

## **NOVEMBER 2002**

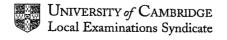
## **INTERNATIONAL GCSE**

## **MARK SCHEME**

**MAXIMUM MARK: 80** 

**SYLLABUS/COMPONENT: 0653/3** 

COMBINED SCIENCE (EXTENDED)



Page 1	Mark Scheme	Syllabus	Paper
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1(a)

feature	arteries	veins	capillaries
valves present	X	<b>√</b>	Х
walls are one cell thick	х	x	<b>V</b>

Trains e	A A	
	one mark per correct column;;;	3
	one man per contest column , , ,	
(b)(i)	more room for haemoglobin;	-
	haemoglobin, combines with / carries, oxygen;	
	so more oxygen can be, carried / transported;	max 2
(ii)	increases surface area (to volume ratio);	
	speeds uptake / release / diffusion, of oxygen;	2
(c)	anaerobic respiration;	
	lactic acid produced;	2
2(a)	the breakdown of the nucleus of an atom;	
	the time taken for half the mass (of a nuclide) to decay / eq;	2
(b)	4 half lives;	
` ,	7.64 years;	2
(c)	defected in opposite directions;	
,	alpha towards negative / beta towards positive;	
·	beta deflected more than alpha;	max 2
(d)	electrons are lost from the atoms (of the material);	1

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3(a)(i)	volume / concentration, of acid solution;	,
<i>5(u)(1)</i>	whether stirred or not;	
	surface area / mass, of magnesium;	max 1
	ourties arour mass, or magnesium,	max 1
(ii)	same amount of, magnesium /reactants, used;	1
(b)(i)	the higher the temperature the higher the rate;	1
(ii)	higher temperature means faster particles;	•
	so more collisions (per unit time);	
	between acid particles and magnesium;	2 max
(-)(:)	hadan san dan san sainus salah sta	_
(c)(i)	hydrogen + magnesium sulphate;	1
(ii)	Н;	
(11)	+ • · · · · · · · · · · · · · · · · · ·	2
	,	2
4(a)	only washes slowly into the lake;	
	because it is not very soluble;	
	does not break down quickly / is persistent;	2 max
(b)	peregrines are carnivores / eat other birds or animals;	
	peregrines are at the end of a food chain;	
	DDT does not break down in animals' bodies;	
	concentrates up food chain;	3 max
(c)(i)	using a pradator / paracita / disagge covering organism :	
(c)(i)	using a, predator / parasite / disease-causing organism;	2
	to control a pest;	2
(ii)	named pest;	
	named control organism;	2
	-	_

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5 (a)	normal approx 90 ° and labelled;	
	both angles correctly labelled;	2
(b)	it is less than 40°;	1
(c)	(up to critical angle), some light is reflected and some refracted;	
	at critical angle refraction occurs along the surface;	
	more than the critical angle there is, no refraction / total internal reflection;	
	critical angle is (approx) 43 ° between 42 and 48;	max 3
(d)(i)	distance between lens and point where rays are brought to a focus;	•
· .	parallel rays;	2
(ii)	real can be projected onto a screen / vice versa;	1
6(a)(i)	ions;	
	sodium and chloride;	2
(ii)	sodium ions are positive;	
	attracted to, negative electrode / cathode;	
	ions gain electrons from the cathode;	
	each ion gains one electron;	3 max
(iii)	sodium too reactive to form from aqueous solution;	
	sodium more reactive than hydrogen;	
	so hydrogen forms (in preference to sodium);	2 max
(b)(i)	they lose electrons;	1
(ii)	green to purple;	
	solution become alkaline / sodium hydroxide is an alkali / OH	
	ions form;	2

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7(a)	a group of cells;	
	that are similar / that perform a particular function;	2
(b)	line to, cell/ vacuolar membrane;	1
(c)	water;	
	has gone out of the cells;	
	by osmosis;	
	from dilute solution to more concentrated solution;	4
(d)	water enters both animal and plant cells;	
	plant cell wall stops it from bursting / animal cell has no cell wall;	2
8 (a)	70 m/s ;	1
0 (a)	70 Hb 5 ,	1
(b)	working;	
4	10 m/s <sup>-2</sup> ;	2
(c)	area under curve / other correct working;	
	245 m;	2
(d)	between 7 and 8 seconds;	•
	from area under graph / by calculating distance after 8 s /	
	other correct working;	2
(e)(i)	potential energy = $mgh / 0.05 \times 10 \times 300$ ;	
	= 150 J;	
	(allow ecf for one mark if out by a factor of 10)	2
(ii)	converted to, sound / heat;	1.
` '		

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9(a) Cl 37 has more neutrons; two more; 2 17; (ii) 18; 2 (b)(i) covalent; 1  $\text{Cl}_2 + \text{H}_2 \rightarrow 2\text{HCl}$ (ii) all formulae correct; 2 balancing; outer shell of H has 1 electron and outer shell of Cl has 7; (iii) correct diagram showing shared pair;

2