

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0653 COMBINED SCIENCE

0653/23

Paper 2 (Core Theory), maximum raw mark 80

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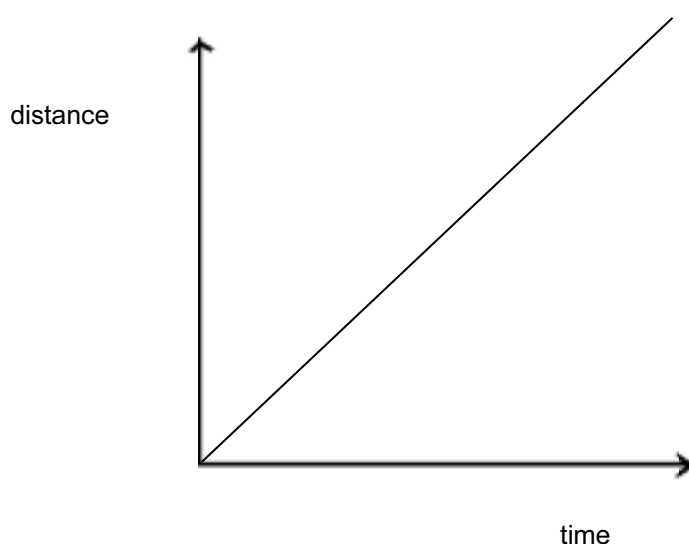
Page 2	Mark Scheme	Syllabus	Paper
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- 1 (a) (i) Fe_2O_3 ; [1]
- (ii) iron has reacted with oxygen in the air/water rises to take the place of the oxygen; [1]
- (iii) $79 \pm 1 \text{ cm}^3$;
allow higher value with explanation of allowance for volume of iron and cotton wool [1]
- (iv) nitrogen; [1]
- (b) no/less rusting and no/less movement of the liquid;
rusting requires water (vapour)/less water (vapour) available; [2]
(giving credit for appreciation that air initially contained some water vapour)
- (c) painting/oil/plating/more reactive metal;
exclusion of water/oxygen/air; [2]

[Total: 8]

- 2 (a) (i) the weight of the canoe and the man: **T**;
the force propelling the canoe forward: **U**;
the friction due to water resistance: **S**;
3 correct 2 marks, 2 correct 1 mark [max 2]
- (ii) water current balances propulsion force (owtte);
unbalanced forces needed to move/accelerate (the canoe); [2]

(b)



straight line;

[1]

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- (c) (i) chemical (energy) ; [1]
- (ii) kinetic (energy) ; [1]
- (iii) heat/sound/kinetic energy of the water ; [1]
- (d) speed = distance/time or (time =) distance/speed ;
time = 2400/2 = 1200 (s) ; [2]

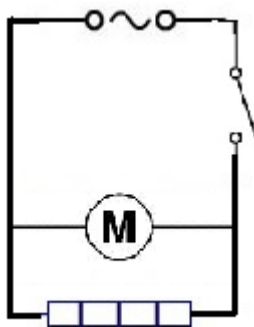
[Total: 10]

- 3 (a) premolar/molar ; [1]
- (b) (i) decay had reached the pulp cavity/nerve ; [1]
- (ii) bacteria/plaque in the mouth ;
feed on sugar ;
secrete acids ;
acids attack the enamel ; [max 3]
- (c) small pieces make the food easier to swallow ;
increases surface area of food ;
speeds up enzyme action/gives better access to enzymes/
ref. to faster/more efficient digestion ; [max 2]
- (d) breaks down large molecules ;
into small (molecules) ;
that can be absorbed into the blood/by small intestine ; [3]
- (e) no (no mark)
enzymes are affected by pH ;
enzyme will not be at optimum/optimum is acidic pH ;
enzyme will be denatured ; [max 2]

[Total 12]

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4 (a)



complete circuit ;
all components in correct positions (motor and heater either way round) ; [2]

(b) heating (the water) gives molecules more energy ;
more water molecules have enough energy to escape (from hair) ;
(allow any or all points in any equivalent wording, or showing deeper understanding of
molecular motion) [2]

(c) convection ; [1]

(d) (i) volt ; [1]

(ii) $220/5 = 44$;
ohm/ Ω ; [2]

(e) (i) short circuit (accept other reasonable ideas which might lead to fuse melting) ; [1]

(ii) 10A (no mark)
2A and 5A fuses would blow ;
15A fuse gives less protection than 10A fuse ; [2]

[Total 11]

Page 5	Mark Scheme	Syllabus	Paper
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- 5 (a) (i) geotropism ; [1]
- (ii) makes sure roots grow downwards/does not matter which way up the seed is planted (the roots will always grow downwards) ;
to anchor plant ;
to absorb mineral ions/water/nutrients ; [max 2]
- (iii) radicle curves round 180° ; [1]
- (b) (i) no sex cells/no gametes involved/only one parent ; [1]
- (ii) seeds have resulted from fusion of gametes/sex cells/haploid nuclei/
involve two parents ; [1]
- (iii) plants from runners will be identical and from seeds will show variation ;
ref. to genetically ; [2]
- [Total 8]**
- 6 (a) flame ;
explosion/pop ; [2]
- (b) (i) (measurement of) mass ;
(measurement of) time ; [2]
- (ii) repeat at different temperatures under same conditions ; [1]
- (iii) increase in temperature causes increase in rate of reaction ; [1]
- (c) (i) Period 4/transition elements/metals/series ; [1]
- (ii) no reaction/no change in mass ;
copper less reactive than hydrogen/below hydrogen in reactivity series ; [2]
- [Total 9]**

Page 6	Mark Scheme	Syllabus	Paper
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7 (a) (i) visible light ;
radio waves and ultra-violet (both required for mark) ; [2]

(ii) reflection ; [1]

(b) (i) number of vibrations/cycles/oscillations per unit time (accept per second) ; [1]

(ii)

gamma radiation	X ;				microwaves	
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[1]

(c) brighter ; [1]

[Total 6]

8 (a) (i) as the length increased, the time taken (for the acid to reach the centre) increased ;
increase is not linear/not proportional ; [2]

(ii) 6.5 minutes (allow 0.5 minutes tolerance) ;
20 minutes (allow 0.5 minutes tolerance) ; [2]

(iii) time taken for oxygen/food to reach all the parts/middle of
the cell would be (too) long ; [1]

(b) large surface area/thin/biconcave disc ; [1]

[Total 6]

Page 7	Mark Scheme	Syllabus	Paper
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- 9 (a) (i) anode ;
cathode ;
(in that order) [2]
- (ii) copper ;
pink/brown deposit ; [2]
- (iii) chlorine ;
bleaching of litmus paper ;
ignore reference to red or pink colouration [2]
- (b) compound
mixture
element
element
compound
5 or 4 correct for 2 marks, 3 or 2 correct for 1 mark ;; [max 2]
- (c) (i) an element consists of one type of atom and a compound contains different
atoms/elements (bonded together) ; [1]
- (ii) the composition of a mixture is variable and a compound contains a fixed proportion of
elements ;
a compound contains atoms/elements bonded together/which are difficult to separate
and a mixture is easier to separate ; [max 1]

[Total: 10]