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Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **May/June 2019**

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.

Cambridge International will not enter into discussions about these mark schemes.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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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
AVP	alternative valid point

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Question	Answer	Marks
1(a)(i)	1. *objective lens* (×)40 **+** *number of cells* 5 or above **;** 2. *idea of* cells being large enough to see plasmolysis clearly with ×40 lens **or** *idea of* having a large number of cells there are enough to count cells in different stages of plasmolysis **;**	**2**
1(a)(ii)	1. heading for solution / sample / slide **;** 2. (heading for dependent) state of plasmolysis **;** 3. collects results for each solution **;** 4. correct trend **;** 5. records a number for each solution and each state of plasmolysis (at least 16 numbers in total) **;**	**5**
1(a)(iii)	correct results from candidates table **;**	**1**
1(b)	1. lines are continuous, thin and sharp **+** minimum size **;** 2. draws only 4 whole cells **+** each cell touching at least one of the other cells **+** at least two cells showing some degree of plasmolysis **;** 3. cell wall drawn as two lines, 3 lines where two cells touch **;** 4. label line and label to cell membrane **;**	**4**
1(c)(i)	1. below 0.4 mol dm^{-3} water moved into the potato tissue **or** above 0.4 mol dm^{-3} water moved out of the potato tissue **;** 2. no net movement of water at 0.4 mol dm^{-3} **;**	**2**
1(c)(ii)	1. (the sucrose solution / 0.2 mol dm^{-3} solution) had a higher water potential than the potato cells / tissue **;** 2. (so) water moved into the potato / cells / tissue by osmosis**;**	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(c)(iii)</td><td>
one mark per row

any three from:
<table>
<tr><th>variable</th><th>how variable may be standardised</th></tr>
<tr><td>potato</td><td>(same) age / from same plant / type / species / cut from the same potato ;</td></tr>
<tr><td>surface area</td><td>use ruler / calipers / cork borer ;</td></tr>
<tr><td>length / width / diameter / cross section</td><td>use measuring equipment, e.g. ruler, calipers ;</td></tr>
<tr><td>volume (of sucrose solution)</td><td>use a measuring cylinder / syringe / burette / graduated pipette to measure volume ;</td></tr>
<tr><td>time</td><td>timer ;</td></tr>
<tr><td>temperature</td><td>thermostatically controlled water-bath ;</td></tr>
</table>
</td><td>3</td></tr>
</table>

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Question	Answer	Marks
2(a)(i)	no plant / fake plant **or** plant with no leaves **or** accept use only one / same plant (and put in each condition) / AW **;**	**1**
2(a)(ii)	use (calcium / sodium / potassium) hydroxide / chloride / oxide **or** silica gel / drying agent **or** use dehumidifier **;**	**1**
2(a)(iii)	1. volume for P1, P2 and P3 + cm^3 **;** 2. records correct calculated values for each of the solutions for volume lost **;**	**2**
2(a)(iv)	correct answer from their results **+** least volume of water loss **;**	**1**
2(b)(i)	1. correct answer 240 **;** 2. shows 242 + 237 + 235 + 246 divided by 4 **or** shows 242 + 237 + 297 + 235 + 246 divided by 5 **; ecf**	**2**
2(b)(ii)	1. *x*-axis labelled as carbon dioxide concentration / ppm **+** *y*-axis labelled as number of stomata (/)mm^{-2} **;** 2. scale on *x*-axis 20 to 2 cm **+** labelled each 2 cm **+** scale on *y*-axis is 20 to 2 cm **+** labelled each 2 cm **;** 3. correct plotting of points with a small cross or dot in circle **;** 4. smooth, thin line, joined point to point, through 5 points / curve **or** line of best fit **;**	**4**
2(b)(iii)	as the concentration of carbon dioxide increases the number of stomata decreases **;**	**1**
2(b)(iv)	correct answer from candidates graph **;**	**1**

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Question	Answer	Marks
2(c)	1. minimum size **+** no shading **+** no cells **;** 2. whole leaf drawn **+** at least 3 lines **;** 3. correct leaf shape **+** at least 3 lines across width of vascular tissue in the centre **;** 4. correct proportion of the diameter of the central region to the total diameter of the leaf section **;** 5. label line and label to epidermis **;**	**5**
2(d)	1. 17 (eyepiece graticule units) **;** 2. shows multiplication of eyepiece graticule units by 39.7 **;** 3. correct answer **+** correct units **;**	**3**

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