MARK SCHEME for the October/November 2015 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
- **/**   separates alternatives within a marking point
- **R**   reject
- **ignore**   mark as if this material was not present
- **A**   accept (a less than ideal answer which should be marked correct)
- AW   alternative wording (accept other ways of expressing the same idea)
- <u>underline</u>   words underlined (or grammatical variants of them) must be present
- max   indicates the maximum number of marks that can be awarded
- mark independently   the second mark may be given even if the first mark is wrong
- ecf   credit a correct statement that follows a previous wrong response
- ( )   the word / phrase in brackets is not required, but sets the context
- **ora**   or reverse argument
- AVP   any valid point

Question	Answer	Mark	Additional Guidance
1 (a)	appropriate number of rows and columns ; headings correct (time and temperature); both units correct (s and °C) ; 3 different temperatures recorded ; time recorded for each temperature ; results as expected (hottest first) ;	[6]	
(b) (i)	to make the results more reliable / to find anomalies / AW ;	[1]	**ignore** to reduce / avoid errors / accuracy **A** to find average / mean
(ii)	(rate of respiration) increases as the temperature increases;	[1]	

(c)	(i)	(all the temperatures timed together, so) it is difficult to watch them at same time / AW ; difficult to judge colour or end point (to know when to stop timing) ;	max [1]	
	(ii)	put the test-tubes in one at a time / measure separately / stagger the time AW ; use white card or colorimeter AW to see colour change more clearly; repeats ;	max [1]	answer needs to be consistent with (c)(i)
	(iii)	yeast foaming out of the test-tube / volume loss / difficult to measure volume accurately / yeast activity is variable ;	[1]	

(d)	**(i)**	($54 \div 30$) = <u>1.8</u> ;	[1]	
	(ii)	axes labelled and scaled evenly *x axis* – pH and *y axis* – rate of CO_2 production / cm^3 per min ; size ; all points plotted accurately to ±½ small square ; line drawn ; [4]		
	(iii)	*description:* as the pH increases the volume / rate increases **ora** ; credit use of calculated data ; *explanation:* reference to **enzymes** linked to pH ; [3]		**A** any rate / volume doubles between pH4 and pH5 / or rate / volume trebles between pH5 and pH6. **A** increased pH increases **enzyme** activity;
			[Total: 19]	

2	(a)	(i)	drawing of outer edge uses single clear unbroken lines ; drawing occupies at least half of the space provided ; detail ;	[3]	e.g. four or more distinct compartments / sections
		(ii)	length **XY** on photomicrograph is 58 (mm) ; line drawn on drawing and measurement recorded ±1 mm ; correct units recorded for at least one measurement ; formula: $\dfrac{\text{length of } \mathbf{XY} \text{ on drawing}}{\text{length of } \mathbf{XY} \text{ on photomicrograph}}$; correct magnification ;	[5]	

(b) (i)	*any two differences:*			[2]
	feature	pollen grain **R**	pollen grain **S**	
	shape	round / spherical / AW	lobed / triangular / oval / elongated / bean shaped / AW ;	
	surface	spikey / hooked / rough / pointed	smooth / wrinkled ;	
	Number of visible parts / areas / AW	entire / one part	more than one visible part / AW ;	
(ii)	spikes / hooks AW (on the outside surface) ;		[1]	

(c) (i)	idea of a graticule / ruler in the eyepiece / microscopic ruler ;	[1]	.
(ii)	*any three from:* during first 6 / up to 8 minutes pollen tube **R** grows faster / more than pollen tube **S**; after 6 / 8 minutes pollen tube **S** grows faster / more than pollen tube **R**; after / at 20 minutes / at end pollen tube S is longer than pollen tube **R**; use of calculated figures to compare **S** and **R**;	max [3]	**A** comparative statements **ignore** figures quoted directly from table. **N.B.** pollen tube **S** is 11.3μm longer than pollen tube R after **20** minutes = 2

(d) (i)	*sampling* – picking fruits at different levels on the same plant / different plants of same species; different levels of fruit on plant / different locations / random numbering of samples e.g. choosing numbers from table / pick fruits from a bag / AVP; *counting seeds* – inside container / water / collect fruits before they split open / discard fruits that have already split / cut seeds from each fruit ; method e.g. tally chart, click counter, repeating / count more than once ;		max [3]	**need to give the idea that individual fruits are counted separately**
(ii)	<u>23</u>;	[1]		
(iii)	<u>24</u>;	[1]		
(iv)	(idea that) pollen does not grow long enough (to reach ovules) / pollen not reaching stigma / lack of pollinators AW / less ovules (fertilised or un-fertilised) ovules do not develop / less fertilisation / AW / named environmental factors e.g. not enough water / cold or frost / minerals / disease AW ;		[1]	**ignore** mutation / genes / genetic makeup
		[Total: 21]		