MARK SCHEME for the March 2016 series

0610 BIOLOGY

0610/52	Paper 5 (Practical Test), 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.

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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

Question	Mark scheme	Mark	Guidance
1 (a)	change to blue-black	[1]	
(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 ; 5 **W** – start is blue-black, gradual change through dark brown to orange-brown ; 6 **C** – start is blue-black, remains blue-black for longer than **W**, may turn brown towards the end ;	[6]	**R** units in any data cell/m for min **R** if colour and letter not both a 'header'
(c)	*idea of* minimising contamination ; to measure simultaneously ;	[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]	

Question	Mark scheme	Mark	Guidance
(f)	*any two errors with two matching improvements:* 		**R** improvement if it contradicts error

any two errors with two matching improvements:

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 ; Accept method without equipment
(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

[max 4]

Question	Mark scheme	Mark	Guidance
(g)	**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 / 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
(h)	Benedict's solution turns (brick) red ; with heat ;	[2]	**A** green / yellow / orange for red
		[Total: 24]	

2 (a) (i)	**A** axes labelled with units, in correct orientation ;
	S linear scale for plotted points to 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 their 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]	