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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
- <u>underline</u> 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)	*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]	

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Question	Mark scheme	Mark	Guidance
(g)		[max 2]	**R** improvement if it contradicts error **A** errors and improvements 2 and 3 if not already awarded in **1(f)**

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

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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.

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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]	

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