Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Paper 31 (Advanced Practical Skills 1) **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)	*risk:* medium **or** high and states reason with correct reference to hazard **;**	**1**
1(a)(ii)	1 *labels under correct sequence of beakers:* 0.01, 0.001, 0.0001 and % once **;** 2 shows transfer of 1 (cm^3) from second beaker to third beaker and 1(cm^3) from third beaker to fourth beaker and 1 (cm^3) from fourth beaker to fifth beaker and cm^3 once **;** 3 shows 9 (cm^3) of **W** added to each beaker and cm^3 once **;**	**3**
1(a)(iii)	time for **H** recorded **;**	**1**
1(a)(iv)	1 *heading for independent variable:* invertase / **E** and concentration and % **;** 2 *heading for dependent variable:* time taken for first colour change and seconds / s **;** 3 readings for at least four concentrations **;** 4 shortest time is for 1%**;** 5 records results to nearest second **;**	**5**
1(a)(v)	correct interpretation from table **;**	**1**
1(a)(vi)	*any three from:* 1 use concentrations of invertase solution within a narrower range either side of estimated concentration of **H** **;** 2 repeat and calculate a mean for each concentration **;** 3 *ref. to* staggered start / *ref. to* complete experiment for each concentration before moving on to next **;** 4 maintain water-bath at 30°C**;** 5 *ref. to* considering that honey extract may contain sucrose / reducing sugar / glucose **;**	**3**
1(b)(i)	1 *x*-axis: storage time / weeks and *y*-axis: percentage concentration of sucrose **;** 2 scale on *x*-axis: 5 (weeks) to 2 cm and scale on *y*-axis: 0.5(%) to 2 cm **;** 3 correct plotting of all points using small crosses or dots in circle **;** 4 points joined with a thin line passing through all points as either a line of best fit or straight lines joining each point to the next **;**	**4**

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Question	Answer	Marks
1(b)(ii)	*any two from:* 1 decrease over time ; 2 *ref. to* levelling off / reduced gradient over time ; 3 use of data to support ;	**2**
1(b)(iii)	1 glucose and fructose ; 2 invertase in honey breaks down the sucrose ;	**2**
2(a)(i)	**Slide J1 *Helianthus* stem** 1 suitable size and no shading ; 2 draws only sector and no cells ; 3 correct proportions of tissues ; 4 correct shapes and number of tissues / layers ; 5 label line and label to epidermis ;	**5**
2(a)(ii)	1 suitable size and lines continuous, thin and sharp ; 2 draws only three whole cells ; 3 draws (xylem) cells with suitable wall thickness ; 4 draws two lines around each cell and three lines where two cells touch ; 5 label line and label to lumen in one vessel element only ;	**5**
2(b)(i)	1 records measured length of line **X**–**Y** and measured length of scale bar ; **A** suitable range of measurements based on printed diagram 2 divides measured length of line **X**–**Y** by measured length of scale bar ; *ecf from mp1* 3 multiplies answer by 1.5 (length represented by scale bar) ; *ecf from mp2* 4 correct units for final answer (mm) ; *or* 1 records measured length of line **X**–**Y** and measured length of scale bar ; **A** suitable range of measurements based on printed diagram 2 divides 1.5 (length represented by scale bar) by measured length of scale bar ; *ecf from mp1* 3 multiplies answer by measured length of line **X**–**Y** ; *ecf from mp2* 4 correct units for final answer (mm) ;	**4**

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Question	Answer	Marks
2(b)(ii)	*any three from:* 1 position of vascular bundles (**J1** around the edge, Fig. 2.2 in central region) **;** 2 number of vascular bundles (more present in **J1** than in Fig. 2.2) **;** 3 size of air spaces (large / larger in Fig. 2.2) **;** 4 number of air spaces (**J1** has no / few air spaces, Fig. 2.2 has many) **;** 5 thickness of epidermis (Fig. 2.2 has a thinner epidermis compared with **J1**) **;**	**3**
2(b)(iii)	*any one from:* 1 numerous / large air spaces (for buoyancy) **;** 2 central / single vascular bundle (for flexibility) **/** minimal support needed in water **;** 3 thin / absent cuticle (for gas exchange) **;**	**1**

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