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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0610 BIOLOGY

0610/62 Paper 6 (Alternative to Practical), maximum raw mark 40

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.

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- **R** reject
- **ignore** ignore (mark as if this material was not present)
- **A** accept (a less than ideal answer which should be marked correct)
- AW alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) must be present
- max indicates the maximum number of marks that can be awarded
- mark independently the second mark may be given even if the first mark is wrong
- ecf error carried forward (credit a correct statement that follows a previous wrong response)
- ( ) the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- AVP any valid point

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<table>
<tr><th></th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>1 (a) (i)</td><td>table drawn with (ruled) lines and distinct columns or rows ;

both headings correct: <u>leaf</u> size / piece / area and time ;

correct units in column / row headings <u>only</u> ;

times recorded in each row ;</td><td>[4]</td><td>example layout:

<table><tr><td rowspan="2">leaf size / <u>mm</u></td><td colspan="3">time / s</td></tr><tr><td>(piece)1</td><td>(piece)2</td><td>(piece)3</td></tr><tr><td>10 × 10</td><td>72</td><td>65</td><td>79</td></tr><tr><td>15 × 15</td><td>48</td><td>49</td><td>44</td></tr></table></td></tr>
<tr><td>(ii)</td><td>(mean 10 mm × 10 mm) <u>72</u> (s) and
(mean 15 mm × 15 mm) <u>47</u> (s) ;</td><td>[1]</td><td></td></tr>
<tr><td>(iii)</td><td>larger (leaf size) is faster / smaller (leaf size) is slower ;</td><td>[1]</td><td></td></tr>
<tr><td>(b)</td><td>oxygen is produced ;

reference to action of catalase ;

bubbles of (oxygen / gas / air) collect on the leaf and cause it to rise / AW ;

(oxygen / gas) is less dense so leaf rises ;</td><td>max [2]</td><td></td></tr>
</table>

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	Mark scheme	Mark	Guidance
(c)	*either*: quicker as there is more cut edge / more damaged cells **;** (so) has <u>more</u> catalase exposed to peroxide **;** (so) produces <u>more</u> oxygen **;** *or*: slower because leaf piece is heavier / AW **;** not enough gas / oxygen to lift extra mass **;**	max [2]	
(d) (i)	amount / quantity / volume / concentration of hydrogen peroxide solution **;** type of leaf / species of leaf / same leaf **;** same distance moved by leaf / tubes marked at same height or at 40 mm **;** mass / size of metal wire **;**	max [1]	

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	Mark scheme	Mark	Guidance
(ii)	timing three tubes at same time ; measure each separately ; cutting the leaves accurately ; use a cutter of known size / cork borer of known diameter / cut around a template ; using different parts / thickness / age of the leaf ; cut leaves from same part / same thickness / same age ; measuring volume of peroxide with a drawn line / AW ; (instead) measure out exact volume using syringe / burette / pipette / measuring cylinder / AW ; metal wire may damage leaf / may react with hydrogen peroxide ; use wire that does not cause damage / is unreactive ; using the same hydrogen peroxide for both leaves / AW ; use fresh peroxide so concentration is the same ;	max [2]	*marking points in pairs: 1 mark for the error and 1 mark for the improvement*

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	Mark scheme	Mark	Guidance
(iii)	idea of replacing the peroxide with water / leaf with paper / using a boiled leaf ; reference to keeping the rest of the experiment unchanged / describe the same experimental conditions ;	[2]	
(iv)	*hazard:* hydrogen peroxide is irritant / harmful / AW ; *safety precaution:* wear eye protection / gloves / use forceps ; *hazard:* scissors / knife cause cuts / AW ; *safety precaution:* cut away from fingers / use a tile with a knife ;	[2]	*1 mark for hazard and 1 mark for safety precaution*
(e) (i)	*axes* – labelled with units and suitable scale ; *size* – occupies at least half the grid ; *plot* – all points plotted accurately ±½ square ; *bars* – same width and same size gap between each bar ;	[4]	

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	Mark scheme	Mark	Guidance
(ii)	*description:* leaf Z is the fastest / leaf W the slowest / AW **;** sequence is Z > X > Y > W **; ora** comparative use of data **;** *conclusion:* different species have different amounts / activity of catalase / enzyme **;** leaf Z has more / more active, catalase than any of the other leaves / AW **; ora** leaf Z (hairy so) traps more bubbles **;** leaf W has thicker veins / more vascular tissue, so heavier **;**	max [3] **[Total:24]**	
2 (a) (i)	allow any single value in the range 48–58 **;**	[1]	
(ii)	$\frac{18}{\text{value from (i)}} \times 100$ **;** 31 – 39 (%) **;**	[2]	

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	Mark scheme	Mark	Guidance
(b)	cell B has no clear nucleus / nuclear membrane / nuclear envelope **; ora** cell B chromosomes / chromatids present / AW **; ora** cell B has no nucleolus (in the nucleus) **; ora**	max [2]	
(c) (i)	whole drawing uses single clear lines with no shading **;** drawing occupies at least half of the space provided **;** cell shape is approximately twice as long as wide **and** cell wall shown as separate layer around some of the cell **;** individual chromosomes drawn as double lines resembling the arrangement in photograph **;** label line to a chromosome **;**	[5]	
(ii)	line drawn along length of Fig. 2.2 **;** measurement recorded in mm **;**	[2]	
(iii)	$\frac{\text{length measured from Fig. 2.2}}{800}$ **;** correct answer **;**	[2]	

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	Mark scheme	Mark	Guidance
(d)	X has layers of cells / Y has no layers / AW ; X has different types of cells / Y cells all look similar / AW ; Y cells are invading / spreading into X / AW ; cells in Y are breaking away from rest of cells on surface / cells in X remain within outer layer / AW ; cells in Y have large(er) nuclei / nucleus fills almost all the cell / cells in X have small(er) / various sizes of nuclei / AW ;	max [2] **[Total: 16]**	

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