

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 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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- 1a (yes - no mark for that)
voltage is proportional to current / $V = IR$;
straight line ;
through origin ; max 2
- b 1.8 A ;
idea of proportionality ; 2
- c voltmeter in the circuit with correct symbol ;
voltmeter in suitable position (parallel);
ammeter in the circuit with correct symbol ;
ammeter in series ;
method of varying voltage described ; 4 max
- 2(a) (inside) red blood cells ; 1
- (b)(i) aa ; 1
- (ii) *phenotypes of parents* normal normal ;
genotypes of parents Aa Aa ;
gametes A and a A and a ;
offspring AA Aa Aa aa ; 4
- (c) less oxygen to, cells / tissues / muscles ;
correct reference to respiration ;
so less energy available ; 3
- (d) iron ; 1
- 3a 2 fractional distillation
3 cracking
4 polymerisation
- 3 in correct sequence for two marks ; ;
1 correct and 2 swapped round for one mark ; 2

Page 2	Mark Scheme	Syllabus	Paper
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- b(i) B ; 1
- (ii) C ; 1
- c polyethene / polythene ;
ethene molecules join together ;
to form, larger molecules / long chain ;
correct use of the terms monomer and polymer ; 3 max
- d $(12 \times 4) + (1 \times 10)$;
58 ; *not g* 2
- 4 water molecules gain, movement / kinetic energy ;
molecules spread out ;
so the water, expands / takes up more space / moves up the tube ;

flask expands ;
as molecules vibrate, more ; 4 max
- 5a speed = distance \div time ;
 $(200 \times 10^6) \div (25 \times 10^2) = 80000$ km per hour ; 2
- b(i) 3×10^8 m/s / 3×10^5 km/s ; 1
- (ii) time = distance \div speed *or* $(200 \times 10^9) \div (3 \times 10^8)$;
= 667 s ; 2
- c 60 kg / the same ;
mass is not affected by gravity ; 2

Page 3	Mark Scheme	Syllabus	Paper
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6a	Fe ₂ O ₃ ; need for charges to balance ;	2
b (i)	iron oxide + carbon monoxide → iron + carbon dioxide ;	1
(ii)	carbon monoxide ; oxygen has been added ;	2
c (i)	aluminium <u>ions</u> are positive so are attracted to, negative electrode / cathode ; aluminium <u>ions</u> gain electrons ; at / from, the <u>cathode</u> ; gain three electrons ;	3 max
d	aluminium. too reactive / more reactive than carbon ;	1
7(a)(i)	sweat secreted / sweat onto surface of skin ;	1
(ii)	water evaporates ; takes heat (from skin) / latent heat described ;	2
(b)(i)	dilate / vasodilation ; <i>not move</i>	1
(ii)	more blood near surface of skin ; heat lost by <u>radiation</u> ;	2
(c)	rate of reactions / metabolism, affected by temperature ; enzymes ; denatured / damaged, if temperature too high ;	2max
8a	(no - no mark for that) centre of mass is not beyond cliff edge ; correct reference to, moments / turning forces ;	2
b(i)	work = force x distance ; 7500 x 50 = 375 000 J ;	2
(ii)	power = work ÷ time ; 375 000 ÷ 120 ; 3125 W ;	3

Page 4	Mark Scheme	Syllabus	Paper
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- 9a(i) acid and alkali selected ;
correct products on right hand side ; ; 3
- (ii) H^+ ; 1
- (iii) acid added to the alkali ;
carefully / slowly / in stages ;
use indicator / pH meter, to detect, end point / end point ;
correct definition of end point e.g. colour of named indicator ; 3 max
- (iv) heat (the mixture) / evaporate the water / leave until water evaporates ; 1
- (b) OH^- ;
- 10 (a) to stop it photosynthesising ;
destarch it / so no starch present at start of experiment ;
so she knew any starch present had been made during the experiment ; 2max
- (b)(i) to kill the cells / destroy the cell membranes / remove the wax layer / make
it permeable (to iodine) ; 1
- (ii) to remove the, chlorophyll / green pigment ;
to decolourise the leaf ;
so that the colour could be seen more clearly after testing with iodine ; 2 max
- (c) shaded areas labelled blue / black ;
white areas labelled orange / brown ; 2
- (d) absorbs light ;
which provides energy to make the reaction happen ; 2