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**BIOLOGY**

**9700/33**

Paper 3 Advanced Practical Skills 1

**October/November 2017**

MARK SCHEME

Maximum Mark: 40

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**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.

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Question	Answer	Marks
1(a)(i)	regular intervals + at least 5 times ;	<b>1</b>
1(a)(ii)	top of arrow to appropriate height ; bottom of arrow to appropriate height ;	<b>2</b>
1(b)(i)	1 table drawn + heading pH ; 2 heading height of foam + mm ; 3 records results for at least three times + 5 pH values ; 4 height of foam recorded as whole millimetres ;	<b>4</b>
1(b)(ii)	shows maximum height of foam for pH 5 divided by time ; answer to the appropriate degree of accuracy ;	<b>2</b>
1(b)(iii)	decides whether temperature was a significant source of error ;	<b>1</b>
1(b)(iv)	states the height of foam for <b>U</b> ;	<b>1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(b)(v)	estimates the correct pH using the result stated in <b>(b)(iv)</b> ;	<b>1</b>
1(b)(vi)	states at least five concentrations of hydrogen peroxide ;  concentrations of hydrogen peroxide prepared by proportional dilution or serial dilution ;  describes counting the number of bubbles or collecting the volume of oxygen using displacement of water or alternative correct method ;	<b>3</b>
1(c)(i)	<p>1 (x-axis) temperature °C + (y-axis) rate of enzyme activity / arbitrary units ;</p> <p>2 (scale on x-axis) 10.0 to 2 cm, labelled at least each 2 cm + (scale on y-axis) 10.0 to 2 cm, labelled at least each 2cm ;</p> <p>3 correct plotting of five points with a small cross or dot in circle ;</p> <p>4 five plots, joined plot to plot + thin line drawn ;</p>	<b>4</b>
1(c)(ii)	correct reference to optimum temperature + 16°C ;  as temperature increase more enzyme substrate complexes form or correct reference to kinetic energy ;  after a specific temperature enzyme denatured ;	<b>3</b>

Question	Answer	Marks
2(a)(i)	1 plan diagram of appropriate size + no cells ; 2 correct section drawn ; 3 draws tissues in the part of the vascular ring below <b>R</b> ; 4 draws detail of tissues at the top of <b>R</b> correctly ; 5 draws tissues beneath the epidermis correctly ; 6 uses one label line + one label to identify the epidermis ;	<b>6</b>
2(a)(ii)	1 quality of line for outer wall of cells + cells of appropriate size ; 2 only four cells drawn, each cell of the group touching at least two of the other cells ; 3 cell walls drawn as two lines close together ; 4 a cell drawn with 5 sides or more ; 5 uses one label line + one label, <b>C</b> , to identify a structure made of cellulose ;	<b>5</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(b)(i)	correct measurement of line <b>X</b> ; records correct units ; correct answer shown to appropriate degree of accuracy ;	<b>3</b>
2(b)(ii)	states only observable differences ; any three observable differences of comparison ;;; e.g. on <b>J1</b> the vascular tissue is positioned in the shape of a ring while the vascular bundles in Fig. 2.2. are distributed throughout the stem	<b>4</b>