Cambridge Assessment International Education

# Cambridge IGCSE™

**BIOLOGY** **0610/53**

Paper 5 Practical Test **October/November 2022**

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 October/November 2022 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.

**Mark scheme abbreviations**

- **;** separates marking points
- **/** alternative responses for the same marking point
- **R** reject the response
- **A** accept the response
- **I** ignore the response
- ecf error carried forward
- AVP any valid point
- ora or reverse argument
- AW alternative wording
- underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(a)(i) | 0.02 (mol per $dm^3$) **;** | **1** | |
| 1(a)(ii) | two temperatures recorded **and** final temperature is same or lower than the starting temperature **;** | **1** | |
| 1(a)(iii) | table draw with headings underlined and minimum of two columns and all headings correct **;**<br>two results recorded **;**<br>*correct trend:* test-tube **A** has fewer bubbles than test-tube **B ;** | **3** | check supervisor's report if trend not as expected |
| 1(a)(iv) | values from candidate's table divided by 3 **;** | **1** | |
| 1(a)(v) | conclusion that matches results **;** | **1** | e.g. at higher (glucose) concentrations (yeast) respires at a higher rate |
| 1(a)(vi) | concentration of glucose **;** | **1** | |
| 1(a)(vii) | *explanation:* temperature decreased / changed / **A** starts at different temperature to **B** / AW **;**<br><br>*improvement:* use a thermostatically controlled / maintained water-bath / top-up with warm water / use a Bunsen burner and check the temperature with a thermometer / insulation / lid / do test-tube **A** and test-tube **B** at the same time in same water-bath **;** | **2** | |
| 1(a)(viii) | so that there was the same, amount / concentration / number, of yeast (cells) in both test-tubes **;** | **1** | |
| 1(a)(ix) | *any one from:*<br>to reach temperature of water-bath **;**<br>to equilibrate **;**<br>to wait for, pressure to build up / volume to build up, expansion / AW **;**<br>to wait for gas to be pushed out of the delivery tube /AW **;** | **1** | |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(b) | drawing that shows suitable method of collecting gas **;**<br><br>indication of being able to measure volume of gas (from label or from drawing + label) **;** | **2** | e.g. drawing to show upturned vessel over water OR (gas) syringe attached to delivery tube<br><br>e.g. label for, gas syringe / measuring cylinder, or graduations drawn on the, beaker / test-tube / syringe |
| 2(a)(i) | outline clear and continuous, no shading **;**<br>size - cap width greater than or equal to 65mm **;**<br>detail 1: indication of white patch across the top of the cap and cap drawn separate from stalk **;**<br>detail 2: indication of textured stalk / rough edge to stalk **;** | **4** | |
| 2(a)(ii) | *line* ***A*** = 65 ±1 (mm) **;**<br>43 (mm) **;;** | **3** | MP1 correct measurement recorded<br>MP2 correct answer to any number of significant figures<br>65 ÷ 1.5 = 43 (43.3333333333333)<br>MP3 answer correctly rounded to 2 sf<br>ecf MP2 and MP3 from incorrect measurements<br><br>**ecf** if cm used in mp1<br><br>if **AB** is 66 mm answer is 44 mm,<br>64 mm = 42.666666 or 43 mm |
| 2(b)(i) | axes labelled with unit for temperature **;**<br>linear scale for plotted points to fill half or more of the grid in both dimensions **;**<br>all plotted points accurate to ± half a small square **;**<br>suitable line drawn **;** | **4** | |
| 2(b)(ii) | *any two from:*<br>as temperature increases (mushroom) cap colour gets lighter / score decreases / AW **; ora**<br>use of data **;**<br>no change, between 15–17°C **;** | **2** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(b)(iii) | suitable temperature for mushroom of cap score 2 **;**<br><br>indication on graph of interpolation **;** | **2** | **A** cap scores of between 1 and 3<br>expected value around 24°C<br>ecf from graph |
| 2(b)(iv) | subjective nature of colour score / reference to qualitative nature of measurements AW / temperature based on a line of best fit / between two known points / no colour measurement was recorded at temperature in 3(b)(iii) / no intermediate values **;** | **1** | |
| 2(b)(v) | different species may be different colours / may respond differently to temperature / same species will all be same colour / respond the same way, at the same temperature /AW **;** | **1** | |
| 2(b)(vi) | *any one from:*<br>(sun)light / pH / water / humidity / location / soil / time of day / ref. to growing medium / nutrients / grow in same field / length of time allowed to grow / age of mushroom cap / size of mushroom / AW **;** | **1** | |
| 2(c) | *any two from:*<br>valid ref. to preparation to make an extract **;**<br>add DCPIP **;**<br>sample changes from blue to colourless if vitamin C present **;** | **2** | e.g. liquidise / cut up / put pieces in and shake / grind |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3 | *independent variable:*<br>1 at least two different volumes of water added **;**<br><br>*dependent variable:*<br>2 number of seeds germinated / time taken for seeds to germinate **;**<br><br>*3, 4, 5 method **;;;***<br>• method of maintaining temperature<br>• watering at regular intervals<br>• reference to placing seeds in trays / petri dish / test-tube / planting in soil<br>• check seeds at regular intervals / at a set time period<br>• AVP, e.g. calculation of rate described<br><br>*6, 7 constant variables **;;***<br>• temperature<br>• type of seeds<br>• oxygen concentration<br>• pH<br>• type / amount of, soil / growing medium<br>• light (intensity)<br><br>8 repeat at least two times (three trials) **;** | **6** | |

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