Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/34**

Paper 3 Paper 34 (Advanced Practical Skills 2) **May/June 2020**

MARK SCHEME

Maximum Mark: 40

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

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

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & 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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Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	'List rule' guidance For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided • Any response marked *ignore* in the mark scheme should not count towards ***n*** • Incorrect responses should not be awarded credit but will still count towards ***n*** • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form, (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Mark scheme abbreviations:

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

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Question	Answer	Marks
1(a)(i)	1 at least three additional concentrations (between 10 and 0) ; 2 correct volumes of **S** and **W** to make total volumes of 50 cm^3 for each concentration ;	**2**
1(a)(ii)	states a volume that is between 30 cm^3 and 50 cm^3 ;	**1**
1(a)(iii)	1 *heading for independent variable:* concentration and percentage and to the left of the dependent variable ; 2 *heading for dependent variable:* distance and mm *or* cm ; 3 records results for at least four concentrations ; 4 *correct trend*: 10% concentration of sodium chloride has the largest distance ; 5 records distance as whole mm or to 0.5 mm ;	**5**
1(a)(iv)	time for **U** is closest to the result for 5% sodium chloride ;	**1**
1(a)(v)	1 the 10% sodium chloride solution had a lower water potential than the potato cells / the potato cells had a higher water potential than the 10% sodium chloride solution ; 2 the 0% sodium chloride solution had a higher water potential than the potato cells / the potato cells had a lower water potential than the 0% sodium chloride solution ;	**2**
1(a)(vi)	distance ;	**1**
1(a)(vii)	*any three from:* 1 use a narrower range of concentrations centred around the estimate of **U** ; 2 use at least five more concentrations (of sodium chloride) ; 3 use a protractor (to measure the angle of bend) ; 4 use a distance that is greater than 3 cm from where the potato piece is held to where it is pushed ; 5 use a method to ensure potato pieces are of the same thickness ; e.g. use same cork borer for all pieces 6 run experiments one at a time / stagger the start times ; 7 plot a graph for the standards and read off the result for **U** ; 8 repeat measurements for each concentration, including **U**, and calculate the mean ;	**3**

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Question	Answer	Marks
1(a)(viii)	ruler / graph paper and no effect (on estimating the concentration of **U**) and (because) the same, ruler / graph paper was used each time / the error was the same each time *or* ruler / graph paper and has an affect (on measured result) and (because) the true value will not be that measured *or* syringe and has an effect and (because) the concentrations will be different to those required *or* syringe and has no effect and (because) the concentrations will be the same since the proportions of **S** and **W** will be the same **;**	**1**
1(b)(i)	1 *x*-axis: temperature / °C and *y*-axis: number of molecules per mm^2 **;** 2 scale on *x*-axis: 20 to 2 cm, labelled at least every 2 cm and scale on *y*-axis: 5 to 2 cm, labelled at least every 2 cm **;** 3 correct plotting of all points using small crosses or dots in circles**;** 4 points joined with thin line passing through all points as either a smooth curve or straight lines joining each point to the next **;**	**4**
1(b)(ii)	1 as the temperature increases the number of molecules (diffusing) per mm^2 (of membrane) increases **;** 2 (because) the higher the temperature the, higher the kinetic energy of the molecules / the greater the permeability of the membrane **;**	**2**

Question	Answer	Marks
2(a)(i)	**TS *Ammophila*** 1 suitable size and no shading **;** 2 correct shape of outline of whole section of the leaf on **N1** and no cells drawn **;** 3 correct distribution and proportions of tissues **;** 4 vascular tissue subdivided **;** 5 label line and label to epidermis **;**	**5**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(ii)</td><td>TS Ammophila

1 suitable size <u>and</u> draws lines that are continuous, thin and sharp ;
2 draws three epidermal cells that are adjacent and touching <u>and</u> with a trichome attached to <u>one</u> of the cells ;
3 draws two lines drawn around each cell <u>and</u> three lines where cells touch ;
4 draws at least one cell with rounded shape ;
5 label line and label to cell wall ;</td><td>5</td></tr>
<tr><td>2(b)</td><td>1 records only observable differences ;

2, 3 and 4
any three from:

<table>
<tr><th>feature</th><th>N1</th><th>Fig. 2.1</th><th></th></tr>
<tr><td>shape</td><td>rolled / AW</td><td>round</td><td>;</td></tr>
<tr><td>epidermal cell walls</td><td>thick(er)</td><td>thin(ner)</td><td>;</td></tr>
<tr><td>layer under epidermis</td><td>thick(er) / more than one layer</td><td>thin(ner) / one layer</td><td>;</td></tr>
<tr><td>upper epidermis</td><td>folded / irregular / AW</td><td>smooth</td><td>;</td></tr>
<tr><td>trichomes</td><td>present / many</td><td>absent / none</td><td>;</td></tr>
<tr><td>number of vascular bundles</td><td>many / more</td><td>few(er) / one</td><td>;</td></tr>
<tr><td>shape of vascular bundle</td><td>oval / AW</td><td>round(er)</td><td>;</td></tr>
<tr><td>palisade layer</td><td>thin(ner)</td><td>thick(er)</td><td>;</td></tr>
<tr><td>AVP</td><td></td><td></td><td>;</td></tr>
</table>
</td><td>4</td></tr>
</table>

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Question	Answer	Marks
2(c)	1 records measured diameter of the leaf (across **Q**–**R**) and states units **;** **A** suitable range of measurements based on printed diagram 2 records measured diameter of the vascular tissue (across **Q–R**) and states units **;** **A** suitable range of measurements based on printed diagram 3 presents ratio in a format that is consistent with diameter of leaf : diameter of vascular bundle **;** **A** actual measured figures or simplified figures 4 numbers in ratio written as whole numbers **;** e.g. 3 : 1 / 4 : 1 / 7 : 2	**4**

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