
BIOLOGY**0610/52**

Paper 5 Practical Test

May/June 2017

MARK SCHEME

Maximum Mark: 40

Published

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This document consists of **8** printed pages.

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)	<i>measured:</i> time taken for leaf disc to rise ; <i>changed:</i> 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	

Question	Answer	Marks	Guidance																		
1(a)(vi)	<table border="1"> <tr> <td data-bbox="302 264 799 316"><i>error</i> ;;</td> <td data-bbox="799 264 1290 316"><i>improvement</i> ;;</td> </tr> <tr> <td data-bbox="302 316 799 467">measuring height / not measuring volume / imprecise volume of sodium hydrogencarbonate / water</td> <td data-bbox="799 316 1290 467">use same volume (in test-tubes of the same diameter) / measure volume / use a burette / measuring cylinder / graduated pipette</td> </tr> <tr> <td data-bbox="302 467 799 587">leaf discs different distances from lamp / different light intensity / position of the lamp</td> <td data-bbox="799 467 1290 587">arrange equidistant / AW</td> </tr> <tr> <td data-bbox="302 587 799 707">determining when disc starts to rise is subjective</td> <td data-bbox="799 587 1290 707">time until leaf disc reaches the surface / or rises to a particular level</td> </tr> <tr> <td data-bbox="302 707 799 826">leaf disc did not sink</td> <td data-bbox="799 707 1290 826">use a greater number of leaf discs and measure time on only those which sank</td> </tr> <tr> <td data-bbox="302 826 799 874">timing multiple leaf discs</td> <td data-bbox="799 826 1290 874">stagger timing</td> </tr> <tr> <td data-bbox="302 874 799 959">heating of test-tubes by lamp</td> <td data-bbox="799 874 1290 959">heat-shield / water-bath / use LED lamp / AW</td> </tr> <tr> <td data-bbox="302 959 799 1078">leaf discs were destroyed</td> <td data-bbox="799 959 1290 1078">use fresh leaf discs / have more leaf discs in the sample and measure only those that rise</td> </tr> <tr> <td data-bbox="302 1078 799 1163">AVP</td> <td data-bbox="799 1078 1290 1163">matches AVP</td> </tr> </table>	<i>error</i> ;;	<i>improvement</i> ;;	measuring height / not measuring volume / imprecise volume of sodium hydrogencarbonate / water	use same volume (in test-tubes of the same diameter) / measure volume / use a burette / measuring cylinder / graduated pipette	leaf discs different distances from lamp / different light intensity / position of the lamp	arrange equidistant / AW	determining when disc starts to rise is subjective	time until leaf disc reaches the surface / or rises to a particular level	leaf disc did not sink	use a greater number of leaf discs and measure time on only those which sank	timing multiple leaf discs	stagger timing	heating of test-tubes by lamp	heat-shield / water-bath / use LED lamp / AW	leaf discs were destroyed	use fresh leaf discs / have more leaf discs in the sample and measure only those that rise	AVP	matches AVP	4	<p>each improvement must relate to the given error</p> <p>A test-tube rack blocks light / AW</p>
<i>error</i> ;;	<i>improvement</i> ;;																				
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1(b)(i)	<p>X = 71 s ; Y = 229 s ;</p>	2	<p>max 1 if not rounded up to nearest whole number max 1 if both correct whole numbers but no units</p>																		

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 ($\pm\frac{1}{2}$ a small square), of equal width and separated by a space ;	3	ecf from 1(b)(i)

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

Question	Answer	Marks	Guidance
2(b)(i)	$(70 - 105 =) 35(.00)$; $((35 \div 70) \cdot 100) = 50(.0)$;	2	
2(b)(ii)	comparative data quote in either section with units at least once ; <i>supports hypothesis:</i> shade leaves are longer ; ora <i>does not support hypothesis:</i> 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)	<p>a leaves from the same plant / species ;</p> <p>b at least three leaves from sun and three from shade ;</p> <p>c boil / heat in water ;</p> <p>d heat in ethanol;</p> <p>e rinse leaf;</p> <p>f spread on a white tile</p> <p>g add iodine solution ;</p> <p>h positive test gives a blue-black colour ;</p> <p>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 ;</p>	5	<p>I de-starching leaves</p> <p>I use of a control</p> <p>I ref to lab safety</p>
	Total:	21	