MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

0653 COMBINED SCIENCE

0653/21

Paper 21 (Core 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		e 2 Mark Scheme: Teachers' version		Paper	
		-	IGCSE – May/June 2010	0653	21	
1	(a)	commun populatic ecosyste	ity ; on ; em ;		[3]	
	(b)	all five or arrows b all links p on only c	rganisms included and no others ; etween them going the right way ; present and correct (allow one missing arrow, or her one species) ;	on / pike feeding		
			heron pike water snails water voles			
			pond weed		[3]	
	(c)	no food (no oxyge	(for primary consumers) ; en ;		[2]	
	(d)	(i) C; B; E;			[3]	
		(ii) no c no c no (l not r	ell wall / no part A ; hloroplasts / no part B ; large) vacuole / no part F ; ^r ectangular ;		[max 2]	
					[Total: 13]	
2	(a)	Geiger c cloud ch	ounter / Geiger (Müller) tube / scintillation counter / amber / photographic film ;	spark chamber /	[1]	
	(b)	burns ; eye dam cancer ; mutation radiation	age / cataracts ; (of cells) / damage to DNA ; sickness ;		[max 2]	

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
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(c) (i)

				alpha	beta	gamma		
			most penetrating			\checkmark		
			most ionising	\checkmark				
							;; [2	2]
		(ii)	alpha ; gamma ;				[1	2]
							[Total: 7	7]
3	(a)	(i)	(good) conductor of ele lustrous / sonorous / ma	ctricity / (good) con alleable / ductile / ł	ductor of heat / gre nigh melting point ;	ater density /	['	1]
		(ii)	sodium is too reactive /	very little strength	;		[1]
	(b)	(i)	(it is balanced) idea of same number o of atoms of each eleme	n both sides ; ent / numbers state	ed ;		[2	2]
		(ii)	Fe_2O_3 ; reduction is loss of oxy	gen / O removed fi	rom Fe_2O_3 ;		[2	2]
	(c)	(i)	ionic/electrovalent;				[1]
		(ii)	solution/compound in <u>li</u> free ions ;	<u>quid</u> form which, c	onducts electricity	/ contains	[1]
		(iii)	electrical;				['	1]
		(iv)	any Group 1 or Group 2 [allow copper]	2 metal / zinc ;			[1]
							[Total: 10)]
4	(a)	(i)	brain labelled ;				[1]
		(ii)	nerves / nerve cells / ne effectors / muscles / gla	eurones ; ands ;			[2	2]
	(b)	end	locrine ;				['	1]

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
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(c) (i) P written within area shown ;

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	(ii)	insulin ;	[1]
	(iii)	liver / muscles ;	[1]
	(iv)	ref. to respiration ; no energy (for cells) ; other correct, e.g. hypoglycaemic shock ;	[max 2]
			[Total: 9]
(a)	vibr	ration of (water) particles / discussion of compressions and rarefactions ;	[1]
(b)	(i)	solid ;	[1]
	(ii)	(distance =) speed × time ; = 1500 × 0.5 = 750 (m) ;	[2]
(c)	(i)	measuring cylinder / graduated beaker ;	[1]
	(ii)	balance / scales ;	[1]
	(iii)	mass / volume ;	[1]

[Total: 7]

Page 5		Mark Scheme: Teachers' version Syllabus		Paper	
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6 (a)	(i) \	·;		[1]	
	(ii) 🕽	C – bromine			
	<u>ا</u>	/ – iodine / astatine	ot = 1 month	[0]	
	2	. – iluorine / chlorine (all correct = 2 marks, two or one corre	ect = 1 mark) ;;	[2]	
(b)	(i) a	Il correct for 1 protons, neutrons, electrons ;		[1]	
	(ii) 1	0;		[1]	
	(iii) c	nly protons and neutrons have mass / electrons have no m	ass ;	[1]	
(c)	chlor	ne solution kills bacteria ;			
	may remo	nelp to prevent disease / other acceptable benefit ; ves stains more easily / reference to bleaching ;		[max 2]	
		,		[Total: 8]	
				[10(a), 0]	
7 (a)	36 ;			[1]	
(b)	warm	air less dense than cold :			
()	warm	air near the ground (in open field) rises ;		[
	warm	air cannot get out of the glasshouses ;		[max 2]	
(c)	too h	ot (in glasshouse A) ;			
	ref. to	pollination (by bees); pollination in glassbouse A :			
	so <u>fe</u>	ver tomatoes produced ;		[max 2]	
(d)	carbo	n dioxide (concentration) ;			
	wind	; supply / humidity;			
	water supply / numidity; pests / pesticides / animals ; weeds ;				
	soii / light ;	availadility of minerals ;		[max 2]	
				[Total: 7]	

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	Page 6		6 Mark Scheme: Teachers' version Syllabus		Paper	
				IGCSE – May/June 2010	0653	21
8	(a)	(i)	22 – 78 –	- 20 % ; - 80 % ;		[2]
		(ii)	carb	on dioxide / water vapour / any noble gas ;		[1]
	(b)	(i)	SO ₂	; ;		[1]
		(ii)	lead whic brea	s to acid rain ; ch may damage buildings / harm aquatic ecosystem thing the gas may cause respiratory distress / detai	s / organisms ; I ;	[max 2]
	(c)	(i)	cova	alent;		[1]
		(ii)	O = 2 × 0 by d (so 2	C = O O bonded to central C ; ouble bonds ; 2 × C bonded to central O by double bonds scores 1	l mark)	[2]
						[Total: 9]
9	(a)	(i)	В-	С;		[1]
		(ii)	5 s ; (allo	w 4.8 – 5)		[1]
	(b)	(i)	(wor = 25	k done =) force × distance ; i0 × 10 = 2500 J ;		[2]
		(ii)	kine heat	tic / movement ; : / sound ;		[2]
	(c)	(i)	serie	es ;		[1]
		(ii)	8 (ol	hms) ;		[1]
	(d)	larg bec	ier (tu ause	urning force) / moment ; distance is larger/moment = F × d ;		[2]

[Total: 10]