



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 ; <i>even if all are 0 bubbles; but not tally chart alone without number of bubbles.</i> 5. mean calculated for each potato piece A and B ; <i>allow ½ of a bubble 14.5.</i> 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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Question	Mark scheme	Mark	Guidance								
(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 need not refer to catalase (more bubbles means more activity) A concentration of alcohol.								
(ii)	B has more catalase activity / bubbles, A has less activity / bubbles ;	[1]	I restatement of results (number of bubbles from each piece of potato)								
(iii)	number showing same trend as candidates results ;	[1]									
(d) (i)	<table><tr><th><i>variable</i></th><th><i>controlled by</i></th></tr><tr><td>hydrogen peroxide volume / concentration.</td><td>for each potato piece: measured 10 cm³ 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>	<i>variable</i>	<i>controlled by</i>	hydrogen peroxide volume / concentration.	for each potato piece: measured 10 cm ³ or used same strength / volume solution;	potato;	same dimensions used for each piece // 30 mm × 5 mm × 10 mm or pieces cut from same potato / type of potato / surface area ;	time ;	for bubble counting – keep the same time e.g. counted for 3 min for each piece / soaking for same time e.g. 24 hours;	1 + 1 [max 2]	variable must match control given 'Same time' needs qualification.
<i>variable</i>	<i>controlled by</i>										
hydrogen peroxide volume / concentration.	for each potato piece: measured 10 cm ³ or used same strength / volume solution;										
potato;	same dimensions used for each piece // 30 mm × 5 mm × 10 mm or pieces cut from same potato / type of potato / surface area ;										
time ;	for bubble counting – keep the same time e.g. counted for 3 min for each piece / soaking for same time e.g. 24 hours;										

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Question	Mark scheme		Mark	Guidance
(ii)	source of error	method of reducing error	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;		
(iii)	source of error	reason	[2]	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.
	size of potato/ surface area/ type/ freshness ;	may not be equal so affect rate of activity;		
	temperature different;	affects enzyme activity/ AW		
	temperature;	different temperature affect activity/ AW;		
	carry out more repeats/ trials;	identify anomalous results/ AW;		

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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 $\pm 1\frac{1}{2}$ 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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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]	

