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

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.

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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

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>

<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)		**2**	one mark per correct row

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 **;**

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

Question	Answer	Marks	Guidance
2(d)	1 ref. to using at least 3 temperatures / humidity ;	**6**	
	2 ref. to (three) values for temperature / humidity ;		**A** high, medium and low for humidity and temperature
	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 ;		e.g. for mp 5 and mp 6: light intensity, light wavelength, wind speed, temperature or humidity
	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		