Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **May/June 2016**

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 will not enter into discussions about these mark schemes.

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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

Abbreviations used in the Mark Scheme:

- ; 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	Mark scheme	Mark	Guidance
1 (a) (i)	*length:* 30 (mm) *width:* 10 (mm) *height:* 10 (mm) ;	[1]	all correct for 1 mark
(ii)	1 table drawn with rows or columns ; 2 table drawn with cells for at least 6 bubble readings and 3 means; 3 appropriate column headings with units (number of) bubbles per (or in) 3 minutes / min or (number of) bubbles / minute or min **+** potato / piece of potato / piece / tube **+** slice / stick and 1 or 2 **+** mean / average (number of bubbles per 3 min (or per 1 min) ; 4 correct tally results recorded ; 5 correct mean / average calculated for each potato piece ;	[5]	**I** graphs **R** if units given in cells instead of header

Question	Mark scheme	Mark	Guidance
(b) (i)	prevents leakage of oxygen / all oxygen collected; can observe reaction / bubbles as soon as it starts / AW;	[max 1]	**A** gas / air / bubbles **I** no air / oxygen can enter tube **I** "quicker" unqualified for mp 2
(ii)	prevents leakage of oxygen / all oxygen collected ; increases accuracy / results will be comparable / consistent / reliable / valid; allow a pressure to build up / bubbles to form;	[max 2]	**A** gas / air / bubbles **I** loose bung could come out / no gas from outside enters the tube **I** fair test comments
(c) (i)	catalase produces more bubbles when it is active / **ora**; the lower the percentage of alcohol (used for soaking) the more bubbles are produced / AW / **ora**; the higher the percentage of alcohol used the lower the activity of the catalase / **ora**;	[max 1]	**A** as number of bubbles increases the activity of the catalase increases / positive correlation need not refer to catalase (more bubbles means more activity)
(ii)	**B** has more catalase activity / bubbles, **A** has least activity / bubbles;	[1]	**I** restatement of results (number of bubbles from each piece of potato) **A** B more, C medium and A fewer bubbles / AW
(iii)	number 4 or less than 4 ;	[1]	**A** no bubbles / none / zero

<table>
<tr><th>Question</th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(d) (i)</td><td>
<table>
<tr><th>variable</th><th>controlled by</th></tr>
<tr><td>hydrogen peroxide (volume / concentration).</td><td>measured 10 cm^3 or used same strength solution;</td></tr>
<tr><td>potato (size / length / volume / surface area / type of potato sample of potato);</td><td>same dimensions used for each piece / / 30 mm × 5 mm × 10 mm or pieces cut from same potato / type of potato;</td></tr>
<tr><td>time for measuring bubbles ;</td><td>counted for 3 min for each piece</td></tr>
<tr><td>time of soaking in alcohol;</td><td>same time / 24 hours for each piece;</td></tr>
</table>
</td><td>1 + 1

[max 2]</td><td>variable must match control given</td></tr>
<tr><td>(ii)</td><td>
<table>
<tr><th>source of error</th><th>method of reducing error</th></tr>
<tr><td>bubbles are all different sizes;</td><td>measure the volume use a gas syringe / collect in a measuring cylinder / AVP;</td></tr>
<tr><td>bubbles difficult to count ;</td><td>use a (tally) counter / method of collecting the gas / measure the volume / use 2 people / repeat for reliability / AW;</td></tr>
<tr><td>setting up and starting time;</td><td>use 2 people;</td></tr>
</table>
</td><td>1 + 1

[max 2]</td><td>method must match the error. 1 mark for error, 1 mark for method.</td></tr>
</table>

Question	Mark scheme	Mark	Guidance
(iii)	size / mass / volume / of the slices or type / age of potato, may not be equal ; surface area is different / quantity of available catalase is different / AW ;	[2]	
(iv)	use exactly the same procedure / do the same / repeat / AW / or description of original method; except soak potato in water (and not ethanol) / use 0% alcohol / without alcohol / use untreated potato / AW;	[2]	**I** use boiled potato / boiled catalase / repeat without potato / use water instead of hydrogen peroxide / use liver or yeast / use glass beads
(v)	same or greater number of bubbles than 2% alcohol / **B /** figures quoted (11–18) (mean of 14.5+)/more bubbles as more gas produced / most number of bubbles;	[1]	
(e)	keep away from flames / heat source ; wear goggles / safety glasses: wear gloves; wear lab coat; use tongs / AW;	[max 1]	**A** use a water bath when heating ethanol
(f) (i)	280;	[1]	

Question	Mark scheme	Mark	Guidance
(ii)	**A** axes labelled even scale; **P** **both** plots accurate ±½ small square ; **C** columns not touching of same width columns at least half the grid on y-axis;	[3]	y-axis: (mean) reaction time / ms x-axis: before drinking alcohol and after drinking alcohol / before and after / or key given x-axis labels approximately under each bar **R** superimposed columns
(iii)	220–350 (milliseconds) ;	[1]	
		[Total: 27]	
2 (a) (i)	Outlines – all lines single, clear and unbroken ; Size – occupies at least half of the space provided ; Detail – oval shape + phloem + 1 other area ; two other areas shown ; Label – line to correct area on drawing to show position of xylem (vessel) and line labelled “xylem”	[5]	

Question	Mark scheme	Mark	Guidance
(ii)	measurement of AB = 58 mm; line on their drawing and length measured with correct unit ; correct magnification calculation;	[3]	± 1 mm **A** cm / μm **I** other units ± 1 mm **R** if no line drawn or position not indicated / line in incorrect position **R** if units given ecf if measurement(s) above are incorrect
(iii)	(xylem) walls thick(er) / large (er) / wide(er); (xylem vessels) round(er) ; (xylem) has large(r) cross section area / big(ger) ;	[max 1]	
(b)	1 use of any suitable plant material; 2 put stem / material chosen in (red) dye / add dye to cut (stem) surface; 3 time for absorption of dye; 4 cut (sections) of stem or material chosen; 5 (red stained xylem) will indicate position of vascular bundle	[max 4]	**I** stain it red **I** xylem alone
		[Total: 13]	