



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/22

Paper 2 Core Theory

May/June 2016

MARK SCHEME

Maximum Mark: 80

Published

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 May/June 2016 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0653	22

1 (a)

function	name of organ(s)
ingestion	mouth ;
absorption of digested food	small intestine ;
secrete digestive enzymes	salivary glands ; small intestine ; pancreas ; max 2

[4]

(b) plasma ;

[1]

(c) diffusion ;
from high concentration to low concentration ;

[2]

(d) (i) pH 2.7 allow 0.1 pH tolerance ;

[1]

(ii) activity would disappear ;
graph shows no activity above pH 4.5 ;

[2]

2 (a) (i) electrolysis ;

[1]

(ii) name: bromine ;
colour: brown/orange-brown ;

[2]

(b) copper chloride → copper + chlorine ;

[1]

(c) (i) increase ;

[1]

(ii) electron ; proton ; neutron ;

[3]

(iii) no. protons + no. neutrons / number of particles in the nucleus ;

[1]

3 (a) weight / gravitational (force) ; *accept* gravity

[1]

(b) (i) *Either* it does not affect the speed (*no mark*)
weight / force / gravity acts downwards ;
or it decreases the speed of the cart (*no mark*)
due to friction / frictional forces ;

[1]

(ii) (average) speed = distance / time (or rearranged) ;
time = (distance / speed) = 20 / 8 = 2.5 (s)

[2]

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0653	22

- (iii) horizontal straight line for constant speed /
slightly sloping line for decreasing speed ;
smooth sloping line (straight or curved) down to speed = 0 ; [2]
- (c) (from) potential (energy)/gravitational potential (energy) ;
(to) thermal /heat (energy) ; [2]
- 4 (a) cell membrane ;
ions ;
xylem ;
transpiration ; [4]
- (b) idea of:
root hair cells are very delicate / fine / are easily damaged (by soil) / owtte ; [1]
- (c) (i) carbon dioxide + water ;
(→) sugar / glucose + oxygen ; [2]
- (ii) light ;
supply of carbon dioxide ;
chlorophyll / chloroplasts ;
(suitable temperature) ; [max 2]
- 5 (a) (i) fractional distillation ; [1]
- (ii) (compound / molecule) containing hydrogen and carbon ;
only ; [2]
- (b) (i) methane ; [1]
- (ii) oxygen ; [1]
- (c) (i) C₂H₅ correct ;
–O–H correct ; [2]
- (ii) carbon dioxide ;
water / steam / water vapour ; [2]
- 6 (a) thermal expansion (of sea water) ; owtte [1]
- (b) (i) evaporation ; [1]
- (ii) no effect ;
decrease / cool ; [2]

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0653	22

(c) (i) radiation ; [1]

(ii)

gamma rays	X-rays		(visible) light	infrared		radio waves
------------	--------	--	-----------------	-----------------	--	-------------

1. infrared ; – **must** be circled
 2. (visible) light ; – **must not** be circled
- infrared in correct space ;
light in correct space ;

[4]

7 (a) (i)

organism	producer	consumer	herbivore	carnivore
buzzard		✓		✓
grass	✓			
snail		✓	✓	
thrush		✓		✓

one mark for each correct line ;;;

[3]

(ii) grass → snail → thrush → buzzard
organisms in correct order ;
arrows in correct direction ;

[2]

(b) (i) keeping cattle / growing rice / leaving rubbish in dumps / avp ;

[1]

(ii) it is a greenhouse gas / traps heat / infra-red radiation ;
it contributes to global warming ;

[2]

8 (a) (i) (most reactive) calcium
zinc
iron
copper ;

[1]

(ii) bubbles of gas / fizzing / effervescence / dissolving ;

[1]

(b) (test) aqueous sodium hydroxide / aqueous ammonia ;
(iron(II) ions) (gelatinous) green precipitate / green solid ;
(iron(III) ions) brown precipitate / brown solid ;

[3]

(c) (i) exothermic ;

[1]

(ii) 1+ / +1 / Na⁺ / Na¹⁺ ;

[1]

(iii) (sodium atom) loses one / an electron ;

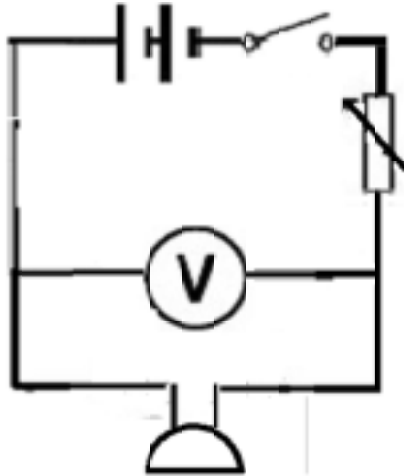
[1]

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2016	0653	22

9 (a) (i) resistor ; *accept* variable resistance / rheostat [1]

(ii) changes / varies current ;
changes / p.d. across the buzzer ; *owtte*
changes the resistance in the main circuit ; [max 2]

(iii)



ammeter symbol;
ammeter in series with buzzer (any correct point in circuit, *reject* if in the
voltmeter branch) ;
all else correct (ignore tiny gaps in wiring) ; [3]

(b) use of correct reading off graph at $6\text{ V} > 0.015\text{ A}$;
resistance at $6\text{ V} = 6 / 0.015 = 400\ (\Omega)$; [2]

(c) frequency unchanged / remains the same ;
amplitude increases ; [2]