

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0653 COMBINED SCIENCE

0653/23

Paper 2 (Core Theory), maximum raw mark 80

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- 1 (a) bronchus correctly labelled ;
trachea correctly labelled ;
larynx correctly labelled ; [3]
- (b) smaller airway diameter ;
presence of mucus obstructing flow ; [2]
- (c) (i) $(12.5 - 5.8) = 6.7$ (dm³/min) ;
 $(\frac{6.7}{5.8} \times 100) = 115$ or 116(%) ; [2]
- (ii) breathe more quickly ;
take deeper/bigger breaths ; [2]
- [Total: 9]
- 2 (a) decreases **and** endothermic ; [1]
- (b) hydrogen ; [1]
- (c) rate of reaction increases/bubbles produced more rapidly/greater temperature change/increases rate of temperature change/reaction will finish faster ; [max 1]
- (d) copper below hydrogen in the reactivity series ;
copper will not displace hydrogen from acid/will not react ;
no temperature change ;
copper is less reactive than magnesium ; [max 2]
- [Total: 5]
- 3 (a) (i) weight/gravitational force ; [1]
- (ii) newton ; [1]
- (b) potential (energy) → kinetic (energy) ;
kinetic (energy) → potential (energy) ; [2]
- (c) **A to B** accelerating ;
B to C constant speed ; [2]
- (d) (distance =) speed × time 9×2 ;
= 18 (m) ; [2]
- [Total: 8]

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- 4 (a) (i) contains the correct proportions of nutrients for an individual ; [1]
- (ii) to prevent scurvy / AVP ; [1]
- (iii) (vitamin C) is a small molecule / only large molecules need to be digested;
can be absorbed without being broken down ;
(vitamin C) must be soluble ; [max 2]
- (b) (i) orange and kiwifruit ;
(because) **both** have average portion values greater than 60 mg ;
OR
orange **AND** has average portion value 70 g / greater than 60 mg ;
kiwifruit **AND** has average portion value 74 g / greater than 60 mg ; [max 2]
- (ii) $\frac{60}{28}$;
 $\times 100 = 214.3(g)$; [2]
- (c) (i) acid would attack / destroy the enamel ; [1]
- (ii) regularly clean teeth / use mouth wash ; [1]

[Total: 10]

5 (a)



all 4 correct for 2 marks, 3 or 2 correct for 1 mark

[2]

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(b)



[1]

(c)

<i>observation</i>	<i>explanation</i>
<i>(bubbles of gas)</i>	hydrogen ;
<i>(indicator changes from green to purple)</i>	alkaline solution ;

[2]

(d) (i)

<i>substance</i>	<i>diagram</i>
<i>(chlorine)</i>	A
<i>(sodium)</i>	B
<i>(sodium chloride)</i>	C

;;

all 3 correct for 2 marks, 2 or 1 correct for 1 mark

[2]

(ii) sodium atoms lose electrons ;
chlorine atoms gain electrons ;
electrons are transferred from sodium to chlorine ;

[max 2]

(iii) opposite charges (attract) ;

[1]

(iv) (ZnCl_2) symbols ;
numbers ;

[2]

[Total: 12]

6 (a) (i) (speed =) $\frac{30}{10} = 3$ (m/s) ;

[1]

(ii) (frequency = $\frac{10}{20}$) = 0.5 ;

Hz/hertz ;

[2]

(b) (distance moved = $2 \times$ amplitude) = 1.0 (m) ;

[1]

(c) **R** in right hand end box ;

[1]

(d) no CO_2 emissions/wave energy comes for free/renewable/AVP ;

[max 1]

[Total: 6]

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- 7 (a) (i) reduces soil erosion ;
roots of trees stabilise soil ; [2]
- (ii) provides habitats ;
 provides shelter / protection from sun / rain / predators ;
 maintains food supply ; [max 2]
- (b) (i) bacteria / microbes use it ;
 for respiration ; [2]
- (ii) (sewage) blocks / reduces light ;
 light is needed for photosynthesis ; [2]
- [Total: 8]**

- 8 (a) (i)

copper carbonate	+	hydrochloric acid	⇒	copper chloride	+	carbon dioxide	+	water
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 water in product row ;
 rest of equation correct ; [2]
- (ii) limewater ;
 milky / cloudy ; [2]
- (b) (i) (*cathode*) copper ;
 chlorine ; [2]
- (ii) an ionic compound ;
 an element ;
 a covalent compound ; [3]
- [Total: 9]**

- 9 (a) (thermal) expansion ; [1]
- (b) (i) conduction ; [1]
- (ii) convection ; [1]
- (c) (i) evaporation ; [1]
- (ii) molecules gain more energy on heating ;
 molecules with enough / high / higher energy escape ; [2]
- [Total: 6]**

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10 (a) (i) (charging by) friction / rubbing with cloth / AVP ; [1]

(b) plastic is an insulator ;
so charge wouldn't leak away ;
OR
metal is conductor ;
so charge would leak away / earthed by student ; [2]

(c) (i) flow of charge ; [1]

(ii) workable circuit with additional heater in series / parallel and at least one switch
and no short circuit ;
two heaters in parallel ;
both switches on parallel branches ; [3]

[Total: 7]