MARK SCHEME for the October/November 2011 question paper

for the guidance of teachers

0620 CHEMISTRY

0620/33

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.

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

Cambridge is publishing the mark schemes for the October/November 2011 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 2011	0620	33
1	(a) (i)	Cs /	Fr		[1]
	(ii)	Br			[1]
	(iii)	U / F	Pu / Th		[1]
	(iv)	Ior	At		[1]
	(v)	As			[1]
	(vi)	He /	Ne / Ar / Kr / Xe		[1]
	(b) (i)	GeC	0 ₂ / GeO		[1]
	(ii)	TeB	r ₂ / TeBr ₄		[1]
	(c) (i)	Sr ²⁺			[1]
	(ii)	F⁻			[1]
2	(a) (i)	molecule / unit / simple compound / building block and used to make a polymer / big molecule / long chain / macromolecule			o make a [1]
		form mon mole note	ation of a polymer / big molecule / long chain / m omers and elimination / removal / formatior ecule / H ₂ O / HC <i>l</i> e: two points needed for 1 mark in both parts	nacromolecule or n of a simple	ioining of or small [1]
	(ii)	-O- I three cont	inkage e correct monomer units inuation		[1] [1] [1]
	(b) (i)	cata acce	lyst and from living organism ept: biological catalyst / protein catalyst		[1]
	(ii)	enzy	me denatured / destroyed		[1]
	(iii)	chro loca mea	matography ting agent / description of locating agent sure R _f / compare with standards		[1] [1] [1]

	Page 3			Mark Scheme: Teachers' version	Syllabus	Paper
				IGCSE – October/November 2011	0620	33
3	(a)	sod war (onl blue or: sod diss Ca ² or: flan Ca ² NH,	lium h m ly) an e) lium h solve ^{t+} give ne tes tes tes tes tes tes	nydroxide solution nmonium phosphate gives off ammonia / gas (whic nydroxide solution fertiliser in water es (white) ppt st k red / orange / orange-red colour	h will turn red litr	[1] [1] mus paper [1] [1] [1] [1] [1] [1]
	(b)	iron pres tem N ₂ not	i cata ssure iperat + 3F e: un	lyst 150–300 atmospheres cure 370–470 °C H₂ ≑ 2NH₃ its required for temperature and pressure		[1] [1] [1] [1]
	(c)	pota	assiu	m / K		[1]
	(d)	(i)	need	ds to be soluble / in solution (to be absorbed by plar	its)	[1]
		(ii)	base proto	e on acceptor		[1] [1]
	(e)	plar add	nt gro I Ca(0	wth depends on soil acidity or pH / plants have optin OH_2 / CaO / CaCO $_3$ / lime / slaked lime / quicklime /	mum pH (for grov limestone	vth) [1] [1]
4	(a)	(i)	alloy iron	/ mixture and carbon / another metal or element etc.		[1] [1]
		(ii)	elect	tron loss		[1]
	(b)	eleo to s	ctrons teel /	s move from / lost from Mg iron		[1] [1]
	(c)	(i)	2H⁺ not b	+ 2e \rightarrow H ₂ balanced = 1		[2]

Page 4				Mark Scheme: Teachers' version	Syllabus	Paper		
				IGCSE – October/November 2011	0620	33		
		(ii)	sacr	ificial protection – is a <u>cell</u>		[1]		
		. ,	cath	odic protection – is electrolysis NOT electrical cell		[1]		
			or:	ificial protection – electrons from more reactive met	əl	[1]		
			cath	odic protection – electrons from battery etc.		[1]		
			or:			, , , , ,		
			sacri	ificial protection – does not need or use power / ba	ttery / electricity	electrical /		
			cath	odic protection – does		[1]		
			or:	ificial protection uses up (peode a sparificial / mars	reactive motel	[4]		
			cath	odic protection doesn't	reactive metal	['] [1]		
						[.]		
5	(2)	liah	+ / I N/	// sun / sunlight / solar energy		[1]		
5	(a)	star	ts / in	nitiates / speeds up		[1]		
	(b)	(i)	0.03	% – 1(%) carbon dioxide		[1]		
	(~)	(-)	acce	ept: less than 1(%)		[.]		
			20%	₀ – 21(%) oxygen		[1]		
		(ii)	remo	ove carbon dioxide from atmosphere		[1]		
			prod	uce oxygen		[1]		
			any phot	two from: osynthesis				
			chlo	rophyll / chloroplast				
			light	/ sun / sunlight / UV / photochemical		[0]		
			Iorm	ed carbonydrates / glucose / sugar(s)		[2]		
	(c)	rea	ction	is photochemical / needs light uses formation of silver / silver ions reduced		[1]		
		(ingr (on	forma	ation of silver) goes black		[1]		
		no l	ight s	till silver(I) bromide / stays white / no reaction		[1]		
6	(a) any three from:							
		bari	um more reactive / forms ions more readily um reacts with (cold) water, nickel does not					
		bari	ium m	nore vigorous with acids				
		nick		mpounds coloured, barium compounds white				
		nick	kei na kel / n	ickel compounds catalysts, barium / barium compou	unds not catalvsts	5		
		nick	cel for	ms complex ions, barium does not		[3]		
	(b)	(i)	forw	ard reaction favoured by low temperatures / rev	erse reaction fa	voured by		
	. ,	. /	high	temperatures / heat		[1]		
			exot	nermic		[1]		
		(ii)	prod	ucts / RHS		[1]		
			has	fewer moles / molecules / smaller volume / ORA		[1]		
		(iii)	do n	ot react or left behind / left at 60 °C		[1]		
		、 /		· · · · · · · · · · · · · · · · · · ·		[.]		

	Page 5	Mark Scheme: Teachers' version	Syllabus	Paper
		IGCSE – October/November 2011	0620	33
	(iv) el ca ar el	ectrolysis athode (pure) nickel node impure nickel ectrolyte is a soluble nickel salt		[1] [1] [1] [1]
7	(a) correc i.e. 12 C ₉ H ₁₈ note:	t method shown 6/14 (= 9) or 14x = 126 or x = 9 or (12 × 9) + 18 = 126 correct formula only = 1	3	[1] [1]
	(b) (i) al C- C [:]	l hydrogen atoms 1bp —C bond atoms 1bp =C 2 bp		[1] [1] [1]
	(ii) co co	prrect repeat unit		[1] [1]
	(iii) bo H· 20 –1 0	ands broken -H +436 (kJ/mol) C=C +610 = +1046 (kJ/mol) onds formed C-H -415×2 kJ/mol C-C -346 = -1176 (kJ/mol) I30 kJ/mol / more energy released than absorbed ::		[1] [1] [1]
	bc 38 bc 40	onds broken 382 (kJ/mol) onds formed 012 (kJ/mol)		[1]
	al no	low: ecf for final mark as long as the answer is not positive: units not necessary	sitive	[']
	(c) (i) bu	utan-1-ol or butan-2-ol or butanol		[1]
	(ii) Cl Cz no	H₃-CH₂-CH(Br)-CH₂Br ₄HଃBr₂ = 1 ote: any other dibromobutane = 0		[2]
	(iii) Hi	I		[1]