Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **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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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)	lose **+** less **;**	**1**
1(a)(ii)	completes Fig. 1.3 drawing all three directions correctly (up + level + down) **;**	**1**
1(b)(i)	for at least 4 suitable concentrations of **S ;** e.g. 0.8, 0.6, 0.4 and 0.2 decides correct volume of sucrose volumes for selected concentrations **;** decides correct total volumes (40 cm^3) for each concentration **;**	**3**
1(b)(ii)	decides appropriate length of potato pieces **;** e.g. 4.0 cm	**1**
1(b)(iii)	1 table drawn **+** heading, concentration of sucrose solution / mol dm^{-3} **;** 2 heading, direction of movement **;** 3 records speed of movement in an appropriate way **;** 4 decides to do repeated drops **;** 5 results for at least 4 concentrations of sucrose **;** 6 correct sequence of directions **;**	**6**

Question	Answer	Marks
1(b)(iv)	correct estimate of concentration of sucrose according to results in **(b)(iii)** ;	**1**
1(b)(v)	identifies one significant source of error ; e.g. difficulty of measuring and cutting pieces of potato to correct dimensions	**1**
1(b)(vi)	uses increased number of concentrations of sucrose solution ; between 2 stated concentrations appropriate to candidate's results ; read off from graph of results or replicate ;	**3**
1(b)(vii)	no net movement of water or reference to dynamic equilibrium ;	**1**
1(b)(viii)	shows on graph reading at 0.3 mol dm^{-3} to estimate the water potential ; correct estimate for water potential **+** kPa $\times 10^2$;	**2**

Question	Answer	Marks
2(a)(i)	1 quality of line (thin and continuous) for at least 6 grains drawn **;** 2 draws only 3 starch grains from **F +** only 3 starch grains from **G ;** 3 grains not overlapping **;** 4 starch grains from **F** drawn as oval shapes **+** starch grains from **G** drawn as angular shapes **;** 5 uses one label line **+** one label, **X**, to identify surface markings on grains **;**	**5**
2(a)(ii)	correct annotations describing observable differences between the starch grains from **F** and **G ;;;** e.g. size of grains from **F** larger than grains from **G**	**3**
2(b)(i)	1 (*x*-axis) time / minutes **+** (*y*-axis) reducing sugar concentration / μM **;** 2 (scale on *x*-axis) 10.0 to 2 cm, labelled at least each 2 cm **+** (scale on *y*-axis) 2.0 to 2 cm, labelled at least each 2 cm **;** 3 correct plotting of six points with a small cross or dot in circle **;** 4 six plots, joined plot to plot **+** thin line drawn **;**	**4**
2(b)(ii)	1 states correct reducing sugar concentration at 35 minutes (**x**) and 15 minutes (**y**) **;** 2 shows **x** minus **y ;** 3 shows answer to mp2 divided by **y** and multiplied by 100 **;**	**3**

Question	Answer	Marks
2(c)	1 plan diagram of appropriate size **+** no cells **+** no shading **;** 2 correct section drawn **+** draws only 3 vascular bundles **;** 3 draws epidermis as 2 lines **;** 4 draws at least one vascular bundle divided into at least 3 sections **;** 5 uses one label line **+** one label to identify phloem **;**	**5**