



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

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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

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

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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

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Question	Mark scheme		Mark	Guidance
(d) (i)	<i>variable</i>	<i>controlled by</i>	1 + 1 [max 2]	variable must match control given
	hydrogen peroxide (volume / concentration).	measured 10cm ³ or used same strength solution;		
	potato (size / length / volume / surface area / type of potato sample of potato);	same dimensions used for each piece / 30 mm × 5 mm × 10 mm or pieces cut from same potato / type of potato;		
	time for measuring bubbles ;	counted for 3 min for each piece		
	time of soaking in alcohol;	same time / 24 hours for each piece;		
(ii)	<i>source of error</i>	<i>method of reducing error</i>	1 + 1 [max 2]	method must match the error. 1 mark for error, 1 mark for method.
	bubbles are all different sizes;	measure the volume use a gas syringe / collect in a measuring cylinder / AVP;		
	bubbles difficult to count ;	use a (tally) counter / method of collecting the gas / measure the volume / use 2 people / repeat for reliability / AW;		
	setting up and starting time;	use 2 people;		

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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)	<u>280</u> ;	[1]	

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Question	Mark scheme	Mark	Guidance
(ii)	<p>A axes labelled even scale;</p> <p>P both plots accurate $\pm \frac{1}{2}$ small square ;</p> <p>C columns not touching of same width columns at least half the grid on y-axis;</p>	[3]	<p>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</p> <p>R superimposed columns</p>
(iii)	220–350 (milliseconds) ;	[1]	
		[Total: 27]	
2 (a) (i)	<p>Outlines – all lines single, clear and unbroken ;</p> <p>Size – occupies at least half of the space provided ;</p> <p>Detail – oval shape + phloem + 1 other area ; two other areas shown ;</p> <p>Label – line to correct area on drawing to show position of xylem (vessel) and line labelled “xylem”</p>	[5]	

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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]	$\pm 1 \text{ mm}$ A cm / μm I other units $\pm 1 \text{ mm}$ 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]	