Cambridge International AS & A Level

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BIOLOGY **9700/31**

Paper 31 (Advanced Practical Skills 1) **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.

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Mark scheme abbreviations

;	separates marking points
/	alternative answers for the same point
R	reject
A	accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
I	ignore

Question	Answer	Marks
1(a)(i)	1 correct concentrations 0.05, 0.025, 0.0125, 0.00625 **+** % at least once **;** 2 shows transfer of 10 cm^3 of 0.05 (%) to next dilution + 10 cm^3 transferred from 2nd to 3rd beaker and from 3rd to 4th and from 4th to 5th **+** cm^3 at least once **;** 3 adds 10 cm^3 of water to each beaker **;**	**3**
1(a)(ii)	1 table drawn **+** heading, percentage concentration of vitamin C / **V ;** 2 heading, volume of DCPIP **+** cm^3 **;** 3 records volumes for at least four concentrations **;** 4 correct pattern of results, the volume for the highest concentration of vitamin C recorded as the highest volume **;**	**4**
1(a)(iii)	*idea of* colour change is difficult to judge **or** difficult to read the syringe **+** reason **;**	**1**
1(a)(iv)	records volume for solution **X ;**	**1**
1(a)(v)	correct estimate according to results **;**	**1**
1(a)(vi)	1 more / wider / narrower, range of concentrations or named concentrations **;** 2 plot a graph **;** 3 read off graph **;**	**3**

Question	Answer	Marks
1(b)(i)	1 (*x*-axis) vegetable **+** (*y*-axis) vitamin C content / mg per 100 g **;** 2 even width of bars **+** scale on *y*-axis: 20 to 2 cm, labelled at least each 2 cm **;** 3 correct plotting of bars in the order of the table **;** 4 bars drawn with thin lines **+** labelled as in table **;**	**4**
1(b)(ii)	1 correct calculation of vitamin C remaining 79–44 **;** 2 shows division by 79 **+** multiplication by 100 **;**	**2**
1(b)(iii)	1 *idea of* membrane structure destroyed by heat **;** 2 vitamin C released from cells **or** vitamin C destroyed by heat **;**	**2**
	Total:	**21**

Question	Answer	Marks
2(a)(i)	1 minimum size at least 80 mm **+** at least 3 vascular bundles drawn **;** 2 no cells **+** only three vascular bundles **+** epidermis **;** 3 outer vascular bundles smaller than inner vascular bundles **;** 4 decides to subdivide vascular bundle into at least two areas **;** 5 uses one label line **+** one label to xylem **;**	**5**

Question	Answer	Marks
2(a)(ii)	1 measurements for both **L** and **T ;** 2 **L** at least 3 times larger than **T ;**	**2**
2(a)(iii)	1 quality of line for outer wall of cells (thin line) **+** minimum size at least 40 mm across largest cell **+** no shading **;** 2 **only** four cells drawn, each cell touching at least one other cell **;** 3 correct proportions of depth to length of epidermal cells using measurements in **(a)(ii) ;** 4 cells drawn with upper convex walls **;** 5 uses one label line **+** one label to cell wall **;**	**5**
2(a)(iv)	many stomata **or** large air spaces **;**	**1**
2(b)	1 shows multiplication by 1000 to convert measurement from mm to μm **;** 2 displays number divided by 1460 **;** 3 correct answer **;**	**3**
2(c)	any 3 correct differences annotated on Fig 2.2 **;;;**	**3**
	Total:	**19**