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

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 March 2016 series for most Cambridge IGCSE® and Cambridge International A and AS Level components.

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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

Question	Mark scheme	Mark	Guidance
1 (a)	*idea of* 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)	*idea of* equilibration ;	[1]	
(ii)	*idea of* minimising contamination ; *idea of* 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]	

<table>
<tr><th>Question</th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr>
<td>(g)</td>
<td>
<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>
</td>
<td>[max 2]</td>
<td>R improvement if it contradicts error

A errors and improvements 2 and 3 if not already awarded in 1(f)</td>
</tr>
</table>

Question	Mark scheme	Mark	Guidance
(h)	**1** test at 40 °C ; **2** test at least one temperature below 40 °C and 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 / no 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 ± 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** *idea that* there is a non-linear relationship / not (directly) proportional ;	[max 2]	**A** faster photosynthesis for higher rate of oxygen produced.

Question	Mark scheme	Mark	Guidance
(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 cm **ecf** correct calculation to nearest whole number from wrong measurement **R** if wrong units stated
		[Total: 16]	