Cambridge International AS & A Level

**Cambridge Assessment International Education**
Cambridge International Advanced Subsidiary and Advanced Level

**BIOLOGY** **9700/33**

Paper 3 Advanced Practical Skills **March 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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the March 2018 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is a registered trademark.



© UCLES 2018

**PUBLISHED**

## 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.

© UCLES 2018

| |
|---|
| 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. |

© UCLES 2018

| Question | Answer | Marks |
|---|---|---|
| 1(a)(i) | 1 states temperature 80 or higher (up to 100) + °C ; | 1 |
| 1(a)(ii) | 1 0.5%, 0.25%, 0.125%, 0.0625% (labels under correct sequence of beakers) ;<br>2 shows transfer of 10 $cm^3$ from 0.5% to third beaker and 10 $cm^3$ from 0.25% to fourth beaker and fourth beaker to fifth beaker ;<br>3 shows 10 $cm^3$ of **W** added to each beaker ; | 3 |
| 1(a)(iii) | 1 2 $cm^3$ of reducing sugar solution + 2 $cm^3$ or more of Benedict's solution ; | 1 |
| 1(a)(iv) | 1 heading: percentage concentration of, **R** / reducing sugar ;<br>2 heading: time / seconds or time / s ;<br>3 readings for all samples as whole numbers ;<br>4 1.0% reducing sugar solution having shortest time ; | 4 |
| 1(a)(v) | 1 time for **S1** longer than **S2** and **S3** ; | 1 |
| 1(a)(vi) | 1 0.5% on middle line and other concentrations in correct order and relative positions ;<br>2 unknowns in correct position compared to candidate results ; | 2 |
| 1(a)(vii) | 1 longer time means more enzyme released or more hydrolysis of sucrose ; | 1 |
| 1(a)(viii) | 1 substrate / sucrose, all hydrolysed ; | 1 |
| 1(b)(i) | 1 biuret ; | 1 |
| 1(b)(ii) | 1 boil the water containing the protein ;<br>2 add 2 $cm^3$ of the boiled water containing the protein to 5 $cm^3$ 1% sucrose solution ; | 2 |

© UCLES 2018

| Question | Answer | Marks |
|---|---|---|
| 1(c) | 1 *x*-axis: species of plant<br>+<br>*y*-axis: concentration of enzyme / arbitrary units ;<br><br>2 scale on *x*-axis: even width of bars, with space between bars<br>+<br>scale on *y*-axis: 10.0 to 2 cm, labelled every 2 cm ;<br><br>3 correct plotting of bars ;<br><br>4 labelled bars drawn with thin vertical and horizontal lines ; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 2(a)(i) | 1 depth given to whole or half numbers (eyepiece graticule units) **+** vascular bundle in correct proportion to depth of leaf ; | **1** |
| 2(a)(ii) | 1 drawing at the appropriate size **+** no shading **+** no cells ;<br><br>2 only area shaded in Fig. 2.2 drawn ;<br><br>3 correct position of vascular bundle relative to whole depth of leaf ;<br><br>4 draws at least two layers of tissue in vascular bundle ;<br><br>5 label line and label to vascular bundle ; | **5** |
| 2(a)(iii) | 1 lines should be continuous, thin and sharp **+** drawn to occupy most of the space provided ;<br><br>2 draws only four cells **+** each cell touching at least one of the other cells ;<br><br>3 two lines drawn around each cell **+** three lines where cells touch ;<br><br>4 cell in epidermal layer in correct proportion to the cell beneath ;<br><br>5 label line and label to cell wall ; | **5** |

© UCLES 2018

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)(i)</td><td>1 L1, L2 and L3 measured using same units ;<br><br>2 correct values for L1, L2 and L3 ;<br><br>3 simplest ratio shown as larger number to smaller number ;<br><br>4 answer to lowest common denominator ;</td><td>4</td></tr>
<tr><td>2(b)(ii)</td><td>1 any one feature to reduce water loss + description ;<br>e.g. trichomes + trap layer of moist air<br>leaves folded + stops water diffusing away</td><td>1</td></tr>
<tr><td>2(b)(iii)</td><td>any three observable differences between P1 and Fig. 2.3:<br><br>
<table>
<tr><th>feature</th><th>P1</th><th>Fig. 2.3</th><th></th></tr>
<tr><td>folding</td><td>folds at ends</td><td>folded up completely</td><td>;</td></tr>
<tr><td>relative size of xylem vessel elements</td><td>smaller</td><td>larger</td><td>;</td></tr>
<tr><td>quantity of trichomes</td><td>lots / more</td><td>fewer</td><td>;</td></tr>
<tr><td>AVP</td><td></td><td></td><td>;</td></tr>
</table>
</td><td>3</td></tr>
</table>

© UCLES 2018