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

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)** 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]

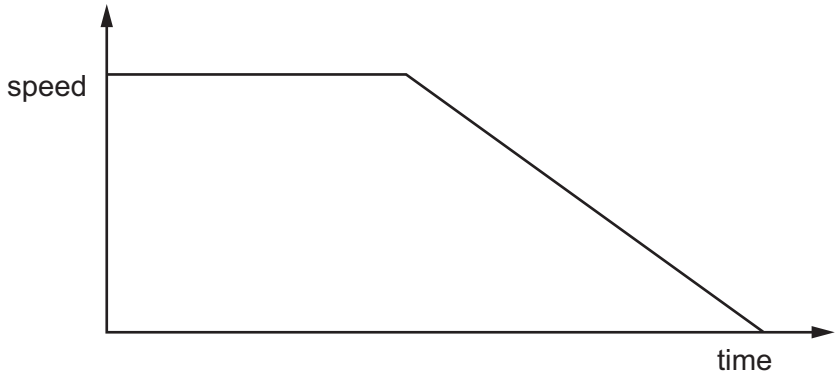
(ii) at the positive electrode bromine and at the negative electrode lead ;
lead appears as a, grey / metallic, deposit / bead of molten metal ;
bromine, is a brown gas / causes a brown colouration of electrolyte ; [3]

[Total: 7]

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

(ii) 40 m/s = 40 × 60 × 60 m/h (= 144 000 m/h) ;
40 × 60 × 60 m/h = 40 × 60 × 60 /1000 km/h = 144 (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 ; [2]
allow sound

[Total: 9]

3 **(a)** **A** trachea ;
B bronchiole ; [2]

(b) breathing rate increase ;
volume / depth (of breathing) increased ; [2]

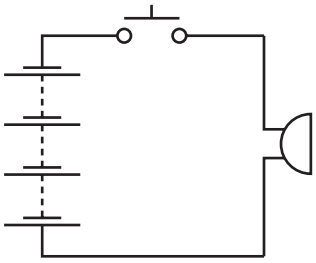
(c) **(i)** more carbon dioxide in exhaled air / less carbon dioxide in inhaled air ; [1]

(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]

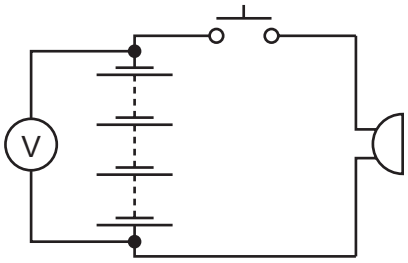
[Total: 9]

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]

(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 → carbon dioxide + water
LHS ; RHS ; [2]

(c) (i) CH_4 ; [1]

(ii) covalent ; [1]

(iii) 2 ; [1]

[Total: 10]

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)

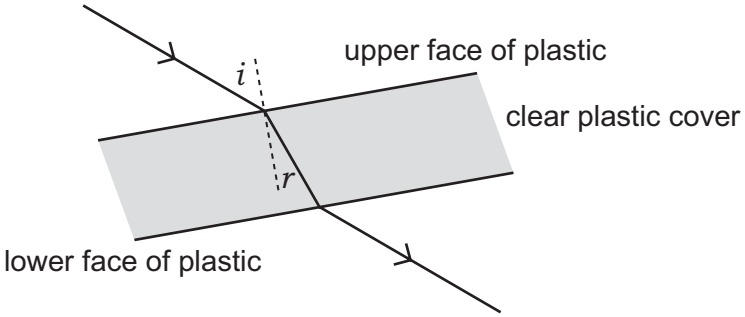


Fig 2.2

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]

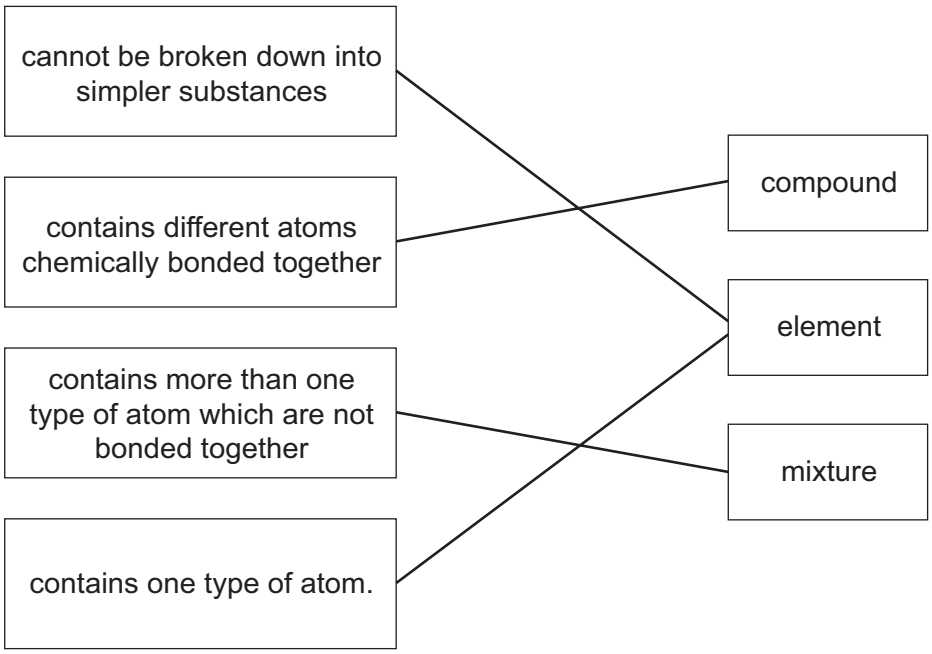
(ii) the tip of the shoot detects the light / controls the response ;
because no response occurs when tip is covered/removed ; [2]

(c) gives more glucose into blood ;
increases pulse rate ;
makes more energy available from respiration / speeds up metabolism ; [max 2]

[Total: 11]

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]