UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the June 2005 question paper

0620 CHEMISTRY

0620/03

Paper 3 (Extended Theory), maximum mark 80

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

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

CIE is publishing the mark schemes for the June 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Grade thresholds for Syllabus 0620 (Chemistry) in the June 2005 examination.

	maximum	minimum mark required for grade:				
	mark available	А	С	E	F	
Component 3	80	58	30	16	11	

The threshold (minimum mark) for B is set halfway between those for Grades A and C. The threshold (minimum mark) for D is set halfway between those for Grades C and E. The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A* does not exist at the level of an individual component.

IGCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0620/03

CHEMISTRY Extended Theory



				IG	CSE – JL	INE 2005		0620	,	3
1	(a)		chlorine	actual colo yellow, yel orange, br black grey	llow/greei own, brov					[1]
			gas, <u>liqui</u> all three r							[1]
			colourles gas	s or (pale)	yellow					[1] [1]
	(b)	Mus	t have a	correct reag	ent other	wise wc = 0				
		yello	w or orar	water or bul nge or brow r grey cryst	/n	lorine gas				[1] [1]
						for bromide)				[1]
		off w	/hite or pa w <u>precipi</u>	<u>tate</u> insolub	o r cream _l ole in aqu	q) <u>orecipitate</u> or eous ammoni olour or solubi	а		onia	[1] [1] [1]
		pale	yellow o	nitrate(aq) r off white c tate insolub	-	<u>orecipitate</u> eous ammoni	a			[1] [1] [1]
			•			electrolysis, i otassium mar	` '	etc.		
	(c)	-	$3Cl_2 =$ having eit	•	nts or pro	ducts correct	ONLY [1]			[2]
	(d)	chloi CON		M _r or lower	density c	r lighter mole	cules or mo	lecules move	faster	[1] [2]
		OR	smalle	or based or with no act total of [3]	dditional d	X [1] comment or s	ieve idea [0]			
									тот	AL = 12
2	(a)		_	′n²⁺ + 2I ⁻ ther reactar	nts or pro	ducts correct	ONLY [1]			[2]
	(b)			odium hydr xcess (only		white precipi tate mentione				[1] [1]
		Mark		rst (sodium	•	same results le or aqueous stating that the	s ammonia),			[1] , then an

Mark Scheme

Paper

Syllabus

	Pag	e 2		yllabus	Paper
			IGCSE – JUNE 2005	0620	3
	(c)	(i)	zinc <u>and</u> a reason Do not mark conseq to iodine in excess		[1]
		(ii)	final mass of zinc bigger or the level section higher or less a gradient less steep or longer time or falls more slowly	zinc used u	p [1] [1]
		(iii)	steeper gradient same loss of mass of zinc		[1] [1]
					TOTAL = 10
3	(a)	(i)	CH ₃ -CH==CH ₂		[1]
		(ii)	conseq to (i) correct repeat unit COND evidence of continuation		[1] [1]
		(iii)	monomer COND because it has a double bond or unsaturated or alke NOT addition	ene	[1] [1]
	(b)	(i)	to remove fibres or remove solid NOT precipitate, NOT impurities, NOT to obtain a filtrate		[1]
		(ii)	because silver atoms have <u>lost electrons</u> OR oxidation number increased		[1]
		(iii)	silver chloride		[1]
	(c)	(i)	name of an ester formula of an ester if they do not correspond MAX [1] Accept name - terylene for formula ester linkage and continuation If a 'fat' complete structure must be correct e.g. C ₁₇ H ₃₅ etc. Mark for formula only - [1]		[1] [1]
		(ii)	alcohol or alkanol NOT a named alcohol		[1]
	(d)	(i)	acid loses a proton base accepts a proton		[2] [1]
			OR same explanation but acid loses a hydrogen ion (1) and base gains hydrogen ion (1)		
		(ii)	only partially ionised or poor hydrogen ion donor or poor poor poor poor does not form many hydrogen ions in water or low corions NOT pH		

TOTAL = 15

		ICCCE HINE 2005	0000	2
		IGCSE – JUNE 2005	0620	3
4 (a)	(i)	correct word equation (carbon dioxide and water) Accept correct symbol equation		[1]
	(ii)	Must have a correct reagent otherwise wc = 0 add (acidified) barium chloride(aq) or nitrate or add bar COND white precipitate NOT lead(II) compounds	ium ions	[1] [1]
	(iii)	low pH or universal indicator turns red(aq) pH 3 or less		[1]
(b)	(i)	$H_2S + 2O_2 = H_2SO_4$ unbalanced [1]		[2]
	(ii)	unpleasant smell or it is poisonous or when burnt for dioxide or forms sulphuric acid NOT it is a pollutant	ms acid rain	or forms sulphur [1]
	(iii)	2H to 1S COND 8e around sulphur atom 2e per hydrogen atom THREE correct TWO from above [1] lonic structure = [0]		[2]
(c)	(i)	vanadium oxide ${f or}$ vanadium(V) oxide ${f or}$ vanadium per Must be correct oxidation state if one given	ntoxide or V ₂ 0	O ₅ [1]
	(ii)	400 to 500° C		[1]
	(iii)	add to (concentrated) sulphuric acid NOT dilute COND (upon sulphuric acid) above then add water		[1] [1]
(d)	mol mol	as of one mole of $CaSO_4 = 136$ es of $CaSO_4$ in 79.1g = 0.58 accept 0.6 es of H_2O in 20.9 g = 1.16 accept 1.2 seq x = 2 x given as an integer		[1] [1] [1]
				TOTAL = 16
5 (a)	(i)	A is glutamic acid B is alanine Accept names only, NOT R_f values		[1] [1]
	(ii)	because acids are colourless or to make them visible or to show positions of the samples or distance travelle	d	[1]
	(iii)	compare with known acids or reference samples or star Accept from colours of samples	ndards	[1]
	(iv)	amide linkage COND different monomers continuation Accept hydrocarbon part of chain as boxes If nylon 6 then only one monomer [1] NOT different more	nomers	[1] [1] [1]

Mark Scheme

Syllabus

Paper

Page 4		Mark Scheme	Syllabus	Paper
		IGCSE – JUNE 2005	0620	3
(b)	correct structure as syllabus (box representation) correct linkageO continuation			[1] [1]
(c)	(i)	$C_6H_{12}O_6 = 2C_2H_5OH + 2CO_2$ not balanced [1] Accept C_2H_6O		[2]
	(ii)	gives out <u>energy</u> or equivalent NOT heat N.B. a total of [1] not [2]		[1]
	(iii)	glucose used up or yeast 'killed' by ethanol NOT yeast used up NOT reactant to	used up	[1]
	(iv)	oxidise alcohol to acid or to ethanoic acid or to carbon dioxide and water or if oxygen present aerobic respiration or cannot have anaerobic respiration in presence of NOT it is anaerobic respiration, must be additional content of the c		[1]
	(v)	fractional distillation		[1]
				TOTAL = 15
				101AL - 13
6 (a)	(i)	bauxite		[1]
	(ii)	to reduce melting point or improve conductivity or as a solvent or reduce the working temperature		[1]
	(iii)	carbon dioxide or monoxide or fluorine		[1]
(b)	(i)	aluminium		[1]
	(ii)	solution goes colourless or copper formed or a <u>brown solid</u> forms or blue colour disappears or bubbles NOT goes clear or copper formed		[1]
	(iii)	covered with an oxide layer		[1]
(c)	read	ction no reaction reaction		[1] [1]
(d)	(i)	$2Al(OH)_3 = Al_2O_3 + 3H_2O$ Not balanced [1]		[2]
	(ii)	Aluminium nitrate = aluminium oxide + nitrogen dio only TWO correct products [1]	xide + oxygen	[2]
				TOTAL = 12