

CAMBRIDGE INTERNATIONAL EXAMINATIONS**Cambridge International General Certificate of Secondary Education****MARK SCHEME for the March 2016 series****0610 BIOLOGY****0610/62**

Paper 6 (Alternative to Practical), maximum raw mark 40

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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>idea of</i> withdrawing a sample to test ; aspect of appropriate method described ;	[2]	
(b)	1 one table with ruled lines for at least 6 rows and 3 columns ; 2 a column / row, with header: time / min ; 3 two, columns / rows headings as, colour / observation, W / C ; 4 correct completion of information into table ;	[4]	R units in any data cell / m for min R if colour and letter not both a 'header'
(c) (i)	<i>idea of</i> equilibration ;	[1]	
(ii)	<i>idea of</i> minimising contamination ; <i>idea of</i> allowing simultaneous measurement ;	[max 1]	
(d)	(blue-black shows) starch present at, 0 min / start ; (dark brown shows) some starch present at 2 min ; (orange-brown shows) no starch present, after 2 min / from 4 min ;	[3]	
(e)	yes : C stayed blue-black for longer / slower colour change ; ORA OR no : there is not a large enough range of temperatures ;	[max 1]	
(f) (i)	drop / dropping pipettes, are imprecise / volume of amylase may vary ; shaking can, cause spillage / inconsistent mixing ;	[max 1]	I miscounting (of drops)
(ii)	appropriate apparatus to measure precise volume ; e.g. syringe / burette / graduated pipette / measuring cylinder ; appropriate apparatus to stir carefully / consistently; e.g. (magnetic) stirrer / glass rod / bung / test-tube shaker ;	[max 1]	

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Question	Mark scheme		Mark	Guidance																		
(g)	<table><tr><th>Source of error</th><th>Improvement</th></tr><tr><td>experiment was done only once ;</td><td>repeat entire experiment (at least 3 times in total) to calculate an average ;</td></tr><tr><td>shaking, can cause spillage/ inconsistent mixing ;</td><td>(magnetic) stirrer / glass rod bung / flask to swirl;</td></tr><tr><td>drops / dropping pipettes, are imprecise / volume of amylase may not be the same ;</td><td>use syringe / burette / graduated pipette / measuring cylinder ;</td></tr><tr><td>(long) intervals between testing / AW ; A reaction finishes between points</td><td>test, more often / every minute / 30 seconds;</td></tr><tr><td>colour changes are subjective ; A endpoint hard to judge</td><td>colour chart / standards / control with no starch / colorimeter ;</td></tr><tr><td>trying to do, W and C simultaneously ;</td><td>do W and C separately / second person to do second tube ;</td></tr><tr><td>(water) temperature changes ;</td><td>insulate beakers / use (thermostatically controlled) water-bath ;</td></tr><tr><td>AVP ; e.g. contents in pipette might contaminate spotting tests</td><td>AVP ; e.g. use clean pipettes each time</td></tr></table>		Source of error	Improvement	experiment was done only once ;	repeat entire experiment (at least 3 times in total) to calculate an average ;	shaking, can cause spillage/ inconsistent mixing ;	(magnetic) stirrer / glass rod bung / flask to swirl;	drops / dropping pipettes, are imprecise / volume of amylase may not be the same ;	use syringe / burette / graduated pipette / measuring cylinder ;	(long) intervals between testing / AW ; A reaction finishes between points	test, more often / every minute / 30 seconds;	colour changes are subjective ; A endpoint hard to judge	colour chart / standards / control with no starch / colorimeter ;	trying to do, W and C simultaneously ;	do W and C separately / second person to do second tube ;	(water) temperature changes ;	insulate beakers / use (thermostatically controlled) water-bath ;	AVP ; e.g. contents in pipette might contaminate spotting tests	AVP ; e.g. use clean pipettes each time		R improvement if it contradicts error A errors and improvements 2 and 3 if not already awarded in 1(f)
	Source of error	Improvement																				
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		[max 2]																				

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(h)	1 test at 40 °C ; 2 test at least one temperature below 40 °C <u>and</u> one above ; 3 use of water-bath (to maintain different temperatures)/AW ; 4&5 named controlled variables ;; 6 measure time taken until iodine becomes orange brown / <u>no</u> longer changes colour ; 7 by repeated sampling at interval of less than 2 mins ; 8 repeat entire experiment/replicates ; 9 relevant stated safety procedure ;	[max 6]	Units must be stated correctly once 4&5 – e.g. equilibration time ; pH ; volume / concentration, iodine / amylase / starch ; I amount / quantity I regular
(i)	Benedict's solution turns (brick) red ; with heat ;	[2]	A orange / yellow / green
		[Total: 24]	
2 (a) (i)	A axes labelled with units, in correct orientation ; S linear scale for plotted points to cover half or more in both dimensions ; P all plotted points accurate to $\pm$ half small square ; L smoothed line passing through all points ; L line with no extrapolation ;	[5]	A x: distance / cm y: bubbles per min OR bubbles / min R m for min S origin must be stated at least once P R bar chart / histogram L R feathering / thick line
(ii)	line drawn from 6 bubbles to trend line, and then to the distance axis ; correct reading from their graph ;	[2]	ecf for wrong trend line in 2(a)(i) R if wrong units
(iii)	1 at higher light (intensity) rate of oxygen production is higher ; ora 2 at shorter distance from lamp rate of oxygen production is higher ; ora 3 comparative data quote with units stated at least once ; 4 <i>idea that</i> there is a non-linear relationship / not (directly) proportional ;	[max 2]	A faster photosynthesis for higher rate of oxygen produced.

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(iv)	prevents (lamp) heating up, plant/water ;	[1]	I maintain/control, temperature A stops temperature rise / water absorbs heat/lamp releases heat I cooling
(b) (i)	O – clear outline ; S – size larger than Fig. 2.2 ; D – detail (3 or 4 layers shown) proportions must be: thin → thick → medium moving inwards ;	[3]	O – R any cell detail drawn / feathering / shading / drawn with a compass S – R if smaller than 8 cm diameter
(ii)	L – stele labelled and label line touches or enters the stele	[1]	
(iii)	69 ±0.5 (mm) ; (=69/7.5) 9 (times / x) ;	[2]	A 6.9 <u>cm</u> ecf correct calculation to nearest whole number from wrong measurement R if wrong units stated
		[Total: 16]	