Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/51**

Paper 5 Practical Test **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)	length 30 (mm), width 10 (mm), height 10 (mm) ;	[1]	Check Supervisor's report and candidates for variation **A** cm if clearly shown
(ii)	1. table drawn to show rows / at least 3 columns ; 2. table drawn with room for at least 4 bubble readings ; 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 / stick / piece / AW slice / stick and 1 or 2 / mean / average (number of bubbles per 3 min or per 1 min) ; 4. four numbers for bubbles recorded ; *even if all are 0 bubbles; but not tally chart alone without number of bubbles.* 5. mean calculated for each potato piece A and B ; *allow ½ of a bubble 14.5.* 6. mean for A and B are different (expect A < B) ;	[6]	Check supervisor's report
(b)	prevents leakage of oxygen / all oxygen collected ; increases accuracy / results will be comparable / consistent / reliable / valid / AW; 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

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<table>
<tr><th>Question</th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(c) (i)</td><td>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 ;</td><td>[max 1]</td><td>A as number of bubbles increases the activity of the catalase increases

need not refer to catalase (more bubbles means more activity)
A concentration of alcohol.</td></tr>
<tr><td>(ii)</td><td>B has more catalase activity / bubbles, A has less activity / bubbles ;</td><td>[1]</td><td>I restatement of results (number of bubbles from each piece of potato)</td></tr>
<tr><td>(iii)</td><td>number showing same trend as candidates results ;</td><td>[1]</td><td></td></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>for each potato piece: measured 10 cm^3 or used same strength / volume solution;</td></tr>
<tr><td>potato;</td><td>same dimensions used for each piece / / 30 mm × 5 mm × 10 mm or pieces cut from same potato / type of potato / surface area ;</td></tr>
<tr><td>time ;</td><td>for bubble counting – keep the same time e.g. counted for 3 min for each piece / soaking for same time e.g. 24 hours;</td></tr>
</table>
</td><td>1 + 1

[max 2]</td><td>variable must match control given

‘Same time’ needs qualification.</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(ii)</td><td>
<table>
<tr><td>source of error</td><td>method of reducing error</td></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>
<tr><td>(iii)</td><td>
<table>
<tr><td>source of error</td><td>reason</td></tr>
<tr><td>size of potato / surface area / type / freshness ;</td><td>may not be equal so affect rate of activity;</td></tr>
<tr><td>temperature different;</td><td>affects enzyme activity / AW</td></tr>
<tr><td>temperature;</td><td>different temperature affect activity / AW;</td></tr>
<tr><td>carry out more repeats / trials;</td><td>identify anomalous results / AW;</td></tr>
</table>
</td><td>[2]</td><td>method must match the error. 1 mark for error, 1 mark for reason.

R reference to bubbles already in (d)(ii) or (b) loose bung.</td></tr>
</table>

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Question	Mark scheme	Mark	Guidance
(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 in **B** / 2% quoted results ;	[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]	
(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]	

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Question	Mark scheme	Mark	Guidance
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]	
(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]	

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Question	Mark scheme	Mark	Guidance
(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]	

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