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**COMBINED SCIENCE**

**0653/32**

Paper 3 Core Theory

**March 2019**

MARK SCHEME

Maximum Mark: 80

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**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 March 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **9** printed pages.

**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks																				
1(a)(i)	(E) vacuole ; (F) cytoplasm ;	2																				
1(a)(ii)	starch grains irregular shapes / sizes and chlorophyll all the same shapes / sizes ;	1																				
1(a)(iii)	add iodine solution ; goes blue-black ;	2																				
1(b)(i)	glucose ;	1																				
1(b)(ii)	produces small molecules ; that can be absorbed ;	2																				
1(c)	one mark for each correct line  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>organism</th> <th>carnivore</th> <th>consumer</th> <th>herbivore</th> <th>producer</th> </tr> </thead> <tbody> <tr> <td>lettuce</td> <td></td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>snail</td> <td></td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>hedgehog</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table> <div style="text-align: right;">; ; ;</div>	organism	carnivore	consumer	herbivore	producer	lettuce				✓	snail		✓	✓		hedgehog	✓	✓			3
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lettuce				✓																		
snail		✓	✓																			
hedgehog	✓	✓																				

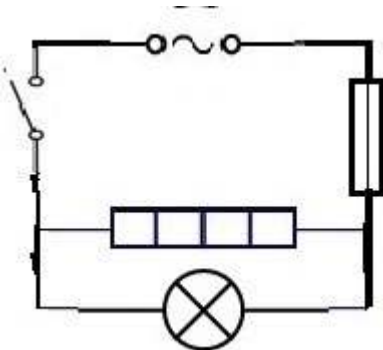
Question	Answer	Marks
2(a)(i)	coal / natural gas ;	1
2(a)(ii)	<u>fractional distillation</u> ;	1
2(a)(iii)	feedstock / for making chemicals ;	1
2(b)(i)	alkane(s) ;	1

Question	Answer	Marks
2(b)(ii)	(compound X) no change ; (compound Y) brown / orange (to) ; colourless / decolourises ;	3

Question	Answer	Marks
3(a)	X at any point on graph from t = 0 to t = 2 ;	1
3(b)(i)	4 (s) ;	1
3(b)(ii)	accelerating / changing speed / increasing speed ; (moving) downwards ;	2
3(c)	$(0.62 \times 10) = 6.2$ (N) ;	1
3(d)	chemical : gravitational potential ;	2

Question	Answer	Marks
4(a)(i)	(one-way) valve ; prevents back flow of blood / ensures blood flows in one direction ;	2
4(a)(ii)	vena cava ;	1
4(b)(i)	oxygen is picked up at the lungs ;	1
4(b)(ii)	in red blood cells ; by haemoglobin ;	2
4(c)(i)	adrenaline is released ;	1
4(c)(ii)	when exercising ;	1

Question	Answer	Marks
5(a)(i)	(electrons) 11 <b>AND</b> (protons) 11 ; (neutrons) 12 ;	2
5(a)(ii)	2, 8 ;	1
5(b)	electrolyte ; anode ; cathode ; chlorine (gas) ; hydrogen (gas) ;	5
5(c)(i)	uses a thermometer to measure temperature (before and after) ; temperature should show an increase / idea that heat is given out ;	2
5(c)(ii)	(effect) (turns) blue ; (explanation) (forms) (sodium) hydroxide / alkaline (solution) ;	2

Question	Answer	Marks
6(a)(i)	 <p>correct symbols ; fuse in series ; lamp in parallel ;</p>	3
6(a)(ii)	10 A ;	1

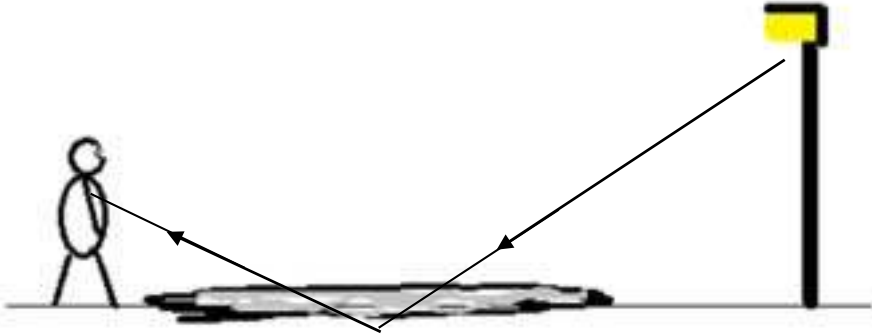
Question	Answer	Marks
6(b)(i)	conduction ;	1
6(b)(ii)	convection ;	1
6(c)	faster moving molecules / molecules with greater kinetic energy ; escape surface / leave the liquid / reference to evaporation ;	2
6(d)	gap closes (again) ; wooden floor / wood expands on heating ;	2

Question	Answer	Marks
7(a)(i)	<b>A</b> petal ; <b>B</b> sepal ;	2
7(a)(ii)	arrow drawn from anther ; to stigma ;	2
7(a)(iii)	in the <u>ovule</u> ;	1
7(b)	<b>E</b> no germination – no mark too cold (for germination) ; <b>F</b> yes germination happens – no mark has all the conditions needed for germination owtte / light not needed for germination ;	2
7(c)	light is coming from one side / from the right / seedlings grow towards the light / seedlings are showing photo tropic response ;	1

Question	Answer	Marks
8(a)(i)	(element) contains only one type of atom / found in the Periodic Table ; (compound) consists of two or more / more than one element / type of atom ;	2
8(a)(ii)	one pair of responses from  carbon monoxide ; poisonous gas / affects oxygen transport / respiration ;  sulfur dioxide ; forms acid rain / effect of acid rain described / problems with breathing ;  oxides of nitrogen ; forms acid rain / smog can cause breathing problems ;  methane ; contribution to global warming ;  increase of / excess of carbon dioxide ; contributes to global warming ;	2
8(b)(i)	oxygen / O <sub>2</sub> ; water (vapour) / H <sub>2</sub> O ; either order	2
8(b)(ii)	increase temperature / acidic gases present ;	1

Question	Answer	Marks
9(a)	$R = V/I = 240 / 0.5 ;$ $= 480 ;$ ohms / $\Omega ;$	3
9(b)	parallel ; if in series, all lamps would have gone out / lamp not working means a break in circuit / if in parallel there is still a complete circuit if one lamp goes out ;	2



Question	Answer	Marks
9(c)(i)	distance between two successive crests / troughs ;	<b>1</b>
9(c)(ii)	greater than ; the same as ;	<b>2</b>
9(d)	incident ray and reflected ray both drawn with arrows ; angle of incidence and angle of reflection equal, judged by eye ; 	<b>2</b>