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 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.

Cambridge International is publishing the mark schemes for the October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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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Question	Answer	Marks
1(a)(i)	shows at least three more concentrations of ethanol **;** shows correct volumes of **A** and **W** to make these concentrations **;**	**2**
1(a)(ii)	1. *heading for independent variable*: percentage concentration ethanol **and** before heading for dependent variable **and** no units in body of table **;** 2. *heading dependent variable*: symbol or colour intensity **;** 3. readings for all samples **;** 4. intensity of red colour decreases with decreasing concentration **;** 5. results recorded using ++++ scale **;**	**5**
1(a)(iii)	identifies the independent variable as concentration of ethanol **;**	**1**
1(a)(iv)	*any **three** from*: 1. proteins in membrane denatured **;** 2. dissolved phospholipids / hydrophobic components (of membrane) **;** 3. increases permeability **;** 4. higher concentrations of ethanol **and** more diffusion of pigment **;**	**3**
1(a)(v)	*any **two** sources of error **and** improvements from*: 1. colour judgement subjective **;** 2. colorimeter or use of colour chart **;** 3. cutting to 2 cm **;** 4. use of cutting template or more precise method of cutting described **;** 5. time lag **;** 6. staggered start **;** 7. washing only once **;** 8. standardise, e.g. washing twice **;**	**4**

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Question	Answer	Marks
1(b)(i)	1. *x*-axis: water potential / MPa **and** *y*-axis: acoustic emission / arbitrary units **;** 2. scale on *x*-axis: 0.25 MPa to 2 cm, labelled at least every 2 cm **and** scale on *y*-axis: 20 arbitrary units to 2 cm, labelled at least every 2 cm **;** 3. correct plotting of all six points using small crosses or dots in circles **;** 4. six plots joined with thin line passing through all points and line is either smooth curve or joined plot to plot **;**	**4**
1(b)(ii)	correct value from graph **;**	**1**
1(b)(iii)	*any **one** from*: reduce gap between intervals **;** AVP **;**	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>1. suitable size and no shading and no cells ;
2. draws correct sector ;
3. correct shape and distribution of tissues ;
4. correct proportions of tissues ;
5. label line and label to epidermis ;</td><td>5</td></tr>
<tr><td>2(a)(ii)</td><td>1. lines continuous, thin and sharp ;
2. draws only four whole cells and each cell touches at least two other cells ;
3. two lines around each cell and three lines where cells touch ;
4. at least one cell with three or more angles ;
5. label line and label to one cell wall ;</td><td>5</td></tr>
<tr><td>2(b)(i)</td><td>1. measures and records length of C–D, E–F and G–H ;
2. measures and records depth of six outer layers ;
3. (for diameter) shows addition of three values and shows division by three
and (for depth of outer layer) shows addition of six values and shows division by six ;
4. answers to correct degree of accuracy ;</td><td>4</td></tr>
<tr><td>2(b)(ii)</td><td>states answer as larger whole number to smaller whole number and simplest whole number ratio ;</td><td>1</td></tr>
<tr><td>2(c)</td><td>1. organises comparison into three columns with one column for features and collects only differences ;

any three from:

<table>
<tr><th>Feature</th><th>J1</th><th>Fig. 2.2</th></tr>
<tr><td>size of vascular bundles</td><td>smaller</td><td>larger ;</td></tr>
<tr><td>xylem</td><td>fewer</td><td>more ;</td></tr>
<tr><td>phloem</td><td>fewer</td><td>more ;</td></tr>
<tr><td>layers of cells around vascular tissue</td><td>two layers</td><td>one layer ;</td></tr>
<tr><td>air spaces</td><td>present / more / larger</td><td>absent / less / smaller ;</td></tr>
<tr><td>thickened layer beneath epidermis</td><td>present</td><td>absent ;</td></tr>
<tr><td>cortex cells</td><td>fewer</td><td>more ;</td></tr>
<tr><td>gaps in outer surface</td><td>present / more</td><td>absent / fewer ;</td></tr>
<tr><td>AVP</td><td>described</td><td>described ;</td></tr>
</table>
</td><td>4</td></tr>
</table>

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