

**BIOLOGY**

**9700/36**

Paper 3 Advanced Practical Skills 2

**October/November 2016**

**MARK SCHEME**

Maximum Mark: 40

**Published**

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This document consists of **6** printed pages.

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Question	Answer	Mark
1(a)	(risk assessment)  irritant + medium risk ;	1
1(b)(i)	(decisions on serial dilutions)  1 correct concentrations of 0.5, 0.25, 0.125, 0.0625 + % ;  2 shows transfer of 20 cm <sup>3</sup> of 1% to next dilution + 20 cm <sup>3</sup> transferred from 2nd to 3rd beaker and from 3rd to 4th and from 4th to 5th + cm <sup>3</sup> ;  3 adds 20 cm <sup>3</sup> of water to each beaker ;	3
1(b)(ii)	(recording results)  1 table drawn + heading, percentage concentration of antibiotic ;  2 heading, time + seconds ;  3 records results for at least four concentrations ;  4 correct pattern of results, the highest concentration of antibiotic recorded as the shortest time for colour change ;  5 times recorded as whole seconds ;	5
1(b)(iii)	(records time for U)  appropriate number for time + seconds ;	1
1(b)(iv)	(interpretation of estimate)  correct estimate in accordance with recorded times ;	1

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
1(b)(v)	(source of error with reason)  appropriate error with reason e.g. colour + difficult to judge ;	1
1(b)(vi)	(modification to investigate another variable)  1 (to standardise concentration of antibiotic) uses stated concentration of antibiotic or uses same concentration of antibiotic ;  2 (changes independent variable – temperature) at least five temperatures ;  3 (method) uses thermostatically controlled water-bath ;	3
1(c)(i)	(layout of data)  1 (x-axis) external concentration of glucose / $\text{mmol dm}^{-3}$ + (y-axis) rate of glucose uptake by cells / $\text{mmol cm}^{-3} \text{ hr}^{-1}$ ;  2 (scale on x-axis) 5 to 2 cm, labelled at least each 2 cm + (scale on y-axis) 100 to 2 cm, labelled at least each 2 cm ;  3 correct plotting of five points with a small cross or dot in circle ;  4 five plots joined point to point, drawn as a thin line ;	4
1(c)(ii)	(interpretation)  correctly reads value for rate of glucose uptake from graph at 7 $\text{mmol dm}^{-3}$ ;	1

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
1(c)(iii)	<p><i>(conclusion)</i></p> <p>1 reference to carrier proteins/channel proteins ;</p> <p>2 (at low concentrations of external glucose) carrier proteins available or (at high concentrations of external glucose) limited availability of carrier proteins ;</p>	<b>2</b>
	<b>Total:</b>	<b>22</b>

<b>Question</b>	<b>Answer</b>	<b>Mark</b>
2(a)(i)	<p><i>(plan drawing)</i></p> <p>1 large size + no shading ;</p> <p>2 no cells + at least three lines or two lines and part of vascular tissue + correct section drawn ;</p> <p>3 part of vascular tissue + epidermis drawn as two lines drawn closely together ;</p> <p>4 uses one label line + one label to phloem ;</p>	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
2(a)(ii)	<p><i>(layout of drawing)</i></p> <p>1 quality of line for outer wall of cells thin and sharp + minimum size at least 40 mm across largest cell ;</p> <p>2 only four cells drawn, each cell touching at least one other cell + no shading ;</p> <p>3 cell walls drawn as two lines close together ;</p> <p>4 at least one cell drawn with at least five sides ;</p> <p>5 uses one label line + one label to cell wall ;</p>	<b>5</b>
2(b)(i)	<p><i>(simplest ratio)</i></p> <p>1 measures depth of the midrib + length of the vascular bundle ;</p> <p>2 records whole numbers (mm) or to 0.5 (mm) for both measurements ;</p> <p>3 displays, in final ratio, larger number to smaller number ;</p> <p>4 final answer as simplest ratio ;</p>	<b>4</b>
2(b)(ii)	<p><i>(conclusion)</i></p> <p>thick cuticle or air spaces or AVP ;</p>	<b>1</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
2(c)	<p><i>(observable differences)</i></p> <p>organises comparison into three columns with one column for features, one headed <b>M1</b> and one headed <b>Fig. 2.2</b> ;</p> <p>any three observable differences of comparison ; ; ;</p>	<b>4</b>
	<b>Total:</b>	<b>18</b>