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**COMBINED SCIENCE****0653/32**

Paper 3 Core Theory

**October/November 2018**

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 October/November 2018 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 **10** printed pages.

**PUBLISHED****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)	<p>1 mark for each correct diagram / name / function ;;;;</p>	<b>4</b>
1(b)	diameter of red blood cell = 21 mm ; magnification = $21 / 0.007 = 3000$ (times) ;	<b>2</b>
1(c)	amino acid ; carbon dioxide ; platelets ;  All 3 correct = 2 2 or 1 correct = 1	<b>2</b>

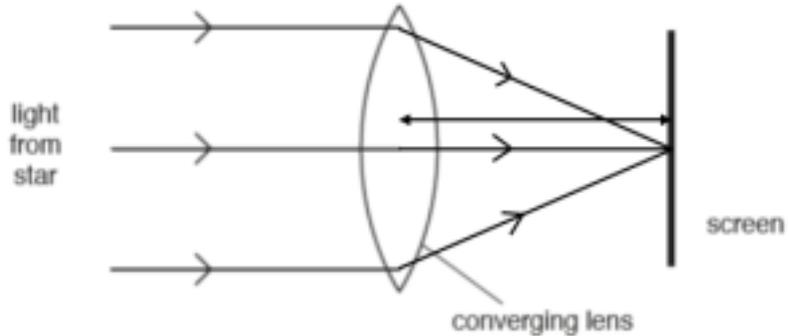
Question	Answer	Marks
1(d)(i)	breaks down ; large / insoluble <u>molecules</u> ; into small / soluble molecules ; that can be absorbed ; <b>Max 3</b>	<b>3</b>
1(d)(ii)	salivary glands / stomach / pancreas / ileum / small intestine ;	<b>1</b>

Question	Answer	Marks
2(a)(i)	(process <b>A</b> ) filtration / filtering / filter ; (process <b>B</b> ) evaporation ;	<b>2</b>
2(a)(ii)	decreases ;	<b>1</b>
2(a)(iii)	increases ;	<b>1</b>
2(a)(iv)	exothermic ;	<b>1</b>
2(b)(i)	<div style="text-align: center;"> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 5px;">(copper carbonate)</div> <span style="margin: 0 10px;">+</span> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 5px;">sulfuric acid</div> <span style="margin: 0 10px;">→</span> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 5px;">copper sulfate</div> <span style="margin: 0 10px;">+</span> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 5px;">carbon dioxide</div> <span style="margin: 0 10px;">+</span> <div style="display: inline-block; border: 1px solid black; padding: 5px; margin: 5px;">water</div> </div> <p>sulfuric acid LHS AND copper sulfate RHS ; carbon dioxide AND water RHS ;</p>	<b>2</b>
2(b)(ii)	(test) (add) aqueous sodium hydroxide OR aqueous ammonia ; (observations) (light) blue precipitate OR blue ppt (then deep blue solution) ;	<b>2</b>
2(b)(iii)	high density / high melting point / (element or compound) act as catalysts ;	<b>1</b>

Question	Answer	Marks
3(a)(i)	Z	1
3(a)(ii)	2000 N ; constant speed / no acceleration, (so forces must balance) ;	2
3(b)(i)	C on any point on graph line between 0 and 20 s, or between 50 and 60 s ;	1
3(b)(ii)	(average) speed = (total) distance / (total) time ; = 200 / 60 = 3.3(3) (m / s) ;	2
3(c)(i)	chemical ; kinetic ;	2
3(c)(ii)	the Sun ;	1
3(c)(iii)	converted / transformed into thermal energy ;	1

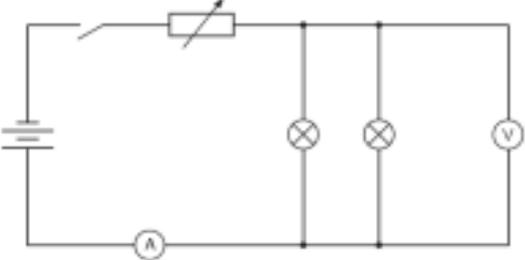
Question	Answer	Marks
4(a)	no reaction ; the increased temperature / boiling has removed enzyme activity ;	2
4(b)(i)	the water / river is polluted ; contains bacteria / viruses / microbes / pathogens ; that cause disease ; <b>Max 2</b>	2
4(b)(ii)	animals / fish will die / move away ; due to suffocation / less oxygen for respiration ;	2

Question	Answer	Marks																			
5(a)(i)	petroleum ;	<b>1</b>																			
5(a)(ii)	methane ;	<b>1</b>																			
5(b)(i)	unreactive / (only) burn / combust ;	<b>1</b>																			
5(b)(ii)	C – C single bond ; All else correct ;	<b>2</b>																			
5(c)(i)	number of protons (in an atom / nucleus) ;	<b>1</b>																			
5(c)(ii)	<table border="1"> <thead> <tr> <th rowspan="2">particle</th> <th colspan="3">property</th> </tr> <tr> <th>position in atom</th> <th>relative charge</th> <th>relative mass</th> </tr> </thead> <tbody> <tr> <td>electron</td> <td>surrounding nucleus</td> <td>(-1)</td> <td>negligible</td> </tr> <tr> <td>neutron</td> <td>(nucleus)</td> <td>0</td> <td>1</td> </tr> <tr> <td>proton</td> <td>nucleus</td> <td>+1</td> <td>(1)</td> </tr> </tbody> </table> <p>2 or 3 correct entries = 1 mark 4 or 5 correct entries = 2 marks All correct = 3 marks</p>	particle	property			position in atom	relative charge	relative mass	electron	surrounding nucleus	(-1)	negligible	neutron	(nucleus)	0	1	proton	nucleus	+1	(1)	<b>3</b>
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Question	Answer	Marks
6(a)(i)	able to flow / takes up the shape of container / any appropriate property ;	1
6(a)(ii)	<p><b>(liquid)</b> irregular / random arrangement ; molecules can move around one another ; molecules further apart ;</p> <p><b>(solid)</b> regular / lattice arrangement ; molecules vibrate around fixed positions ; molecules tightly packed / closer together ;</p> <p><b>Max 2</b></p>	2
6(b)	thermometer ;	1
6(c)	ticks in first, second and fourth boxes ; cross in 3rd box ;	2
6(d)(i)	conduction and convection require a medium	1
6(d)(ii)	gamma in left-hand end box ;	1
6(d)(iii)	 <p>all three rays refracted to meet the screen at the same point ;</p>	1
6(d)(iv)	focal length correctly indicated as on above diagram ;	1

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
7(a)(i)	<b>A</b> no mark presence of root hairs ; xylem / phloem / vascular tissue (stele) found in the central area ;	<b>2</b>
7(a)(ii)	one area of xylem correctly shaded in <b>B</b> ;	<b>1</b>
7(b)	mesophyll cells ; higher ; diffuses ; stomata ;	<b>4</b>
7(c)	carbon dioxide ; sugar / glucose + oxygen ;	<b>2</b>

Question	Answer	Marks
8(a)	(prediction) no reaction <b>AND</b> (explanation) lead bromide is solid / needs to be molten / liquid ;	1
8(b)	(name) chlorine ; (effect) bleaches / (turns) white / decolourises ;	2
8(c)	(oxidised) carbon ; (reduced) copper oxide ;	2
8(d)(i)	water (vapour) / noble gas / named noble gas ;	1
8(d)(ii)	oxygen / O <sub>2</sub> AND water (vapour) / H <sub>2</sub> O ;	1

Question	Answer	Marks
9(a)	<u>variable</u> resistor ;	1
9(b)(i)	$R = V / I = 3.0 / 0.40$ ; $= 7.5 (\Omega)$ ;	2
9(b)(ii)	Brightness changes / resistance decreases ;	1
9(c)(i)	 <p>lamp in parallel ;</p>	1
9(c)(ii)	higher (current) reading ; combined resistance of two resistances in parallel is less than either of the two resistances ;	2