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BIOLOGY **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2017**

MARK SCHEME

Maximum Mark: 40

Published

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Question	Answer	Marks
1(a)(i)	refers to the contents of the test-tubes reaching the temperature of the water-bath **;**	**1**
1(a)(ii)	appropriate statement concerning temperature as a significant source of error with reference to the difference in temperature at the end of the investigation **;**	**1**
1(a)(iii)	table drawn **+** heading, trial or test-tube **;** records 3 times **;**	**2**
1(a)(iv)	Suggests appropriate advantage of carrying out a trial test **;** e.g. learning to identify when the end-point reached	**1**
1(a)(v)	time taken to reach end-point **;**	**1**
1(a)(vi)	correct concentrations of 50, 25, 12.5 **+** % **;** shows transfer of 20 cm^3 of 100 (%) to next dilution **+** 20 cm^3 transferred from 2^{nd} to 3^{rd} beaker and from 3^{rd} to 4^{th} **+** cm^3 **;** adds 20 cm^3 of water to each beaker **;**	**3**
1(a)(vii)	1 table drawn **+** heading, concentration of milk / % **+** time to reach the end-point / seconds **;** 2 records at least 3 times for 3 substrate concentrations **;** 3 records the fastest time for the highest concentration of milk **;** 4 records times as whole seconds **;**	**4**
1(a)(viii)	replaces milk with water or replaces enzyme with water or uses boiled and cooled enzyme **;**	**1**
1(a)(ix)	states an appropriate concentration of milk **;** uses at least five temperatures **;** use of thermostatically controlled water-bath **;**	**3**

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Question	Answer	Marks
1(b)(i)	1 (*x*-axis) source of milk **+** (*y*-axis) percentage mass of protein **;** 2 (*x*-axis) even width of bars **+** (scale on *y*-axis) 2.0 to 2 cm, labelled at least each 2 cm **;** 3 correct plotting of five bars **+** bars in order of table **;** 4 five separate bars **+** bars drawn with thin lines **+** labelled appropriately **;**	**4**
1(b)(ii)	states that seal milk has the highest concentration of protein **;** more enzyme substrate complexes formed or more substrates bind to active sites of enzymes **;**	**2**

Question	Answer	Marks
2(a)(i)	1 plan diagram of appropriate size **+** no cells **+** no shading **;** 2 correct section drawn **+** draws at least 3 different layers of tissue **;** 3 draws 3 layers of tissue for the central stele or for the edge of the root **;** 4 draws air spaces in the cortex **;** 5 uses one label line **+** one label to identify the endodermis **;**	**5**
2(a)(ii)	1 quality of line for the outer wall of xylem vessels **+** cells of appropriate size **;** 2 draws only four xylem vessels **+** with the large xylem vessel touching each of the other 3 smaller vessels **;** 3 cell walls drawn as two lines close together **;** 4 draws the largest xylem vessel lumen at least twice the size of the smallest xylem vessel lumen **;**	**4**
2(a)(iii)	correct annotation to lumen (e.g. unrestricted flow of water) **or** to wall (e.g. prevents xylem vessel collapsing) **;**	**1**

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Question	Answer	Marks
2(b)	1 correct measurement of scale bar **;** 2 shows length of scale bar in μm, divided by 2499 **;** 3 shows length of line, **X**–**Y**, divided by answer to mp2 **;** 4 decides to record answer in μm **;** *alternative ways to calculate actual diameter accepted*	**4**
2(c)	any three observable differences of comparison **;;;** e.g. on **M1** air spaces present while in Fig. 2.2. air spaces absent	**3**

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