Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/51**

Paper 5 Planning, Analysis and Evaluation **May/June 2019**

MARK SCHEME

Maximum Mark: 30

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.

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).

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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 guidance for examiners)
I	ignore (for answers that include irrelevant information that does not contradict the expected answer)
AW	alternative wording (where responses vary more than usual)
ora	or reverse argument (for answers which are written as the opposite to the expected answer)
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ecf	error carried forward
mp	marking point (with relevant number)

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Question	Answer	Marks
1(a)(i)	0.13 ;	**1**
1(a)(ii)	(reaction time would be) unchanged ; **or** (reaction time would be) longer / AW ;	**1**
1(b)(i)	distance ruler, drops / falls ;	**1**
1(b)(ii)	*any 7 of:* 1. test in silence / quiet / AW **and** noise / AW ; 2. method to ensure silence ; 3. ensure consistent / similar / same / known, level / volume / loudness / decibels, of noise / AW ; 4. suitable number of people tested ; 5. *idea of* no warning given when ruler to be dropped ; 6. *detail of ruler use:* same, ruler / starting distance / type or weight of ruler / held vertically ; 7. same or similar age / same sex ; 8. use same / dominant, hand ; 9. no, (named) drugs / medications / stimulants / depressants ; 10. *idea of* avoiding people with conditions affecting reaction time e.g. poor hearing / poor sight / neurological disorders ; 11. same, time of day / stated time ; 12. *ref. to* a minimum of three repeats **and** calculate a mean ; 13. low / medium, risk ;	**7**
1(c)	(independent variable / sound present or absent, is) discontinuous / discrete / qualitative / categoric, variable ;	**1**
1(d)(i)	*absence of noise* (mean) reaction time is longer **or** *presence of noise* (mean) reaction time is shorter ;	**1**
1(d)(ii)	comparing (two) means / continuous data / normal distribution ;	**1**
1(d)(iii)	there is no (significant) difference between the (mean) reaction times for no (background) noise and (background) noise ;	**1**

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Question	Answer	Marks
1(d)(iv)	not significant / is due to chance (at $p > 0.05$) **and** because, it / calculated value / 2.05, is less than, the critical value of *t* / table value of *t* / 2.12 **; ora**	**1**
1(e)(i)	*idea of* the (number of), repeats (of the task) / AW **;**	**1**
1(e)(ii)	*idea that* as repeats increase, (number of) errors decrease / accuracy increases **;**	**1**
1(e)(iii)	(student **Y**, replicate 5) – circle around the number 44 **;**	**1**
1(e)(iv)	*idea of* (student) **Y and** as, had fewer errors / were more accurate (than rest of students) **;** **or** as (results) start off lower / as (results) are lower in trial one / as even from the very beginning (results) are lower **;**	**1**
1(f)	*any 2 of:* *idea that* the more, replicates / repeats, carried out, fewer errors are made **;** *idea of* after, 6–7 / several trials, number of errors starts to plateau / number of errors does not continue to decrease **;** *idea that* interruptions / AW, increases number of errors **;**	**2**

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Question	Answer	Marks
2(a)(i)	50 (cm^3) **;**	**1**
2(a)(ii)	7 (straws) **;**	**1**
2(b)	*any 4 of:* *estimate of numbers:* 1. calculate the volume of the sample **or** volume of sample is, (for mm^3) 0.25 × 0.25 × 0.1 / 0.00625 / 6.25 × 10^{-3} / (for cm^3) 0.025 × 0.025 × 0.01 / 0.00000625 / 6.25 × 10^{-6} **;** 2. divide the number of sperm by the volume **and** method of converting to cm^3 **;** *deciding which sperm to include:* 3. *idea of:* count those where sperm (fully) inside **the** square / 0.0625 (mm^2) / all (small) squares / haemocytometer / quadrant / grid **;** 4. *idea of:* include those touching the (line) top and left / up and right **or** exclude those touching bottom and right / down and left **;** *detail of method:* 5. AVP **;** e.g. *ref to* dilution of sample / stirring / even spreading / immobilising sperm / use of coverslip / screenshot for counting **;**	**4**
2(c)	*sugar: idea that* (it) provides or gives energy / is an energy source / (is used) in respiration / (is used) to produce ATP **;** *buffer:* (change in pH may), denature enzymes / proteins **;** *antibiotics: idea of*, killing / stopping reproduction of, bacteria / AW **;**	**3**

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