Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/32**

Paper 3 Advanced Practical Skills 2 **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

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Question	Answer	Marks
1(a)(i)	records 3 times ; seconds recorded as whole numbers ;	**2**
1(a)(ii)	calculates mean time correctly using results from **(a)(i) +** seconds ;	**1**
1(a)(iii)	*any one from:* 1 the same size of cubes not exactly the same size ; 2 cubes not put into acid at exactly the same time ; 3 AVP ;	**1**
1(a)(iv)	*any two from:* 1 standardise the size of cubes ; 2 standardise the volume of acid ; 3 standardise the temperature of acid ; 4 AVP ;	**2**
1(a)(v)	four correct volumes of 1.0 mol dm^{-3} hydrochloric acid (8, 6, 4, 2) ; four correct volumes of distilled water (2, 4, 6, 8) ;	**2**
1(a)(vi)	headings are concentration of hydrochloric acid / mol dm^{-3} **+** time / seconds ; records 4 mean times for 4 concentrations of hydrochloric acid ; the time for the highest concentration recorded as the shortest time ;	**3**
1(a)(vii)	*from the candidates' results in **(a)(vi)*** calculates correct rate of diffusion in 1.0 mol dm^{-3} hydrochloric acid **and** correct rate of diffusion for the lowest concentration of hydrochloric acid ;	**1**

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Question	Answer	Marks
1(a)(viii)	correct statement concerning the rejection or supporting the hypothesis based on the results **;** correct explanation of how results provide evidence for rejection or supporting the hypothesis **;**	**2**
1(a)(ix)	correct suggestion for concentration of acid to be used with a reason for that choice e.g.1.0 mol dm^{-3} **+** fastest time to change colour / AVP **;**	**1**
1(a)(x)	use different sizes of cube **;** uses at least 5 different sizes of cubes **or** *ref. to* size of cubes and SA:VOL ratio **;**	**2**
1(b)(i)	label on *x*-axis as type of pathogenic bacteria **+** label on *y*-axis as diameter of zone of inhibition / mm **;** even width of bars **+** scale on *y*-axis is 5 to 2 cm **+** labelled each 2 cm **;** correct plotting of 5 bars **;** separate bars drawn with vertical lines meeting horizontal lines **+** labelled **P**, **Q**, **R**, **S**, **T ;**	**4**
1(b)(ii)	bacterium **Q** **+** **C** most effective at inhibiting reproduction / AVP **;**	**1**

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Question	Answer	Marks
2(a)(i)	1 minimum size **+** no shading **+** no cells **;** 2 at least 4 layers of tissue drawn **;** 3 includes details of tissue beneath vascular bundle **;** 4 shows subdivision of vascular bundle **;** 5 label line and label **X** to identify a region containing xylem tissue **;**	**5**
2(a)(ii)	1 minimum cell size **+** lines thin and continuous **;** 2 three cells drawn **+** drawn with each cell touching at least one of the other cells in the group **;** 3 inclusion shown within palisade cell or epidermal cell **;** 4 label line and label **P** to identify chloroplast **;**	**4**
2(b)(i)	count the number of squares completely filled **and** count the number of squares more than half-filled **;**	**1**
2(b)(ii)	records the total area of the leaf showing in Fig. 2.2 to a whole number **or** to 0.5 within limits **;** records the area of the leaf section occupied by the vascular bundle **V** to a whole number **or** to 0.5 within limits **;**	**2**
2(b)(iii)	shows the value for the area of **V** divided by the value for the area of the leaf section × 100 **;** answer to the correct degree of accuracy **;**	**2**
2(b)(iv)	using a grid with smaller squares / AVP **;**	**1**
2(c)	*any three* observable differences **; ; ;** e.g. **M1** few trichomes and Fig. 2.2 many trichomes **M1** many air spaces and Fig. 2.2 few air spaces **M1** presence of palisade mesophyll tissue and Fig. 2.2 absence of palisade mesophyll cells	**3**

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