
BIOLOGY

5090/61

Paper 6 Alternative to Practical

May/June 2017

MARK SCHEME

Maximum Mark: 40

Published

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 May/June 2017 series for most Cambridge IGCSE[®], Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

Mark schemes will use these abbreviations:

;	separates marking points
/	alternatives
()	contents of brackets are not required but should be implied
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
Ig	ignore (for incorrect but irrelevant responses)
AW	alternative wording (where responses vary more than usual)
AVP	alternative valid point (where a greater than usual variety of responses is expected)
ORA	or reverse argument
<u>underline</u>	actual word underlined must be used by candidate
+	statements on both sides of the + are needed for that mark

Question	Answer	Marks	Guidance
1(a)(i)	axes correct orientation and both axes labelled fully ; linear scale for both axes ; all 5 points visibly plotted correctly ; plotted points joined with ruled lines and no extrapolation ;	4	
1(a)(ii)	activity / volume of oxygen produced increases as pH increases ; reaches a peak / AW at pH7 ; then decreases ;	3	A neutral for pH7
1(a)(iii)	concentration of hydrogen peroxide ; volume of hydrogen peroxide ; mass of tissue ; surface area of tissue ;	2	

Question	Answer	Marks	Guidance
1(a)(iv)	use same volume / concentration of hydrogen peroxide each time ; idea of using same type / volume / mass / surface area of enzyme / tissue ; fresh samples used (at each temperature) ; different temperatures ; range of suitable temperatures stated ; method of maintaining temperature ; leave time for flask and contents to come to temperature before measuring begins ; measure volume of oxygen produced in (same) given time ;	5	A water bath, R direct heating
1(a)(v)	stated safety precaution ; explanation ;	2	explanation must be linked to safety precaution
1(b)(i)	60 (°C) ;	1	
1(b)(ii)	breaks down protein (stains) ; named protein stain e.g. blood / food / milk ; not denatured / deactivated by hot water / AW ;	2	
	Total:	19	

Question	Answer	Marks	Guidance									
2(a)	drawing 35–45 mm diameter ; overall shape and proportions ; nucleus correct shape ; clear, continuous, smooth (rather than sketchy outline) of cell with no shading, stippling or cross-hatching ;	4										
2(b)(i)	P : red blood cell / erythrocyte ; Q : white blood cell ;	2	A named type of white blood cell									
2(b)(ii)	cell Q has: nucleus present ; granular cytoplasm ; larger (than cell P) ;	1										
2(c)	<table border="1" data-bbox="322 922 1115 1075"> <thead> <tr> <th data-bbox="322 922 589 971">feature</th> <th data-bbox="589 922 851 971">cell Q</th> <th data-bbox="851 922 1115 971">plant cell</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 971 589 1021">cell wall</td> <td data-bbox="589 971 851 1021">absent</td> <td data-bbox="851 971 1115 1021">present ;</td> </tr> <tr> <td data-bbox="322 1021 589 1075">nucleus</td> <td data-bbox="589 1021 851 1075">lobed AW</td> <td data-bbox="851 1021 1115 1075">round / circular ;</td> </tr> </tbody> </table>	feature	cell Q	plant cell	cell wall	absent	present ;	nucleus	lobed AW	round / circular ;	2	award one mark for each correct row
feature	cell Q	plant cell										
cell wall	absent	present ;										
nucleus	lobed AW	round / circular ;										
	Total:	9										

Question	Answer	Marks	Guidance
3(a)(i)	width = 22 ; mm ;	2	A ± 1 mm A 2.2 cm
3(a)(ii)	44 (mm) ; ;	2	A 42–46 consistent with (a)(i) correct answer, with no working shown, gains both marks
3(b)(i)	mean width of leaves from shady position = 46.2 (mm) ; mean width of leaves from sunny position = 32.7 (mm) ;	2	
3(b)(ii)	leaves from a shady position have a higher mean width ; leaves from a sunny position have more variable widths ;	2	
3(b)(iii)	take more leaves / use larger sample ;	1	lg calculate average / mean
3(c)	leaves from shady place have a <u>larger surface / area</u> ; to trap more / available light ; for <u>photosynthesis</u> ; OR leaves from sunny position have <u>smaller surface / area</u> ; lose <u>less</u> water ; due to <u>transpiration</u> ;	3	A less evaporation
	Total:	12	