**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2013 series

## 0610 BIOLOGY

**0610/52** Paper 5 (Practical Test), maximum raw mark 40

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

**Mark schemes will use these abbreviations**

- ; separates marking points
- / alternatives
- **R** reject
- **A** accept (for answers correctly cued by the question)
- **I** ignore as irrelevant
- **ecf** error carried forward
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- Underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context
- **D, L, T, Q** quality of: drawing / labelling / table / detail as indicated
- max indicates the maximum number of marks.

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| Question | Answer | Marks | Guidance for Examiners |
|---|---|---|---|
| 1 (a) (i) | extract number of bubbles of gas released / 1 minute<br>**'seeds 1'**<br>**'seeds 2'**<br>**'seedlings 1'**<br>**'seedlings 2'**<br>completion of each box;;;; | [4] | Check Supervisor's report. |
| (ii) | *Description of each result:-*<br>Credit <u>use</u> of data for comparison;<br><br>Any 2 comparative statements with/without data:<br>seeds 1 versus seeds 2;<br>seeds 1 v seedling 1;<br>seedling 1 v seedling 2;<br>overall summary, e.g. seeds v seedlings; | Max [3] | Check Supervisor's report.<br>based on the candidate's results – comparison. |
| (iii) | catalase / enzyme is more active in seeds OR less active in seedlings;<br>seeds give more foam / oxygen OR seedlings give less foam / oxygen; | Max [1] | |

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|---|---|---|---|
| (b) (i) | reaction is fast – so some bubbles of gas missed;<br><br>increase reliability;<br><br>any reference to '**identification'** of anomalies;<br><br>AVP e.g. variation in seeds / gas leaking ; | Max [2] | Ignore 'to take a mean' unqualified<br>Ignore idea of 'accuracy'<br>Ignore 'temperature' |
| (ii) | enzymes, e.g. catalase, within cells / inside seeds / seedlings;<br><br>testa around seeds / AW (barrier idea) prevents substrate / hydrogen peroxide contacting with enzymes;<br><br>speeds up reaction / surface area idea;<br><br>might not fit inside test-tubes;<br><br>mixture of seeds in extract / more uniform sample; AVP; | Max [2] | Equation given in introduction – oxygen is identified.<br>Allow **ORA** throughout |

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|---|---|---|---|
| **(c) (i)** | *2 errors from:*<br><br>oxygen bubbles not all composed of oxygen / bubbles of different sizes /<br>oxygen escaped before bung fitted tightly / bubbles too fast to count / AW /<br><br>different mass of seed / seedlings /<br><br>different degree of grinding /<br><br>different hydrogen peroxide conc. / amount /<br><br>shaking tubes / any ref to timing /<br><br>ref to temperature / pH ;; | Max [2] | Ignore 'bubbles' alone – require reference to the need to count / size of bubbles / speed of release.<br><br>Ignore ref to number of seeds / age of seeds, etc. |
| **(ii)** | *One improvement for one error from **(c)(i)***<br><br>measure volume of oxygen instead of counting bubbles / use a measuring cylinder / use of gas syringe / monitor mass lost /<br>use thistle funnel and tap to add hydrogen peroxide AW/<br>tightly fitting bungs /<br>use of accurate timing device / AW /<br>water bath /<br>pH buffer; | [1] | There must be a link to (c)(i)<br><br>e.g. use of stop clock instead of looking at the clock on the wall.<br>Need to state a practical method not just 'avoid the error' or 'use same amount of hydrogen peroxide' |

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|---|---|---|---|
| (d) (i) | extract height of foam / mm<br>**'seeds 1'**<br>**'seeds 2'**<br>**'seedlings 1'**<br>**'seedlings 2'** | [2] | Check Supervisor's report.<br>Any two appropriate measurements for each mark. |
| (ii) | catalase / enzyme is more active in seeds / seedlings;<br>seeds / seedlings give more / less foam / oxygen; | Max [1] | Correct conclusion based on candidates' results;<br>Seeds or seedlings may vary. |
| (iii) | Yes or No<br>appropriate deduction + evidence; | [1]<br>**[Total: 19]** | Must justify decision.<br>e.g. more bubbles linked to more foam idea<br>or both conclusions show more activity with seeds than seedlings |

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|---|---|---|---|
| **2 (a) (i)** | measurements in mm<br>bean A 25<br>B 27<br>C 28<br>D 27<br>E 29 | Max [2] | All within 1 +/– 1mm,<br>Any two correct for **1** mark.<br>4 or 5 correct for **2** marks.<br>Ignore decimal places. |
| **(ii) and (iii)** | bean length / mm — original tally marks — extra tally — number in group<br>**24.0 – 25.9** 1 I 2<br>**26.0 – 27.9** 4 II 6<br>**28.0 – 29.9** 7 II 9<br>**30.0 – 31.9** 17 17<br>**32.0 – 33.9** 6 6<br>**34.0 – 35.9** 5 5 | [2 and 2] | Check for ecf in tally and number.<br>2 marks for their correct tallies cf measurements.<br>2 marks for correct numbers cf tallies in their table. |
| **(iv)** | histogram:<br>**A –** labelled axes and suitable even scale;<br>**S –** size to fill half or more of the grid in both directions;<br>**P –** plot;<br>**C –** columns equal width and touching; | [4] | **A** either orientation<br>*x*-axis must show categories not just numbers<br>**P** cf <u>numbers</u> in their table, allow <u>one</u> wrong plot.<br>Bar charts and Line graphs lose **C** mark.<br>**R** plotted points not joined |
| **(v)** | <u>continuous</u> ; | [1] | Ignore normal / natural distribution. |

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| (b) (i) | drawing: **O** – outline clear;<br>**S** – size;<br>**D** – detail;<br>**L** – labels: any from: plumule / radicle / cotyledon; | [4] | Check Supervisor's report.<br>O – allow stippling but no other shading.<br>S – more than half of available space [75 mm]<br>D – part of embryo inside and outside (beyond edge of cotyledon)<br>L – Ignore stem / root / testa.<br>Ignore label lines which cross or do not touch the intended structure. |
| (ii) | measurements:<br>length of seed in mm;<br>length on their drawing to mm accuracy;<br><br>formula;<br><br>answer; | [4] | Check Supervisor's report.<br>**R** if no line on their drawing **A** +/ 1 mm<br><br>length on drawing in words or numerals<br>length of seed<br>ecf from measurements for correct length, words or numbers<br><br>Accept if answer correct without working = 2 marks.<br>R if mm after the figures.<br>R if wrongly rounded |
| (c) | Biuret solution / test;<br><u>blue</u> to purple / mauve; | [2]<br><br>**[Total: 21]** | **A** named $CuSO_4$ + NaOH / biuret A + B / I and II / albustix.<br>[ colour change yellow to green]<br>Need starting colour in answer or remains blue if protein is absent.<br>If boiling involved **R** colour change. |

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