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**COMBINED SCIENCE**

**0653/31**

Paper 3 Core Theory

**October/November 2017**

MARK SCHEME

Maximum Mark: 80

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**Published**

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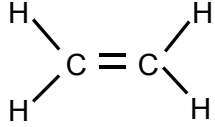
Question	Answer	Marks
1(a)	red blood cells ; pulmonary vein ; aorta ; capillaries ;	4
1(b)(i)	activity is affected by the adrenaline ;	1
1(b)(ii)	(destroyed) by the liver ;	1
1(c)	<b>A</b> trachea ; <b>B</b> bronchiole ;	2
1(d)	becomes faster ; becomes deeper ;	2

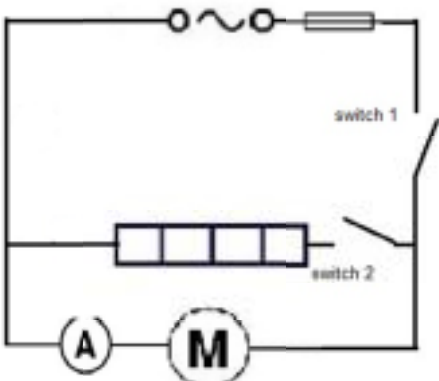
Question	Answer	Marks
2(a)(i)	(negative) cathode <b>and</b> (positive) anode ;	1
2(a)(ii)	(negative) lead ; (positive) bromine / Br <sub>2</sub> ;	2
2(a)(iii)	ionic / electrovalent ;	1
2(a)(iv)	new substance(s) made ;	1
2(b)(i)	hydrochloric (acid) / HCl ;	1
2(b)(ii)	Increases ;	1
2(b)(iii)	(test) (acidified) 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) <b>D</b> 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 <sub>2</sub> ; water / H <sub>2</sub> 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) / $\Omega$ ;	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 <b>X</b> 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

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