

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0653 COMBINED SCIENCE

0653/22

Paper 2 (Core Theory), maximum raw mark 80

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1 (a) copper oxide (loses oxygen so) is reduced / copper ions gain electrons ;
carbon (gains oxygen so) is oxidised ; [2]

(b) (i) electrodes correctly labelled anode and cathode ;
electrolyte labelled ; [2]

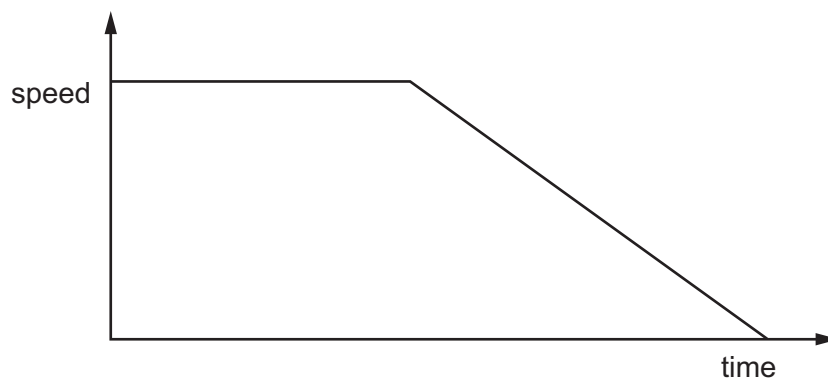
(ii) at the positive electrode bromine and at the negative electrode lead ;
lead appears as a, grey / metallic, deposit / bead of molten metal ;
bromine, is a brown gas / causes a brown colouration of electrolyte ; [3]

[Total: 7]

2 (a) (i) speed = distance/time / (time =)distance / speed ;
 $200/40 = 5$ (s) ; [2]

(ii) $40 \text{ m/s} = 40 \times 60 \times 60 \text{ m/h} (= 144\,000 \text{ m/h})$;
 $40 \times 60 \times 60 \text{ m/h} = 40 \times 60 \times 60 / 1000 \text{ km/h} = 144 \text{ (km/h)}$; [2]

(b)



horizontal straight line ;
followed by descending line, straight or curved, to meet time axis ; [2]

(c) (i) (400 N – no mark)
for constant speed, forces must be equal and opposite (owtte) ; [1]

(ii) chemical energy in the rider ;
heat/thermal energy during braking ;
allow sound [2]

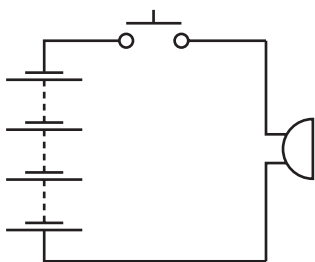
[Total: 9]

Page 3	Mark Scheme	Syllabus	Paper
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- 3 (a) **A** trachea ;
B bronchiole ; [2]
- (b) breathing rate increase ;
volume / depth (of breathing) increased ; [2]
- (c) (i) more carbon dioxide in exhaled air / less carbon dioxide in inhaled air ; [1]
- (ii) (after exercise) exhaled air contains more carbon dioxide / ora ;
use of numbers from data (e.g. exhaled air contains about four times
as much carbon dioxide) ; [2]
- (iii) no carbon dioxide present ;
not enough carbon dioxide in air to show a result ; [2]

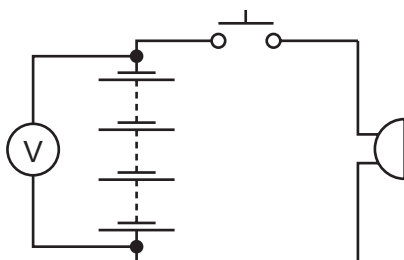
[Total: 9]

- 4 (a) (i)



- complete series circuit ;
battery of 4 cells connected correctly ; [2]

- (ii)



- symbol with correct connections (both required) [1]

- (b) (i) number of vibrations / waves per unit time ; [1]
- (ii) amplitude increased ;
frequency unchanged ; [2]

Page 4	Mark Scheme	Syllabus	Paper
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(c) (i) resistance = $6 / 2 = 3$;
(units) ohms / Ω ; [2]

(ii) current increased / doubled ;
in parallel circuits, the current from the source is larger than the current in each branch /
(owtte) ;
resistance is lower ; [max 2]

[Total: 10]

5 (a) (i)

	in nucleus	outside nucleus
number of protons	6	0
number of neutrons	6	0
number of electrons	0	6

column correct ; column correct ; [2]

(ii) equal numbers of protons and electrons ;
equal numbers of positive and negative charges ;
protons are positive and electrons are negative ; [max 2]

(b) (i) natural gas / petroleum / refinery gas / rice fields / from biodegradation / digestive
activity of ruminants ; [1]

(ii) methane + oxygen \rightarrow carbon dioxide + water
LHS ; RHS ; [2]

(c) (i) CH_4 ; [1]

(ii) covalent ; [1]

(iii) 2 ; [1]

[Total: 10]

Page 5	Mark Scheme	Syllabus	Paper
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- 6 (a) infra-red ; [1]
- (b) molecules have more energy so more of them are moving faster (owtte) ;
more molecules have enough KE / moving fast enough to escape (from surface) ; [2]
- (c) need a medium for conduction & convection / no medium in space (owtte) ; [1]

(d)

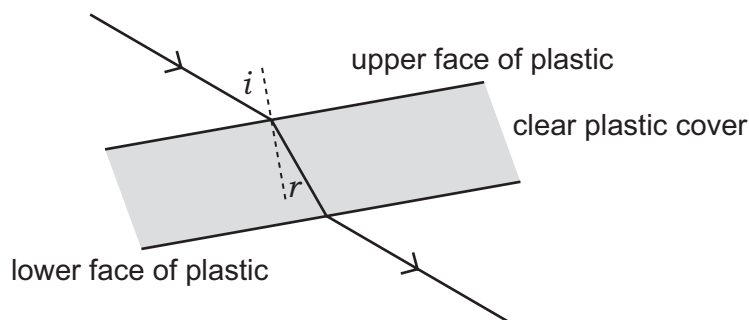


Fig 2.2

- refracted ray in plastic bent towards normal ;
normal drawn at upper face with angles of incidence and refraction correctly marked ;
emergent ray parallel to incident ray ; [3]

[Total: 7]

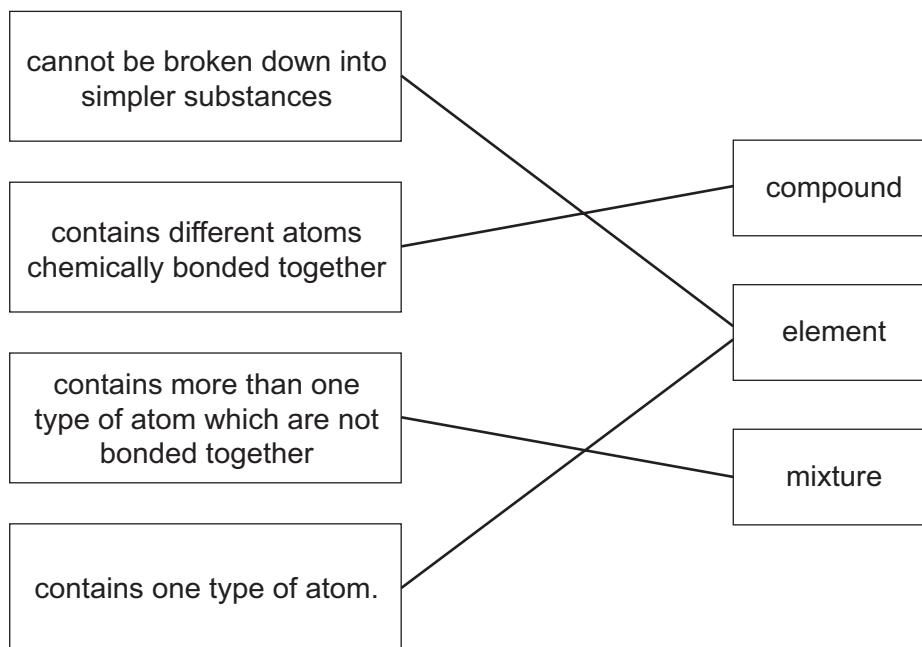
- 7 (a) (i) phototropism ; [1]
- (ii) more / better absorption of light ;
more / better photosynthesis ;
any statement about light hitting leaves at right angles / not at an angle ; [max 2]
- (iii) sensitivity ;
movement ;
growth ; [max 2]
- (b) (i) shoot X bends towards the light / responds ;
shoots Y and Z do not ; [2]
- (ii) the tip of the shoot detects the light / controls the response ;
because no response occurs when tip is covered/removed ; [2]
- (c) gives more glucose into blood ;
increases pulse rate ;
makes more energy available from respiration / speeds up metabolism ; [max 2]

[Total: 11]

Page 6	Mark Scheme	Syllabus	Paper
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- 8 (a) workable filtration equipment ;
collection of filtrate ;
evaporation ; [3]

(b)



[4]

- (c) (i) aluminium (atoms) lose electrons ;
sulfur (atoms) gain electrons ;
electrons are transferred from aluminium to sulfur (atoms) ;; [max 2]

- (ii) Al_2S_3 ; [1]

[Total: 10]

- 9 (a) (i) cervix correctly labelled ;
vagina correctly labelled ; [2]

- (ii) ovary correctly labelled ; [1]

- (b) (i) oviduct / fallopian tube ; [1]

- (ii) uterus ;
(embedded) in lining ; [2]

- (c) sharing needles / blood transfusions / avp ; [1]

[Total: 7]