Cambridge International AS & A Level

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BIOLOGY **9700/36**

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

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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**

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**

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**