide/carbon monoxide (which escapes)	[1]
	(ii)		ns silicon(IV) oxide <b>or</b> silicon oxide <b>or</b> silica CaO reacts with SiO <sub>2</sub>	[1]
		to fo igno	form slag <b>or</b> calcium silicate ore an incorrect formula if a correct name given <b>I</b> Si + $O_2$ + CaO form slag	[1]
				[Total: 13]
(a)	(i)		₅COOH <b>or</b> C <sub>6</sub> H₅CO₂H <b>Г</b> C7H <sub>6</sub> O₂ /C <sub>6</sub> H <sub>6</sub> COO	[1]
	(ii)	corre	ium hydroxide + benzoic acid = sodium benzoate + w ect spelling needed <b>NOT</b> benzenoate CEPT correct symbol equation	vater [1]
	(iii)		ium carbonate <b>or</b> oxide <b>or</b> hydrogencarbonate <b>TWO</b> <b>Γ</b> Na	[2]
(b)	(i)	7.7%	6	[1]
	(ii)		any number: equal number ratio example 1:1 or 6:6	[2]
	(iii)	mole	birical formula is CH ecular formula is C <sub>6</sub> H <sub>6</sub> e.c.f., award of marks not dependent on <b>(ii)</b>	[1] [1]
(c)	(i)	C₀H₅	<sub>8</sub> O <sub>6</sub>	[1]
	(ii)	alcol NOT	oon – carbon double bond <b>or</b> alkene hol <b>or</b> hydroxyl <b>or</b> hydroxy <b>f</b> hydroxide roxide and alcohol = 0	[1] [1]
				[Total: 12]

Seco	ond va	ariant	t Mark Sc	cheme				42			
	Pa	ige 5			Mark Scheme	ah ar 2000	S	yllabus	".Day	r	
5	(a)	(ii)	Na <sup>+</sup> and OR C <i>l</i> <sup>−</sup> NB ions NOT any	e → H <sub>2</sub> 2e → C $l_2$ or 2 l OH <sup>-</sup> are left removed OH <sup>-</sup>	ormula essentia Ia <b>or</b> Na⁺			0620	PaCa.	r nbridge.cor.	*
	(b)	(i)	NOT jus	<b>st</b> to make it sa	afe to drink <b>or</b> p	s/germs bacteria, urify it <b>or</b> clean it gate a correct resp				[1]	
		(ii)	ammoni <b>NOT</b> nyl		<b>or</b> hydrogen ch	nloride <b>or</b> margari	ine			[1]	
		(iii)		<sup>.</sup> triester <b>or</b> lipio sis <b>or</b> saponific						[1] [1]	
									[Tot	al: 7]	

## 6 (a) (i) aqueous

, (י)						
	aqueous	tin	manganese	silver	zinc	
	solution	Sn	Mn	Ag	Zn	
	tin(II) nitrate		R	NR	R	
	manganese(II) nitrate	NR		NR	NR	
	silver(I) nitrate	R	R		R	
	zinc nitrate	NR	R	NR		
	[1] for each row					[3]
	ignore anything written ir	ı blank spac	e			
(ii)	Zn + 2AgNO <sub>3</sub> → Zn(NO <sub>3</sub> all species correct [1] accept correct ionic equa Zn + 2Ag <sup>+</sup> → Zn <sup>2+</sup> + 2Ag	ation				[2]
(iii)	Sn <sup>2+</sup> must be made clear it gains electrons <b>or</b> oxid reason must relate to an <b>NB</b> not dependent on ide	ation numbe oxidant	er decreases <b>or</b>			[1] [1]
(iv)	covered with oxide layer makes it unreactive <b>or</b> p	otects <b>or</b> al	uminium oxide u	Inreactive		[1] [1]

Page 6	Mark Scheme Syllabus	er
	IGCSE – October/November 2008 0620	apa .
(b) (i)	potassium has one valency electron or loses one electron calcium has two valency electrons or loses two electrons	Dana Cambridg
(ii)	potassium hydroxide → no reaction calcium hydroxide → calcium oxide and water ACCEPT metal oxide	[1] [1]
(iii)	2KNO <sub>3</sub> → 2KNO <sub>2</sub> + O <sub>2</sub> [1] for <b>formula</b> of either product	[2]
	$2Ca(NO_3)_2 \rightarrow 2CaO + 4NO_2 + O_2$ [1] for <b>formulae</b> of any <b>TWO</b> products	[2]
		[Total: 17]
(a) (i)	20 cm <sup>3</sup> 80 cm <sup>3</sup>	[1] [1]
(ii)	forms carbon monoxide	[1]
	poisonous <b>or</b> toxic <b>or</b> lethal <b>or</b> prevents blood carrying oxygen <b>or</b> effect on haemoglobin <b>NOT</b> just harmful, etc.	[1]
(b) (i)	chlorobutane <b>or</b> butyl chloride number not required but if given must be 1, it must be in correct position	[1]
(ii)	light <b>or</b> UV <b>or</b> 200 °C <b>or</b> lead tetraethyl	[1]
(iii)	any correct equation for example 2-chlorobutane or dichlorobutane must include HC1	[1]
(c) (i)	correct repeat unit <b>COND</b> continuation –(CH(CH <sub>3</sub> )–CH <sub>2</sub> )–	[1] [1]
(ii)	propan-1-ol <b>or</b> propan-2-ol <b>or</b> propanol if number given then formula must correspond for second mark.	[1]
	number must be in correct position structural formula of above $CH_3-CH_2-CH_2-OH$ or $CH_3-CH(OH)-CH_3$ <b>NOT</b> $C_3H_7OH$	[1]
	if first mark not awarded then either formula will gain mark [1]. accept either formula for "propanol" in (i) NB On scoris both marks entered together not as [1] and [1] separately	1
(iii)	$CH_3-CH_2-CH_2-CH_2-Cl$ or $CH_3-CH_2-CH(Cl)-CH_3$ <b>NOT</b> $C_4H_9Cl$ if equation given look at RHS only	[1]
	response must not include HC1	