Cambridge International AS & A Level

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BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **May/June 2018**

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)	0.8, 0.6, 0.4, 0.2 **;** correct volumes which add up to 10 **;**	**2**
1(a)(ii)	heading for percentage concentration of milk **;** expected pattern of results **;** only colours in key used **;**	**3**
1(a)(iii)	violet **;**	**1**
1(a)(iv)	correct answer according to results in **(a)(ii)** and **(a)(iii)** **;**	**1**
1(a)(v)	colorimeter or more colour standards **;** drop size of milk or **K** varies / AVP **; ;** volume using small syringe / graduated pipette / AVP **;**	**3**
1(b)(i)	heading for coagulation **;** correct patterns of coagulation using key **;**	**2**
1(b)(ii)	four **or** five crosses recorded **;**	**1**
1(b)(iii)	the percentage concentrations from Table 1.2 on the scale **;** puts **U** in the correct position for their results **;**	**2**

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Question	Answer	Marks
1(c)(i)	label on *x*-axis as temperature / °C **+** label on *y*-axis as percentage coagulation of the milk**;** scale on *x*-axis is 10 to 2 cm **+** *y*-axis is 20 to 2 cm **+** labelled each 2 cm **;** correct plotting of five points with a small cross or dot in circle **;** line sharp and joined point to point **;**	**4**
1(c)(ii)	*any two from:* with increasing temperature the enzyme and substrate have more kinetic energy **;** more ESCs formed, as temperature increases to 41 °C **;** above 41 °C the enzyme / rennet denatures **;** above 41 °C fewer ESCs formed **;**	**2**
1(c)(iii)	five or more pHs **+** buffers **;**	**1**

Question	Answer	Marks
2(a)(i)	minimum size **+** at least 3 layers of tissue **+** no cells **;** draws only midrib section shown in Fig 2.1 **;** correct position of vascular bundle to whole depth of leaf **;** draws at least one subdivision of the vascular bundle **;** label line **+** label to identify the vascular bundle **;**	**5**

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Question	Answer	Marks
2(a)(ii)	1 minimum cell size **+** lines thin and continuous **+** no shading **;** 2 only 3 whole cells drawn **+** each cell touching at least one of the other cells **+** 2 lines drawn around each cell with 3 lines where cells touch **;** 3 at least one cell with inclusions drawn **or** palisade cell at least twice as long as it is wide **;** 4 label line and label to identify the cell wall **;**	**4**
2(a)(iii)	1 trichomes / cuticle / sunken stomata / curled leaf / folded leaf / AW **;** 2 traps moisture / reduces evaporation / reduces the surface area for water loss / reduces diffusion of water **;**	**2**
2(b)(i)	(answer to step1) 0.0025 **;** displays answer from step 1 multiplied by 1000 **;** correct answer **+** µm **;**	**3**
2(b)(ii)	measures correctly in eyepiece graticule units **;** shows multiplication of eyepiece graticule measurement by answer from **(b)(i)** **;**	**2**
2(b)(iii)	*any two* correct annotations **; ;** e.g. shape of leaf folded / rolled in **J1** while in Fig. 2.5 the leaf is triangle shaped	**2**

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