Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/52**

Paper 5 Practical Test **May/June 2017**

MARK SCHEME

Maximum Mark: 40

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.

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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

Mark schemes will use these abbreviations

- **;** separates marking points
- / alternatives
- **I** ignore
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- AVP any valid point
- **ecf** credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

Question	Answer	Marks	Guidance
1(a)(i)	table drawn with appropriate lines and number of cells ; column and row headings and appropriate units; three trials for **W** and three for **S** identified (e.g. by number and letter) ; correct trend ;	**4**	 **R** if units are in the body of table
1(a)(ii)	conclusion fits with the candidate's results ;	**1**	
1(a)(iii)	gas / oxygen (produced) is trapped within the leaf space ; density is reduced / becomes lighter / buoyancy increases ;	**1**	
1(a)(iv)	*measured:* time taken for leaf disc to rise ; *changed:* solution ;	**2**	**A** light intensity / distance of lamp from test tubes
1(a)(v)	size of leaf disc / AW ; number of leaf discs ; concentration of sodium hydrogencarbonate (solution) / 2% ; volume / height of, sodium hydrogencarbonate (solution) / liquid / water; plant species; light intensity / distance of the lamp ;	**2**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)(vi)</td><td>
<table>
<tr><th>error ;;</th><th>improvement ;;</th></tr>
<tr><td>measuring height / not measuring volume / imprecise volume of sodium hydrogencarbonate / water</td><td>use same volume (in test-tubes of the same diameter) / measure volume / use a burette / measuring cylinder / graduated pipette</td></tr>
<tr><td>leaf discs different distances from lamp / different light intensity / position of the lamp</td><td>arrange equidistant / AW</td></tr>
<tr><td>determining when disc starts to rise is subjective</td><td>time until leaf disc reaches the surface / or rises to a particular level</td></tr>
<tr><td>leaf disc did not sink</td><td>use a greater number of leaf discs and measure time on only those which sank</td></tr>
<tr><td>timing multiple leaf discs</td><td>stagger timing</td></tr>
<tr><td>heating of test-tubes by lamp</td><td>heat-shield / water-bath / use LED lamp / AW</td></tr>
<tr><td>leaf discs were destroyed</td><td>use fresh leaf discs / have more leaf discs in the sample and measure only those that rise</td></tr>
<tr><td>AVP</td><td>matches AVP</td></tr>
</table>
;;;;</td><td>4</td><td>each improvement must relate to the given error

A test-tube rack blocks light / AW</td></tr>
<tr><td>1(b)(i)</td><td>X = 71 s ;
Y = 229 s ;</td><td>2</td><td>max 1 if not rounded up to nearest whole number
max 1 if both correct whole numbers but no units</td></tr>
</table>

Question	Answer	Marks	Guidance
1(b)(ii)	labelled axes with units ; even scale and at least 50% of grid used for time axis ; two correctly plotted bars (±½ a small square), of equal width and separated by a space ;	**3**	 **ecf** from **1(b)(i)**

Question	Answer	Marks	Guidance
2(a)(i)	**1** sun leaf / Fig 2.2, is thicker (overall) / has bigger cells; **ora** **2** sun leaf has a thicker palisade mesophyll layer / thicker spongy mesophyll / thicker mesophyll ; **ora** **3** sun leaf palisade layer is more tightly packed / denser ; **ora** **4** sun leaf has a thicker epidermis ; **ora** **5** sun leaf palisade <u>cells</u> are thinner / taller ; **ora** **6** sun leaf has larger air spaces ; **ora** **7** AVP e.g. sun leaf has a deeper / different shaped, vascular bundle ; **ora**	**2**	
2(a)(ii)	**L**ines drawn that are clear and continuous ; **S**cale: to fill more than half the space ; **D**etail: 4 or 5 layers shown ; **P**roportion: palisade mesophyll layer is between third to a half of total mesophyll ;	**4**	**R** shading / stippling / hatching / cells / ruled lines
2(a)(iii)	19 <u>mm</u> (±1 mm) ; 19 ÷ 130 = 0.15 mm ;;	**3**	**ecf** incorrect measurement of line **PQ** if answer incorrect, award 1 mark for correct working shown (19 ÷ 130)

Question	Answer	Marks	Guidance
2(b)(i)	(70 – 105 =) 35(.00) ; ((35 ÷ 70) × 100) = 50(.0);	**2**	
2(b)(ii)	comparative data quote in either section with units at least once ; *supports hypothesis:* shade leaves are longer ; **ora** *does not support hypothesis:* sun leaves are thicker ; **ora**	**3**	**I** larger or bigger **A** sun leaves may be wider / width not measured / width is not given, so cannot calculate area ;
2(c)(i)	extinguish flame / do **not** use a Bunsen burner / no flames ; use a water-bath / place ethanol in a test-tube in boiled water ;	**1**	
2(c)(ii)	to be able to see colour change / AW ;	**1**	

Question	Answer	Marks	Guidance
2(c)(iii)	**a** leaves from the same plant / species ; **b** at least three leaves from sun and three from shade ; **c** boil / heat in water ; **d** heat in ethanol; **e** rinse leaf; **f** spread on a white tile **g** add iodine solution ; **h** positive test gives a blue-black colour ; **i** detail of controlled variable, e.g. heated for same length of time / same volume or concentration of iodine (solution) / leaves picked at the same time ;	**5**	**I** de-starching leaves **I** use of a control **I** ref to lab safety
	Total:	**21**	