Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **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 **;** appropriate column / row headings and appropriate units for percentage concentration of amylase time for starch to be digested / minutes **;** three correct amylase concentrations recorded (either order) **;** three correct timings recorded **;** six correct timings recorded **;**	**5**	**R** if units in body of table **I** units in the body of the table
1(a)(ii)	drops (for **B** at 3, 4 and 5 min) have merged / AW **;** results for **C** have different end times **;** results for **C** are different at 3 min **;** no repeats **;**	**1**	any one from: **A** at 4 / 5 mins **I** enzyme will be denatured by high temperature / results qualitative / subjective / no control / human error
1(a)(iii)	(remove a sample from each of the test-tubes and) add (equal volume of) Benedict's solution **;** heat (in a water-bath) **;**	**2**	

<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 / amount of starch (solution)</td><td>5 cm^3 / same volume , used in each</td></tr>
<tr><td>concentration / amount of starch (solution)</td><td>same concentration of starch solution / used in each</td></tr>
<tr><td>concentration / amount of iodine</td><td>same iodine solution used in each</td></tr>
<tr><td>volume of enzyme / amylase</td><td>1 cm^3 used</td></tr>
<tr><td>temperature</td><td>(maintained at) 60°C</td></tr>
<tr><td>time</td><td>3 minutes for equilibration / testing for, 7 / 8 / 9 / 10, minutes</td></tr>
</table>
; ;
</td><td>2</td><td>one mark for the variable, one mark for method of controlling which must related

I amount of enzyme

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 / amylase does not react with starch / AW ;</td><td>1</td><td></td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(c)(i)</td><td>idea of judging the colour of the endpoint by eye ;

idea of doing several procedures at the same time ;

idea of using one drop for both spots of iodine ;

idea that 1 drop for both spots (could cause contamination);

idea of: two samples needed at the same time with the same rod, (then there will be a difference in the actual time) ;

idea of: size of drops (from either starch or iodine) added varies ;</td><td>2</td><td></td></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 / use colorimeter</td></tr><tr><td>timing and sampling at same time</td><td>start timer then mix and sample and note time when samples taken / AW</td></tr><tr><td>one drop for two samples / one glass rod</td><td>use two rods / pipette</td></tr><tr><td>contamination</td><td>use two rods / pipette</td></tr><tr><td>two samples at the same time</td><td>use two glass rods or do trials separately</td></tr><tr><td>drop size (for either iodine of drop from glass rod)</td><td>use a pipette / syringe</td></tr></table>;</td><td>1</td><td>improvement must match one of the errors from 1(c)(i)</td></tr>
</table>

Question	Answer	Marks	Guidance
1(d)(i)	300 (mg) **;;;**	**3**	if answer incorrect one mark for correct unit and one mark for correct working: $(3 \times 2 \times 0.5) \div 3\,cm^3$ is max 2
1(d)(ii)	3.4 **;**	**1**	**ecf** from **1(d)(i)**
1(d)(iii)	**A**(xes) – labelled with units **;** **S(**cale) – even scale **;** **P(**lot) – all given points plotted accurately ±½ square **;** **L**(ines) – each line drawn (with a ruler) point to point / smooth free-hand curve through points **;**	**4**	

Question	Answer	Marks	Guidance
2(a)(i)	*feature* / *epidermis cell* / *guard cell* shape / wavy outline / oval / bean, shaped / AW **;** chloroplasts / cell inclusions / absent / present **;** cell wall / thin / thick / thick on inside edge **;** cell size / large / small **;** cell arrangement / not paired / in pairs **;**	**2**	one mark per correct row

Question	Answer	Marks	Guidance
2(a)(ii)	outline single clear continuous lines, no shading, 2 cells drawn **;** drawing occupies at least 50 mm along X–Y **;** stoma width is about one sixth of total width of XY **;** cell walls drawn as double line not too wide **;**	**4**	
2(b)	(diameter of guard cells and stomata) value within the range of 31–34 mm **;** line drawn on candidates diagram **and** measurement ±1 mm**;** calculated magnification **;**	**3**	
2(c)	absorption (rate) is lower than transpiration 09:00 to 18:00 / during the day / during the light **ora ;** absorption (rate) is higher than transpiration from 18:00 to 06:00 / at night / in the dark **ora ;** absorption peaks at 18.00 and transpiration peaks between 14:00 to16:00 / absorption rate peaks after transpiration rate **ora ;** transpiration rate increases faster than absorption rate **;** comparative data quote for both curves **;** 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 **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 **;** 2 ref. to (three) values for temperature / humidity **;** 3 ref. to means of obtaining the different temperatures / humidity**;** 4 ref. to checking that the apparatus does not leak **;** 5 ref. to one controlled variable **;** 6 ref. to second controlled variable**;** 7 ref. to measuring distance moved (by the air) along capillary **;** 8 ref. to fixed time / timing for a fixed distance **;** 9 ref. to refilling capillary between measurements **;** 10 ref. to at least two replicates **;** 11 use same shoot / same number of leaves / same area of leaves **;** 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 e.g. for mp 5 and mp 6: light intensity, light wavelength, wind speed, temperature or humidity

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