

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**5129 COMBINED SCIENCE**

**5129/02**

Paper 2 (Theory), maximum raw mark 100

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.

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<b>Page 2</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>
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- 1 (a) (i) earth ;  
 (ii) fuse ;
- (b) blue / black ; [1]

- 2 (a) water ;  
 Minerals / mineral ions / nitrate / mineral salts ;  
 other named mineral nutrient ;  
 nitrate ions / ammonium ions ;  
**not:** salts / nitrogen / other named elements } any 2 [2]

(b) (i) gives a large surface area ; [1]

(ii) thin / permeable ; [1]

(c) (cell) membrane / plasma membrane / plasmalemma ; [1]

3 (a)

														Z	W	
													Y		W	
X																

[4]

(b) ionic, electrovalent ; [1]

- 4 (a) 2 half-lives / 4000 → 2000 → 1000 ; [1]  
 5.8 ; [1]

(b) (i) 94 ; [1]

(ii) 142 ; [1]

(c) nucleus of helium / 2 protons + 2 neutrons ; [1]

(d) both positive / same charge / electrostatic repulsion / like charges repel ; [1]

- 5 (a) 40 ; 18 ;  
 2 (error carried forward) ; [3]

(b) magnesium / magnesium carbonate / magnesium hydroxide ; [2]

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- 6 (a) B still contains starch throughout / contains starch throughout ;  
A only has starch where there were NO seeds / converse ;  
B has more starch than A = 1 mark
- (b) amylase ; [1]
- (c) (i) maltose ; [1]  
**not:** glucose / sugar / carbohydrate
- (ii) energy source / for respiration / for growth ; [1]  
**not** food / nutrients / germination
- 7 heart ;  
valves ;  
veins ;  
glucose ;  
urea ; [5]
- 8 (a) (i) 3 ; [1]  
(ii) 1 ; [1]
- (b) 6 or (a) (i) / 0.5 ; [1]  
 $\Omega$  / ohms ; [1]  
unit alone = 1 mark
- 9 (a) A = hydrogen / H<sub>2</sub> ; (do not accept H)  
B = ethanol ; (do not accept alcohol)  
C = polymerisation ;  
D = bromine / Br<sub>2</sub> ; (do not accept Br / bromide) [4]
- (b) 3 2 2 ; [1]
- (c) plastic bags (any suitable use) ; [1]

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- 10 (a) (i) any correct similarity ;  
 same pattern ;  
 similar proportions for both in towns A–D ;  
 both highest in C ;  
 both lowest in D ; } any 1 [1]
- (ii) town E has high HIV rate and low heroin usage ;  
 town D has some HIV infection but no heroin users ; } any 1 [1]
- (b) Sharing needles ;  
 causes blood / body fluid contact ; [2]
- (c) depression / addiction / withdrawal symptoms / crime /  
 mental problems / financial problems / prostitution etc. ; [1]
- 11 potential / gravitational ; [1]  
 kinetic ; [1]  
 heat / thermal / kinetic / sound ; [1]
- 12  $30 / 0.15$  or moment / distance /  $30 = F \times 0.15$  ;  
 $= 200$  ; [2]
- 13 (a) same element / atomic number / number of protons ;  
 different number of neutrons / mass number ; [2]
- (b) 7 ; 7 ;  
 7 ; [3]
- (c) oxides are acidic / acid rain /  $\text{pH} < 7$  ; [1]
- 14 (a) primary ; [1]
- (b) iron / Fe ; [1]
- (c) changing / alternating current (in primary) ;  
 produces changing magnetic field ;  
 induces e.m.f. / voltage ; [3]

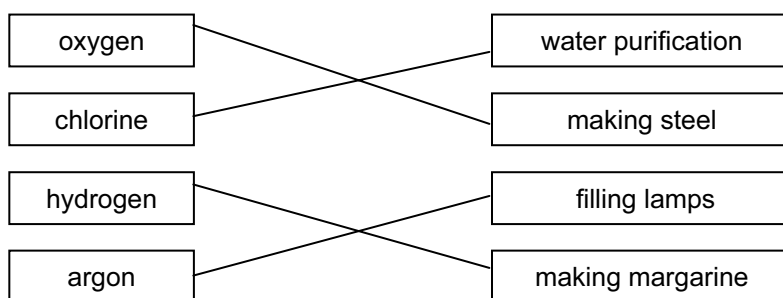
Page 5	Mark Scheme: Teachers' version	Syllabus
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- 15 (a) glucose ;  
to lactic acid ; (ignore energy)
- (b) exercise / high energy activity / rapid respiration /  
increased energy demand ;  
high oxygen demand / lack of oxygen / oxygen debt ; [2]
- (c) (uses) oxygen ;  
produces carbon dioxide ;  
produces water ;  
does not produce lactic acid ;  
releases more energy ; } any 3 [3]
- 16 insoluble ;  
solvent ;  
filtration ;  
evaporation ; [4]
- 17 (a) heather ;  
grouse ; [2]
- (b) (i) heather ; [1]  
(ii) eagle / stoat / shrew / adder / grouse ; [1]
- (c) the Sun ; (do not accept sunlight) [1]
- (d) cannot be reused (within the ecosystem) ;  
energy lost ;  
converted to heat ;  
energy is not recycled ; } any 1 [1]
- 18 (a) smaller range ;  
constriction ;  
retains reading ;  
triangular cross-section ;  
narrow bore ;  
more sensitive ; } any 2 [2]
- (b) (i) increases ; [1]  
(ii) decreases ; [1]

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- 19 (a) rate of change of velocity / change in velocity / time taken ;
- (b)  $a = F / m$  or  $3750 / 2.5$  ;  
= 1500 ; [1]
- 20 (a) (i) haematite / magnetite ; [1]  
(ii) C is more reactive than Fe / below C in reactivity series ; [1]  
(iii) it is an alloy / mixture of iron and other metals ; [1]
- (b) copper / Cu ; [1]
- 21 (a) normal drawn correctly ; [1]
- (b) on entering, ray bends towards normal (not along normal) ; [1]  
ray leaving is horizontal / parallel to incident ray ; [1]

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[4]