Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/52**

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)	*any 2 of:* 1. easy to explain / easy to do / no complex apparatus **;** 2. mobility / physical strength / stamina (of subject), is not necessary **;** 3. no calculations needed to get reaction time AW **;** 4. results are more accurate / precise **;**	**2**
1(a)(ii)	*independent variable*: age **;** *dependent variable*: reaction time **;**	**2**
1(a)(iii)	*any 6 of:* 1. *ref. to* suitable number of people in total **;** 2. *ref. to* equally spread, age categories **;** 3. *ref. to* same number males and females each group **;** 4. *ref. to* consent form (e.g. using data / children / AW) **;** 5. *ref. to* standard conditions for the test, e.g. same (type of) computer / tablet / software / same colour change **;** 6. *ref. to* same, stated, **room** conditions **;** 7. *ref. to* avoiding people with conditions affecting reaction time e.g. poor eyesight / colour-blind / neurological disorders **;** 8. no, (named) drugs / medications / caffeine / alcohol **;** 9. *ref. to* testing at same time of day / stated time **;** 10. *ref. to* using same hand to push the button **;** 11. minimum of three tests on each subject **and** taking a mean **or** minimum of three subjects in same age category **and** taking a mean **;** 12. low / medium risk experiment / parent or guardian present for children / carer for vulnerable adults **;**	**6**
1(b)(i)	$\frac{(340-210)}{340} \times 100$ = 38% **;;**	**2**

Question	Answer	Marks
1(b)(ii)	*any 2 of:* (mean) reaction time in females is higher than in males (at most ages) **;** reaction time decreases (to age 20 years), **then** starts to increase **;** (due to overlaps of SD lines) there is no significant difference between (male and female) reaction times **;**	**2**
1(b)(iii)	*t*-test **;** data is continuous / comparing means / standard deviations are approximately the same **;**	**2**
1(b)(iv)	there is no (significant) difference in the (mean) reaction time between males and females (at same age) **;**	**1**

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Question	Answer	Marks
2(a)(i)	*award mp4 only if 2 marks not already awarded* *any 2 of:* 1. count the sperm inside the (complete) square(s) **;** 2. include sperm with heads inside the square(s) **;** 3. include those touching the line (of square) top and left (and exclude those touching bottom and right) **;** 4. (calculate the) volume of 1 square / $0.05 \times 0.05 \times 0.10$ / 2.5×10^{-4} mm^3 **;**	**2**
2(a)(ii)	1. (calculate the) volume of 1 square / $0.05 \times 0.05 \times 0.10$ / 2.5×10^{-4} mm^3 **;** 2. divide number sperm (in *n* squares) by volume (in *n* squares) **or** divide 1 mm^3 by the volume (in *n* squares) **and** multiply by the number of sperm counted (in *n* squares) **;** 3. multiply by, the dilution factor / 100 **;**	**3**
2(a)(iii)	*any 2 of:* *idea of* small <u>volume</u> / only a sample (volume) is taken **;** (sperm moving so) easy to miscount / harder to count **;** sperm, not evenly distributed / forms clumps / overlap **;** not repeated **;**	**2**
2(b)(i)	*any 2 of:* (no) smoking **;** (no) alcohol **;** (no) medication **;** sperm tested within 2 hours of collection **;** sperm count in a fixed volume (mm^3) **;**	**2**
2(b)(ii)	for comparison **;**	**1**

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Question	Answer	Marks
2(b)(iii)	*any 1 of:* **1.** high(er) FSH **and** low(er) LH, reduces sperm motility / causes group 2 infertility **;** 2. **only** high(er) FSH / high FHS and normal LH, reduces sperm number / causes group 3 infertility **;** 3. FSH **and** LH, both high, prevents sperm release / prevents sperm production / causes no sperm / causes group 4 infertility **;**	**1**
2(c)	count / record the number of, live and dead sperm / sperm of the two different colours / live and total **;** method to calculate the proportion **;**	**2**

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