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CAMBRIDGE
International Education

# Cambridge International AS & A Level

**BIOLOGY** **9700/38**

Paper 3 Advanced Practical Skills 2 **May/June 2026**

MARK SCHEME

Maximum Mark: 40

**Published**

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **10** printed pages.

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**[Turn over**

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**General marking principles**

All examiners must apply these marking principles when marking candidate responses.

| | |
|---|---|
| 1 | Examiners must award marks for each response in line with:<br><br>• the specific **content** defined in the mark scheme<br>• the specific **skills** defined in the mark scheme or in the level descriptions<br>• the **standard of response** required as exemplified by the standardisation scripts. |
| 2 | Examiners must award **whole marks** (not half marks, or other fractions). |
| 3 | Examiners must award marks **positively**. This means that:<br><br>• marks are not deducted for errors or omissions<br>• marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate<br>• the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous. |
| 4 | Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly. |
| 5 | Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen. |
| 6 | Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind. |

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**Science-Specific Marking Principles**

| | |
|---|---|
| 1 | Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly. |
| 2 | The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored. |
| 3 | Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection). |
| 4 | The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted. |
| 5 | ‘List rule’ guidance<br><br>For questions that require ***n*** responses (e.g. State **two** reasons …):<br><br>• The response should be read as continuous prose, even when numbered answer spaces are provided.<br>• Any response marked *ignore* in the mark scheme should not count towards ***n***.<br>• Incorrect responses should not be awarded credit but will still count towards ***n***.<br>• Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response.<br>• Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science. |

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9700/38 Mark Scheme June 2026

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient ($a$) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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## Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

## Annotations

| Annotation | Meaning |
|---|---|
|  | correct point or mark awarded |
|  | correct awarding one mark from marking point or marking group 1.<br>similar numbered ticks are used for marking point or marking groups 2, 3, 4 etc. |
|  | incorrect point or mark not awarded |
|  | information missing or insufficient for credit |
|  | allow or accept |
|  | incorrect or insufficient point ignored while marking the rest of the response |
|  | contradiction in response, mark not awarded |
|  | benefit of the doubt given |
|  | error carried forward applied |
|  | incorrect point or mark not awarded |

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| Annotation | Meaning |
|---|---|
| SEEN | point has been noted, but no credit has been given<br>or<br>blank page seen |

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**Mark scheme abbreviations**

| | |
|---|---|
| **;** | separates marking points |
| **/** | alternative answers for the same point |
| **A** | accept (for answers correctly cued by the question, or by extra guidance) |
| **R** | reject |
| **I** | ignore |
| **( )** | the word / phrase in brackets is not required, but sets the context |
| **AW** | alternative wording (where responses vary more than usual) |
| **underline** | actual word given must be used by candidate (grammatical variants accepted) |
| **max** | indicates the maximum number of marks that can be given |
| **ora** | or reverse argument |
| **mp** | marking point (with relevant number) |
| **ecf** | error carried forward |
| **AVP** | alternative valid point |

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| Question | Answer | Marks |
|---|---|---|
| 1(a)(i) | 3 additional temperatures between 25 °C and 65 °C and at least 5 °C apart ; | 1 |
| 1(a)(ii) | 1 heading for independent variable: temperature / °C, and before heading for dependent variable ;<br>2 heading for dependent variable: colour intensity or symbol ;<br>3 results for each of the five temperatures ;<br>4 correct trend ;<br>5 records intensity as symbols ; | 5 |
| 1(a)(iii) | temperature ; | 1 |
| 1(a)(iv) | as the temperature increases the colour intensity increases ; | 1 |
| 1(a)(v) | *any two from:*<br>1 correct reference to diffusion or kinetic energy ;<br>2 increase membrane fluidity / phospholipids become more fluid / fatty acid tails begin to separate ;<br>3 proteins denature ; | 2 |
| 1(a)(vi) | to make sure that all the stain is washed away from the surface of the potato ; | 1 |
| 1(a)(vii) | to identify and exclude anomalous results ; | 1 |
| 1(a)(viii) | 1 use a colourimeter ;<br>2 use a thermostatically-controlled-water-bath ; | 2 |
| 1(b)(i) | 1 *x-axis*: pH and (y-axis) percentage / % dye removed ;<br>2 scale on x-*axis*: 2 to 2 cm, labelled at least each 2 cm<br>and<br>*y-axis*: 0.5 to 2 cm, labelled at least each 2 cm ;<br>3 correct plotting of five points with a dot in a circle or a cross ;<br>4 line through **5** plots and straight lines joining plot to plot or curve with line going through all plots ; | 4 |
| 1(b)(ii) | correct reading at pH7 from candidate's graph ; | 1 |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>1 a minimum number of tissue layers and uses most of the available space ;<br>2 draws the whole stem with no cells ;<br>3 draws at least 6 vascular areas ;<br>4 draws epidermis as 2 lines ;<br>5 label line to xylem and the label xylem ;</td><td>5</td></tr>
<tr><td>2(a)(ii)</td><td>1 lines continuous, thin and sharp and no shading ;<br>2 draws only four vessel elements and each vessel element touches at least one other ;<br>3 two lines drawn around each cell and three lines where two cells touch ;<br>4 correct shape of cells ;<br>5 label line and label to wall of xylem vessel element ;</td><td>5</td></tr>
<tr><td>2(b)(i)</td><td>1 organises comparison into 3 columns ;<br>(differences) 2, 3 and 4 ; ; ;<br>any three from :
<table>
<tr><th>feature</th><th>M1</th><th>Figure 2.1</th></tr>
<tr><td>vascular bundle – number</td><td>fewer</td><td>more</td></tr>
<tr><td>vascular bundle – position</td><td>below cortex</td><td>in cortex</td></tr>
<tr><td>size of xylem vessels</td><td>relatively smaller</td><td>relatively larger</td></tr>
<tr><td>centre</td><td>contains cells</td><td>no cells present</td></tr>
</table></td><td>4</td></tr>
<tr><td>2(c)(i)</td><td>1 measures diameter of A – B within range and units ;<br>2 measures diameter of central space within range and units ;<br>3 shows both diameters divided by 14 ;<br>4 answers and appropriate units ;</td><td>4</td></tr>
<tr><td>2(c)(ii)</td><td>1 half diameter squared and multiplied by 3.14 for both stem and central space ;<br>2 answer to 3 significant figures ;</td><td>2</td></tr>
<tr><td>2(c)(iii)</td><td>for strength / support / greater flexibility ;</td><td>1</td></tr>
</table>

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