CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 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.

Cambridge will not enter into discussions about these mark schemes.

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Abbreviations used in the Mark Scheme

- **;** separates marking points
- **/** separates alternatives within a marking point
- **R** reject
- **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 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>Question</th><th>Answer</th><th>Mark</th><th>Guidance for Examiners</th></tr>
<tr><td>1 (a)</td><td>table drawn with appropriate number of rows and columns ;
correct headings – time and temperature ;
correct units – s and °C ;
all temperatures correct ;
correct conversion to seconds for results at 4 °C / cold ;
correct times for 22 °C / warm and 52 °C / hot in seconds ;</td><td>[6]</td><td><table>
<tr><td></td><td colspan="3">time / s</td></tr>
<tr><td>temperature / °C</td><td>trial 1</td><td>trial 2</td><td>trial 3</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>130</td><td>118</td><td>127</td></tr>
<tr><td>22</td><td>59</td><td>53</td><td>57</td></tr>
<tr><td>52</td><td>35</td><td>39</td><td>32</td></tr>
</table></td></tr>
<tr><td>(b) (i)</td><td>to make the results more reliable / to find anomalies / AW ;</td><td>[1]</td><td>ignore to reduce / avoid errors / accuracy
A to find average / mean</td></tr>
</table>

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<table>
<tr><td>(ii)</td><td>All 3 correct averages in seconds = 2 ;;

[2]</td><td><table><tr><th>temp</th><th>average</th></tr><tr><td>4</td><td>125 s</td></tr><tr><td>22</td><td>56 s</td></tr><tr><td>52</td><td>35 s</td></tr></table>2 correct averages = 1
1 correct average = 0

R answers in minutes</td></tr>
<tr><td>(iii)</td><td>(rate of respiration) increases as the temperature increases ;

[1]</td><td></td></tr>
<tr><td>(c) (i)</td><td>(all temperatures timed together, so) it is difficult to watch them all at once /

difficult to judge colour or end point (to know when to stop timing) ;

max [1]</td><td>ignore human error</td></tr>
<tr><td>(ii)</td><td>put in tubes one at a time / measure separately (so only need to look at 1 clock at a time) / stagger the time AW /

use white card or colorimeter AW to see colour change more clearly;

[1]</td><td></td></tr>
</table>

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(d) (i)	(54 ÷ 30) = <u>1.8</u> ;	[1]	
(ii)	axes labelled and scaled evenly *x axis* – pH and *y axis* – rate of CO_2 production / cm^3 per min ; size ; all points plotted accurately to ±½ small square ; line drawn ;	[4]	
(iii)	*description:* as the pH increases the volume / rate increases **ora** ; credit use of calculated data ; *explanation:* reference to **enzymes** linked to pH ;	[3]	**A** any rate / volume doubles between pH4 and pH5 / or rate / volume trebles between pH5 and pH6. **A** increased pH increases **enzyme** activity;
		[Total: 20]	

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2 (a) (i)	drawing of outer edge uses single clear unbroken lines ; drawing occupies at least half of the space provided ; detail ;	[3]	e.g. four or more distinct compartments / sections
(ii)	length **XY** on photomicrograph is 58 (mm) ; line drawn on drawing and measurement recorded ±1 mm ; correct units recorded for at least one measurement ; *formula:* $\frac{\text{length of } \mathbf{XY} \text{ on drawing}}{\text{length of } \mathbf{XY} \text{ on photomicrograph}}$; correct magnification ;	[5]	

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<table>
<tr>
<td>(b) (i)</td>
<td>any two differences:
<table>
<tr><td>feature</td><td>pollen grain R</td><td>pollen grain S</td></tr>
<tr><td>(Idea of shape / AW)</td><td>round / spherical / AW</td><td>lobed / triangular / oval / elongated / bean shaped / AW;</td></tr>
<tr><td>(Idea of surface / AW)</td><td>spikey / hooked / rough / pointed</td><td>smooth / wrinkled ;</td></tr>
<tr><td>(Number of visible parts / areas / AW)</td><td>entire / one part</td><td>more than one visible part / AW ;</td></tr>
</table>
</td>
<td>max [2]</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>spikes / hooks AW (on the outside surface) ;</td>
<td>[1]</td>
<td></td>
</tr>
<tr>
<td>(c) (i)</td>
<td>a ruler in the eyepiece or graticule / microscopic scaled ruler ;</td>
<td>[1]</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>any three from:
during first 6 / up to 8 minutes pollen tube R grows faster / more than pollen tube S;

after 6 / 8 minutes pollen tube S grows faster / more than pollen tube R;

after / at 20 minutes / at end pollen tube S is longer than pollen tube R;

use of calculated figures to compare S and R;</td>
<td>max [3]</td>
<td>A comparative statements

ignore figures quoted directly from table.

N.B. pollen tube S is 11.3μm longer than pollen tube R after 20 minutes = 2</td>
</tr>
</table>

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<table>
<tr>
<td>(d) (i)</td>
<td>three from:
<table>
<tr><td>Sampling</td><td>Use same plant / plants of same species;

Different levels of fruit on plant / different locations / random numbering of samples e.g. choosing numbers from table / pick fruits from bag / any valid suggestion;</td></tr>
<tr><td>Counting seeds – any valid suggestion to prevent loss or mixing of seeds from each fruit</td><td>Collect seeds (from each fruit) inside container or water / collect fruits before split open / discard fruits that have already split / cut or count seeds from each fruit / AW;

Method – e.g. tally chart, click counter, repeating / count more than once;</td></tr>
</table></td>
<td>max [3]</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td><u>23</u>;</td>
<td>[1]</td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>(idea that) pollen tube does not grow long enough (to reach ovules) /

pollen not reaching stigma / lack of pollinators AW /

less ovules / (fertilised or unfertilised) ovules do not develop / less fertilisation AW /

named environmental factors e.g. not enough water / minerals / poor temperature / disease AW ;</td>
<td>[1]</td>
<td>ignore mutation / genes / genetic makeup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Total: 20]</td>
<td></td>
</tr>
</table>

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