**Cambridge Assessment International Education**
Cambridge International General Certificate of Secondary Education

**BIOLOGY** **0610/62**

Paper 6 Alternative to Practical **May/June 2019**

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 International will not enter into discussions about these mark schemes.

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## 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.

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| GENERIC MARKING PRINCIPLE 5:<br><br>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:<br><br>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. |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)(i)</td><td>table drawn with minimum two columns and a header line ;<br>appropriate column headings with units in heading only ;<br>both times records in seconds (warm) <u>233</u> and (cool) <u>565</u> ;</td><td>3</td><td>i.e. test-tube / temperature with warm and cool in the data cell<br>OR temperature / °C, and time / s</td></tr>
<tr><td>1(a)(ii)</td><td>at high(er) temperatures the methylene blue became, colourless / disappeared, more quickly / AW ; ora</td><td>1</td><td></td></tr>
<tr><td>1(a)(iii)</td><td><table><tr><th>beaker</th><th>temperature at start / °C</th><th>temperature at end / °C</th></tr><tr><td>warm water</td><td>45</td><td>35</td></tr><tr><td>cool water</td><td>20</td><td>15</td></tr></table>;</td><td>1</td><td></td></tr>
<tr><td>1(a)(iv)</td><td>temperature ;</td><td>1</td><td></td></tr>
<tr><td>1(a)(v)</td><td>volume / amount / type of yeast (suspension) ;<br>number of drops / concentration / amount / type, of methylene blue / indicator / AW ;<br>idea of equilibration time in water-bath / beaker ;<br>depth / amount / type, of oil ;</td><td>2</td><td></td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(b)(i) | *error step 6*<br>subjective / difficult to judge when the colour had disappeared / qualitative ;<br>*improvement*<br>compare to, a test-tube containing yeast with no methylene blue / test-tube that had already changed colour / use a colorimeter / colour standard ;<br><br>OR<br><br>*error step 6*<br>idea that both tubes are observed at the same time ;<br>*improvement*<br>idea that they should conduct each experiment at different times ; | **2** | |
| 1(b)(ii) | *error from Table 1.1*<br>temperature (of the water-bath) not controlled / temperature changes / AW ;<br><br>*improvement*<br>(thermostatically) controlled water-bath / insulation of the beaker ; | **2** | |
| 1(c) | hydrogencarbonate / bicarbonate ;<br>yellow / orange ;<br><br>OR<br><br>limewater ;<br>goes cloudy / milky / white ; | **2** | |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(d) | *independent variable:*<br>at least <u>two</u> different concentrations of ethanol **;**<br><br>*dependent variable:*<br>measuring the time taken for methylene blue to decolourise **;**<br><br>*constant variables:*<br>two from **;;**<br>• same temperature<br>• same pH<br>• same volume of ethanol (solution)<br>• same volume / amount / concentration of sugar<br>one from **;**<br>• same volume / amount / concentration / type, of yeast<br>• same volume / amount / concentration, of methylene blue / indicator<br>• same volume / depth of oil<br><br>*methodology*<br>idea of leaving to equilibrate at set temperature **;**<br>use of a water-bath / insulation to maintain one temperature **;**<br>detail of a comparison / control e.g. test with no ethanol / yeast, present **;**<br>two or more repeats / three or more trials **;**<br><br>*safety*<br>relevant safety e.g. gloves / goggles / no flames **;** | **6** | **A** suitable alternative methods |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a)(i) | outline – clear continuous line around stigmatic disc ;<br>size – larger than 70 mm ;<br>details:<br>nine stigmatic rays shown as double lines ;<br>circle approximately one third of the way out from the centre of the stigmatic disc ; | **4** | |
| 2(a)(ii) | length of line **PQ** 26 mm / 2.6 cm ±1 mm ;<br>16 mm / 2 cm ;; | **3** | |
| 2(b)(i) | 60(%) ;; | **2** | |
| 2(b)(ii) | **A**(xes) – labelled ; pH and percentage germination<br>**S**(cale) – suitable scale and plots occupy at least half the grid in both directions ;<br>**P**(lot) – correct plots ± half a small square ;<br>**L**(ine) – suitable line ; | **4** | |
| 2(b)(iii) | percentage (germination) increases and then decreases ;<br>peaks at pH 6 / highest percentage of germination is at pH 6 ; | **2** | **A** optimum at pH 6 |
| 2(b)(iv) | (test at pH values at) smaller intervals ;<br>between pH 5 and 7 / 5–6 / 6–7 ; | **2** | |
| 2(c) | grind up seeds / AW ;<br>add Benedict's (reagent/solution) ;<br>heat ;<br>red / orange / yellow / green, if reducing sugars present ; | **3** | |

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