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

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

CAMBRIDGE
International Examinations

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 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)

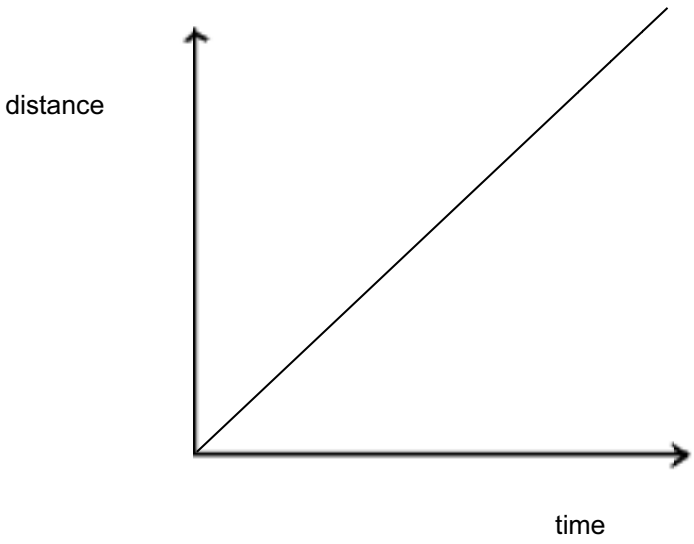
(c) painting/oil/plating/more reactive metal ;
exclusion of water/oxygen/air ; [2]

[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]

(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]

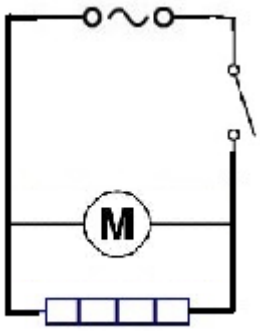
(c) small pieces make the food easier to swallow ;
increases surface area of food ;
speeds up enzyme action/gives better access to enzymes/
ref. to faster/more efficient digestion ; [max 2]

(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]

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]

5 **(a)** **(i)** geotropism ; [1]

(ii) makes sure <u>roots</u> 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]

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	

[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]

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]