Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **May/June 2018**

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.

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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: 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: 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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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>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)(i)</td><td>one table drawn with (ruled) header line and minimum two columns ;

appropriate headings ;

number of bubbles recorded for warm 19 and cool 7 ;</td><td>3</td><td>R units in any data cell</td></tr>
<tr><td>1 (a)(ii)</td><td><table><tr><td>water-bath</td><td>starting temperature / °C</td><td>final temperature / °C</td></tr><tr><td>warm</td><td>50</td><td>43</td></tr><tr><td>cool</td><td>25</td><td>21</td></tr></table>;</td><td>1</td><td></td></tr>
<tr><td>1(b)(i)</td><td>the warmer the temperature the more bubbles are produced / (rate of) respiration is greater at higher temperatures ; ora</td><td>1</td><td></td></tr>
<tr><td>1(b)(ii)</td><td>explanation
miscount bubbles / bubbles may be different sizes / volume of gas produced is unknown ;

improvement
method to collect gas and measure volume described / measure height of foam / AVP ;</td><td>2</td><td></td></tr>
<tr><td>1(b)(iii)</td><td>temperature (of each water-bath / test-tube) ;

idea of using a thermostatically controlled water-bath / description of method that could be used to keep the temperature constant ;</td><td>2</td><td></td></tr>
<tr><td>1(b)(iv)</td><td>(independent variable is) temperature ;
(dependent variable is) number / amount of bubbles (produced) ;</td><td>2</td><td></td></tr>
<tr><td>1(c)(i)</td><td>(average volume) 13.6 ;

(average rate) 2.72 or 2.7 ;</td><td>2</td><td></td></tr>
</table>

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Question	Answer	Marks	Guidance
1(c)(ii)	**A**(xes) – labelled with units i.e. percentage concentration of glucose and <u>average</u> rate of carbon dioxide production / cm^3 per minute **;** **S**(cale) – suitable even scale and data occupies more than half the grid in both directions **;** **P**(lot) – all points plotted accurately ± half a small square **;** **L(**ines) – suitable line drawn (point to point or a smoothed curve) **;**	**4**	
1(c)(iii)	as concentration (of glucose) increases the rate (of CO_2 production) increases **; ora** levels off (at 2.0 or 2.5%) / AW / rate of carbon dioxide production decreases (at 1.5–2.0%) **;** data quote with units **;** e.g. rises from 1.3 cm^3 per min to 4.3 / 4.4 cm^3 per min OR levels off at 2.0 / 2.5% (glucose) **or** levels off at 4.3 / 4.4 cm^3 per min (of carbon dioxide)	**3**	
1(c)(iv)	1.05(%) **;**	**1**	**A** ±0.05%
1(d)(i)	add Benedict's reagent **;** heat **;** green / orange / yellow / red colour shows presence of reducing sugars **;**	**3**	

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Question	Answer	Marks	Guidance
1(d)(ii)	*hazard* / *precaution* Benedict's reagent / goggles / gloves heating / ref. to dangers of using hot water / use a thermostatically controlled water-bath / AVP ;;	2	**I** being careful / supervision

Question	Answer	Marks	Guidance
2(a)(i)	**O** (utline) single clear line no shading **;** **S** (ize) use at least half available space (**AB** greater than 85 mm) **;** **D** (etail) eight algae **;** **D** (etail) circle drawn in the centre **;**	**4**	
2(a)(ii)	**AB** = 85 mm or 8.5 cm **;** 0.2 (mm) or 0.02 (cm) **;;**	**3**	**A** 84–86 mm **ecf** wrong **AB** but correct actual diameter from their measurements for max 2 max 2 if no units given or wrong units given **A** correct answer in micrometres

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Question	Answer	Marks	Guidance
2(b)(i)	*independent variable:* **1** at different light (intensities) **;** *dependent variable:* **2** record colour of hydrogencarbonate indicator after a time or record the time taken to reach a set colour **;** *controlled variables:* **3** same amount / number / mass / species / type, of algae **;** **4** same volume / concentration, of hydrogencarbonate indicator **;** **5** same temperature **;** **6** same time / same end colour **;** **7** same initial colour of indicator at the start **;** *methodology: Max 3 from mp8–11* **8** detail of a quantitative method used to achieve different light intensities e.g. moving light source / use of bulbs with different light intensities / determining light intensity with a light meter **;** **9** method of achieving constant temperature e.g. heat shield / screen / low energy bulb / LED bulb **;** **10** use of a control tube with no algae **;** **11** time to equilibrate (to different light intensities) **;** **12** two or more repeats / replicates **;**	**6**	max 3 from mp3–7
2(b)(ii)	Universal Indicator / litmus / AVP	**1**	

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