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## **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

## 0653 COMBINED SCIENCE

0653/02

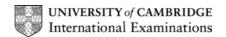
Paper 2 (Core Theory), maximum raw mark 80

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.

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1			contains starch ; contains protein ;	[2]
	(b)	(i)	protein ; in living organisms ; that acts as a catalyst ;	[max 2]
	(	(ii)	cannot digest / breakdown starch; (reject food) cannot absorb, starch / sugar / glucose; into the blood; cells do not get sugar; cannot use (starch / sugar) for respiration;	[max 3]
	(i	iii)	genes / chromosomes / DNA / mutation ; (reject references to inheritance or blood)	[1]
	(i	iv)	no starch in their food / starch not present in meat;	[1]
				[Total: 9]
2	(a)	(i)	hydrogen;	[1]
	(	(ii)	sulfur dioxide; reacts with / dissolves in rainwater / forms sulfurous / sulfuric acid; (allow one mark for reference to ${\rm CO_2}$ and carbonic acid)	[2]
	(b)	(i)	covalent;	[1]
	(	(ii)	two oxygen atoms shown joined to central carbon; by double bonds;	[2]
				[Total: 6]
3	(a)	<b>D</b> to	o C to A to B	[2]
	(b)	alpl	ha radiation completely absorbed by / cannot penetrate paper ;	[1]
			tates (cells) ;	
			ises cancer ; iation burns ;	[max 2]
			elding (e.g. gloves, lead lined clothes etc.);	
			nitoring (radiation badges etc.) ; ited exposure time ;	[max 2]
				[Total: 7]

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4 (	(a) (i)	increase (soil erosion); soil not protected from rain by leaves; soil not held by roots; easily washed away;	[max 2]
	(ii)	decrease (species diversity) ; loss of habitats ; loss of food supplies / disrupts food chains ;	
		more hunting (by humans);	[max 2]
(	(b) (i)	oil palm  → rats  → owls ; ; (all organisms and energy transfer)	[2]
	(ii)	oil palm is producer, rats and owls are consumers; (all organisms required, ignore references to the Sun)	[1]
			[Total: 7]
5 (	(a) (i)	$\rightarrow$ salt ; + water ; (allow H <sub>2</sub> O)	[2]
	(ii)	hydrogen / H / H <sup>+</sup> ;	[1]
	(iii)	NaOH ; (allow NaHO)	[1]
(	(b) (i)	iron ; (allow Fe)	[1]
	(ii) a barrier of zinc / zinc plated onto the steel / covered with zinc; which prevents (the steel from) rusting / keeps air / oxygen and water away the steel;		
	(iii)	metals react with acid / the container would soon react and break; (allow corroded / dissolved)	[1]
(	(c) (i)	9;	[1]
	(ii)	contains (only) hydrogen and carbon / is made of hydrogen and carbon;	[1]
	(iii)	words and/or diagram which conveys (many) small molecules / molecules of propene join together / propene mono link together;	mers
		to form a (long) chain (molecule); (ignore mistakes in displayed formulae if meaning is clear)	[2]
			[Total: 12]

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6	(a)	(i)	15 s ;	[1]
		(ii)	30 s;	[1]
		(iii)	<b>CD</b> and <b>GH</b> / <b>60</b> – <b>80</b> (s) and <b>140</b> – <b>160</b> (s) ;	[1]
	(b)		nstant speed / constant velocity ; erence to balanced forces / equal and opposite forces ;	[2]
	(c)	(i)	may contain carbon monoxide / (products of) incomplete combine poisonous;	ustion ; [2]
		(ii)	chemical; heat / thermal; kinetic / movement / sound / light;	[max 3]
				[Total: 10]
7	(a)	(i)	label to palisade cell ;	[1]
		(ii)	label to stoma ;	[1]
	(b)	(i)	contains DNA / genetic information; which is inherited; controls activity of the cell (by controlling enzymes present); store genes on chromosomes;	[max 2]
		(ii)	controls what enters / leaves the cell; (do not allow direct references to oxygen, water, carbon dioxide	[1]
	(c)	(i)	for photosynthesis ; (in which) water is combined with carbon dioxide ; to provide turgor / support / hold shape ;	[max 2]
		(ii)	xylem (vessel);	[1]
	(d)	(i)	gas;	[1]
		(ii)	diffusion / (evapo)transpiration ; (reject evaporation)	[1]
				[Total: 10]

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8	(a)	(i)	conduction;		[1]
		(ii)	(plastic is) good insulator / poor conductor;		[1]
	(b)	(i)	A, because it is a (diagram of a) solid / close (packed) and	regular ;	[1]
		(ii)	<b>B</b> , because it is a (diagram of a) liquid / close (packed) and	d random ;	[1]
	(c)	(i)	(density =) <u>mass</u> ÷ volume (reject unconventional symbols or units in formula) (volume is) 200 (cm³); = 540 ÷ 200 / 2.7 (g / cm³); (allow ecf for incorrect volume)		[3]
		(ii)	5.4 N;		[1]
					[Total: 8]
9	(a)	(i)	<b>W</b> and <b>Y</b> (both needed) ; (carbonates react with acid to produce) carbon dioxide ;		[2]
		(ii)	Y; transition metal compounds are (often) coloured (other than	ın white) ;	[2]
	(b)	(i)	(strong) heat ;		[1]
		(ii)	(copper oxide +) carbon; → (copper +) carbon dioxide; (allow carbon monoxide and carbon oxide)		[2]
		(iii)	oxidation / reduction / redox ; carbon gains oxygen / copper oxide loses oxygen ;		[2]
		(iv)	complete circuit in which the copper forms a part; circuit would indicate that copper is a conductor i.e. cop source and a current indicator;	oper is in series	with a power [2]

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[Total: 11]