



COMBINED SCIENCE

0653/31

Paper 3 Core Theory

October/November 2017

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 International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2017 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

© IGCSE is a registered trademark.

This document consists of **7** printed pages.

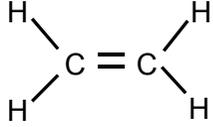
Question	Answer	Marks
1(a)	red blood cells ; pulmonary vein ; aorta ; capillaries ;	4
1(b)(i)	activity is affected by the adrenaline ;	1
1(b)(ii)	(destroyed) by the liver ;	1
1(c)	A trachea ; B bronchiole ;	2
1(d)	becomes faster ; becomes deeper ;	2

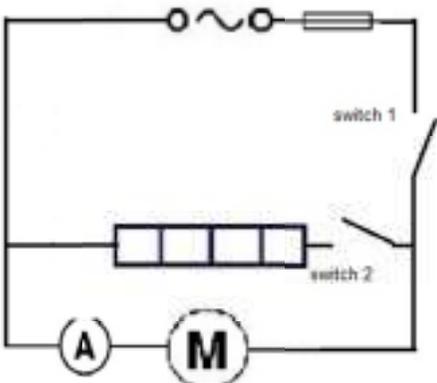
Question	Answer	Marks
2(a)(i)	(negative) cathode and (positive) anode ;	1
2(a)(ii)	(negative) lead ; (positive) bromine / Br ₂ ;	2
2(a)(iii)	ionic / electrovalent ;	1
2(a)(iv)	new substance(s) made ;	1
2(b)(i)	hydrochloric (acid) / HCl ;	1
2(b)(ii)	Increases ;	1
2(b)(iii)	(test) (acidified) silver nitrate ; (observation) white precipitate / solid ;	2

Question	Answer	Marks
3(a)(i)	80 waves / cycles / vibrations / oscillations per second ;	1
3(a)(ii)	first note louder than second note ;	1
3(a)(iii)	yes (no mark) frequency range of guitar lies within frequency range of normal human hearing / is within range 20 Hz – 20 kHz ;	1
3(b)	electromagnetic waves ;	1
3(c)(i)	any two from upright ; virtual ; same size ;	max 2
3(c)(ii)	45° ;	1
3(d)(i)	answer in range 80–84 N ;	1
3(d)(ii)	string breaks (as graph goes up vertically) / permanently stretches / <i>owtte</i> ;	1

Question	Answer	Marks
4(a)	Any two from (large) petals ; anther(s) / are inside the flower ; stigma / is inside the flower ;	max 2
4(b)	(flower) D AND any two from anther is higher than stigma ; anther produces pollen ; pollen is more likely to fall on it ;	max 2
4(c)	sexual reproduction ; from different parents / different genetic material ; (seeds contain) some (genetic material) from each parent ;	max 2

Question	Answer	Marks
4(d)(i)	primroses → snails → thrushes → buzzards correct order ; correct arrows ;	2
4(d)(ii)	snails, thrushes, buzzards ; (get their energy by) feeding on other organisms ;	2

Question	Answer	Marks
5(a)(i)	molecule / compound of carbon and hydrogen / C and H bonded ; only (C&H) ;	2
5(a)(ii)	C=C double bond ; 4 correct C–H bonds ; 	2
5(a)(iii)	carbon dioxide / CO ₂ ; water / H ₂ O ;	2
5(b)(i)	coal ; petroleum ;	2
5(b)(ii)	methane ;	1

Question	Answer	Marks
6(a)(i)	fuse ;	1
6(a)(ii)	to protect fan heater from overload / current too high ;	1
6(a)(iii)	(both) switch 1 and switch 2 ;	1
6(b)(i)	 <p>correct symbol for ammeter ; ammeter in fan motor branch, all circuit connections complete ;</p>	2
6(b)(ii)	$R = V / I$ or $= 240 / 0.2$; $(=) 1200$; ohm(s) / Ω ;	3

Question	Answer	Marks
7(a)	carbon dioxide + water ; → sugar / glucose ;	2
7(b)(i)	any time between 10.00 and 13.00 ; maximum rate of oxygen production / gradient of graph is steep(est) ;	2

Question	Answer	Marks
7(b)(ii)	letter X drawn at 14.00 anywhere below line graph ; (rate of) photosynthesis (oxygen production) dependent on (amount of) light ;	2
7(c)	reduces / causes less / prevents transpiration ;	1

Question	Answer	Marks
8(a)(i)	paint(ing) / oil(ing) / grease / plastic coat / AVP ;	1
8(a)(ii)	oxygen ;	1
8(a)(iii)	add salt / catalyst / increase temperature / heat ;	1
8(b)(i)	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px;">(calcium)</div> <div>+</div> <div style="border: 1px solid black; padding: 5px;">water</div> <div>→</div> <div style="border: 1px solid black; padding: 5px;">calcium hydroxide</div> <div>+</div> <div style="border: 1px solid black; padding: 5px;">Hydrogen</div> <div>;</div> </div>	1
8(b)(ii)	exothermic ;	1
8(b)(iii)	(calcium is) less reactive / sodium is more reactive ;	1
8(c)(i)	transition (metals / elements) ;	1
8(c)(ii)	(copper alloys are) harder / more resistant to wear ;	1

Question	Answer	Marks
9(a)(i)	friction / frictional force / resistance force ;	1
9(a)(ii)	equal (magnitude) ; opposite (direction) ;	2
9(b)	light ; electrical ;	2

Question	Answer	Marks
9(c)(i)	gap will close : (thermal) expansion (of bridge structure) <i>owtte</i> ;	2
9(c)(ii)	evaporates ; faster ;	2
9(c)(iii)	line drawn between the two bottom boxes ;	1