**Cambridge Assessment International Education**
Cambridge International General Certificate of Secondary Education

**BIOLOGY** **0610/52**

Paper 5 Practical Test **October/November 2017**

MARK SCHEME

Maximum Mark: 40

**Published**

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**Mark schemes will use these abbreviations**

- **;** separates marking points
- / alternatives
- **I** ignore
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- AVP any valid point
- **ecf** credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(a)(i) | table drawn with minimum two columns and a line between heading and data **;**<br><br>appropriate column / row headings and appropriate units for percentage concentration of amylase time for starch to be digested / minutes **;**<br><br>three correct amylase concentration recorded in any order**;**<br><br>table shows 2 columns for each concentration with times recorded**;**<br><br>correct trend shown by results **;** | **5** | **R** if units in body of table<br><br>**I** units in the body of the table<br><br>(expect 3% faster 2% faster 1%) |
| 1(a)(ii) | idea that iodine remains brown / yellow / orange / no longer changes colour**;** | **1** | |
| 1(a)(iii) | (remove a sample from each of the test-tubes and) add (equal volume of) Benedict's solution **;**<br><br>heat (in a water-bath) **;** | **2** | |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(b)(i)</td><td><table><tr><td>variable</td><td>controlled by</td></tr><tr><td>(volume of) starch (solution)</td><td>5 $cm^3$/ same volume</td></tr><tr><td>(concentration of) starch solution</td><td>same concentration / used throughout</td></tr><tr><td><u>volume</u> of enzyme / amylase</td><td>1 $cm^3$ used</td></tr><tr><td>temperature</td><td>kept at 55–60 ° C</td></tr><tr><td>time</td><td>3 minutes for incubation / 5 minutes for testing the enzyme</td></tr></table>;<br>;</td><td>2</td><td>one mark for the variable, one mark for method of controlling which must related<br><br>I amount of enzyme<br><br>I same temperature</td></tr>
<tr><td>1(b)(ii)</td><td>so the contents of all the test-tubes reach the same temperature / AW ;</td><td>1</td><td></td></tr>
<tr><td>1(b)(iii)</td><td>to show that there is no starch in the enzyme solution / to show enzyme does not react with starch / AW ;</td><td>1</td><td></td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(c)(i) | idea of judging the colour of the endpoint by eye **;**<br><br>idea of doing several procedures at the same time **;**<br><br>idea that only one drop for both spots of iodine (might give different volumes ) **;**<br><br>idea that 1 drop for both spots (could cause contamination)**;**<br><br>idea of: two samples needed at the same time with the same rod, (then there will be a difference in the actual time) **;**<br><br>idea of: size of drops (from either starch or iodine) added varies **;** | **2** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(c)(ii)</td><td>
<table>
<tr><td>e.g. of error</td><td>improvement</td></tr>
<tr><td>judging colour by eye</td><td>have a standard colour for comparison</td></tr>
<tr><td>timing and sampling at same time</td><td>start timer then mix and sample and note time when first sample taken</td></tr>
<tr><td>one drop for two samples</td><td>use a dropper with enough for both samples / have two glass rods</td></tr>
<tr><td>contamination</td><td>use separate glass rods</td></tr>
<tr><td>doing two samples at the same time</td><td>take a sample from each tube at the same time with different glass rod / do trials separately</td></tr>
<tr><td>size of drop for either</td><td>use a syringe / pipette</td></tr>
<tr><td>time not long enough for enzyme to work</td><td>keep going until all starch has gone</td></tr>
</table>
;</td><td>1</td><td>improvement must match one of the errors from 1(c)(i)</td></tr>
<tr><td>1(d)(i)</td><td>300 (mg) ;;;</td><td>3</td><td>if answer incorrect one mark for correct unit and one mark for correct working:<br>$(3 \times 2 \times 0.5) \div 3\,cm^3$ is max 2</td></tr>
<tr><td>1(d)(ii)</td><td>3.4 ;</td><td>1</td><td>ecf from 1(d)(i)</td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(d)(iii) | **A**(xes) – labelled with units **;**<br><br>**S(**cale) – even scale **;**<br><br>**P(**lot) – all given points plotted accurately ±½ square **;**<br><br>**L**(ines) – each line drawn (with a ruler) point to point / smooth free-hand curve through points **;** | **4** | |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(a)(i)</td><td>
<table>
<tr><td>feature</td><td>epidermis cell</td><td>guard cell</td></tr>
<tr><td>shape</td><td>wavy outline</td><td>oval / bean, shaped / AW ;</td></tr>
<tr><td>chloroplasts / cell inclusions</td><td>absent</td><td>present ;</td></tr>
<tr><td>cell wall</td><td>thin</td><td>thick / thick on inside edge ;</td></tr>
<tr><td>cell size</td><td>large</td><td>small ;</td></tr>
<tr><td>cell arrangement</td><td>not paired</td><td>pairs ;</td></tr>
</table>
</td><td>2</td><td>one mark per correct row</td></tr>
<tr><td>2(a)(ii)</td><td>outline single clear continuous lines, no shading, 2 cells drawn ;<br><br>drawing occupies at least 50 mm along X–Y ;<br><br>stoma width is about one sixth of total width of XY ;<br><br>cell walls drawn as double line not too wide ;</td><td>4</td><td></td></tr>
<tr><td>2(b)</td><td>(diameter of guard cells and stomata) value within the range of 31 – 34 mm ;<br><br>line drawn on candidates diagram and measurement ±1 mm;<br><br>calculated magnification ;</td><td>3</td><td></td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(c) | absorption (rate) is lower than transpiration 09:00 to 18:00 / during the day / during the light **ora ;**<br><br>absorption (rate) is higher than transpiration from 18:00 to 06:00 / at night / in the dark **ora ;**<br><br>absorption peaks at 18.00 and transpiration peaks between 14:00 to16:00 / absorption rate peaks after transpiration rate **ora ;**<br><br>transpiration rate increases faster than absorption rate **;**<br><br>comparative data quote for both curves **;**<br><br>rate of absorption and rate transpiration are equal between 08:00 to 09:00 / at 18:00 **;** | **2** | **A** times in am and pm equivalents<br>**A** some variation in the 09:00 time |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(d) | 1 ref. to using at least 3 temperatures / humidity **;**<br>2 ref. to (three) values for temperature / humidity **;**<br>3 ref. to means of obtaining the different temperatures / humidity**;**<br>4 ref. to checking that the apparatus does not leak **;**<br>5 ref. to one controlled variable **;**<br>6 ref. to second controlled variable**;**<br>7 ref. to measuring distance moved (by the air) along capillary **;**<br>8 ref. to fixed time / timing for a fixed distance **;**<br>9 ref. to refilling capillary between measurements **;**<br>10 ref. to at least two replicates **;**<br>11 use same shoot / same number of leaves / same area of leaves **;**<br>12 AVP **;** e.g. detail of apparatus set up e.g. cutting shoot underwater / drying leaves allow apparatus to equilibrate before taking any readings | **6** | **A** high, medium and low for humidity and temperature<br>e.g. for mp 5 and mp 6: light intensity, light wavelength, wind speed, temperature or humidity |

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