Cambridge Assessment International Education

# Cambridge IGCSE™

**BIOLOGY** **0610/61**

Paper 6 Alternative to Practical **May/June 2021**

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 May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.



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**[Turn over**

**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.

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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. |

**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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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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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(a)(i) | 0.4 **;** | **1** | |
| 1(a)(ii) | table drawn with a minimum of two, columns / row, and a header line **;**<br>headers with units **;**<br><br>four correct lengths ±1 mm recorded **;** | **3** | MP2 concentration (of sugar) / mol per $dm^3$ **or** test tube / AW **and** length (of potato after 20 minutes) / mm<br>MP3 **A**=35 **B**=37 **C**= 39 **D**=42 |
| 1(a)(iii) | so that the results were comparable / so sugar concentration is the only variable that is changed / to ensure the surface area was the same / so surface area does not affect the rate of osmosis / AW **;** | **1** | |
| 1(a)(iv) | concentration of the sugar solution **;** | **1** | |
| 1(a)(v) | *any two from:*<br>measure mass of cylinders (instead of length) **;**<br>more intermediate concentrations of sugar solution ;<br>extend the range of concentrations used **;**<br>repeat at each concentration / replicate the investigation **;**<br>soak for longer than 20 minutes **;**<br>use warmer sugar solutions (to speed up diffusion) **;**<br>keep all at the same temperature **;**<br>dry cylinders before measuring **;** | **2** | |
| 1(a)(vi) | cut away from body / use wooden board or tile / cut on flat surface / keep blade away from body parts / dry before cutting **;** | **1** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(b) | *independent variable:*<br>1 ref. to using at least 2 different temperatures **;**<br><br>*method:*<br>2 method of maintaining a temperature described **;**<br>3 use of a tissue e.g. potato / leaves / root / stem, immersed in water / sugar / salt solution **;**<br>4 method measuring dependent variable described, i.e. length / mass / volume / surface area of (cylinders / tissue / leaves) before and after (immersion) **or** measuring volume of immersion liquid before and after **;**<br><br>*5 + 6 variables kept constant* **;;**<br>*max two from:*<br>• same concentration (of solution) / same volume (of solution / water)<br>• same (initial) length / volume / mass / surface area, of potato or tissue<br>• same type / age /variety / AW, of (potato, tissue) / same potato / same plant<br>• same pH / use a buffer<br>• same immersion time<br><br>7 equilibration of temperature for tissue / solution **;**<br>8 drying before reweighing (if mass measured) **;**<br>9 at least two repeats (of each temperature) / total of three trials **;**<br>10 AVP **;** | **6** | |
| 1(c)(i) | iodine solution **;**<br>blue-black **;** | **2** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(c)(ii) | *lines:* clear, single, unbroken with no shading **;**<br>*size:* central cell has a minimum diameter of 56 mm **;**<br>*detail one:* double line (minimum) for entire cell wall **;**<br>*detail two:* minimum of five starch grains around perimeter of cell **;**<br>*label:* one starch grain labelled **;** | **5** | |
| 1(c)(iii) | (length of line **AB)** 10 ±1 (mm) **;**<br>0.013 (0.011–0.014) mm **;;** | **3** | MP1 for correct measurement<br>MP2 for correct calculation<br>MP3 for correct rounding to two significant figures<br>ecf MP2 & MP3 from previous step |
| 2(a)(i) | ***axes:*** labelled with units as time (after exercise) / minutes **and** pulse rate / beats per minute **or** bpm **;**<br>***scale:*** evenly scaled and plots occupying half of the grid in one direction **;**<br>***plots:*** all correct ± half a small square **;**<br>***line:*** smooth curve (through at least 4 plots) or plot points joined with ruled lines **;** | **4** | **A** either orientation |
| 2(a)(ii) | *any two from:*<br>pulse rate decreases as time increases / AW **;**<br>biggest decrease in pulse rate is in first, one / two, minute(s) / initially **;**<br>plateaus or levels off / returns to pre-exercise pulse rate / returns to 62 (bpm) (at 4 mins) **;** | **2** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a)(iii) | 60.26 (%) **;;;** | **3** | MP1 selection of correct values from table 156 and 62<br>MP2 correct calculation<br>e.g. (94 ÷ 156) × 100 = 60.2564<br>MP3 correct rounding to two decimal places<br>ecf MP2 and MP3 from previous step |
| 2(a)(iv) | pulse rate **;** | **1** | |
| 2(b) | 120 bpm is an anomalous result / AW **;**<br>(idea that anomalous / AW data), should not be included in an average **;** | **2** | |
| 2(c) | *similarity, max one from **;***<br>both have, a wall / layers<br>both have, central space / lumen / AW<br>both contain blood (cells)<br><br>*differences, max two from* **;;**<br>artery wall is thicker ***/*** vein wall is thinner<br>inner surface of artery more irregular / AW ora<br>lumen AW, smaller in artery / ora<br>vein (overall) is bigger ***/*** ora<br>artery (overall or lumen) circular / AW, **and** vein irregular (in shape) / AW | **3** | |