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

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.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

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]	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

<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>

<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>

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)	280 **;**	[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]	

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]	

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]	