Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **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.

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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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Abbreviations used in the Mark Scheme

;	separates marking points
/	separates alternatives within a marking point
R	reject
ignore	mark as if this material was not present
A	accept (a less than ideal answer which should be marked correct)
AW	alternative wording (accept other ways of expressing the same idea)
underline	words underlined (or grammatical variants of them) must be present
max	indicates the maximum number of marks that can be awarded
mark independently	the second mark may be given even if the first mark is wrong
ecf	credit a correct statement that follows a previous wrong response
( )	the word/phrase in brackets is not required, but sets the context
ora	or reverse argument
AVP	any valid point

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Question	Answer	Marks	Guidance
1(a)	one table drawn with at least three columns and a line separating headings from data **;** column / row headings with appropriate units for each heading **;** five correct clot records for each of three test-tubes **;**	**3**	**R** if units given in data cells
1(b)	idea that rennin or enzyme acts / forms clots quickest AW / is optimum / is best, in acid conditions **;** idea that rennin or enzyme acts / forms clots more slowly AW, in water / neutral conditions **;** idea that rennin or enzyme does not act / does not form clots in alkaline / basic conditions **;**	**2**	
1(c)(i)	idea of equilibration / allowing time for test-tube contents to reach the same temperature / all test-tubes at the same temperature **;**	**1**	
1(c)(ii)	volume / 5 cm^3 / mass, of milk **;** volume / 2 drops, of acid / alkali / distilled water **;** volume / 1 cm^3, of enzyme / rennin **;** concentration / 0.1%, of enzyme / rennin **;** temperature / 40 °C **;** equilibration time / 3 minutes **or** total time / 5 minutes (for investigation) **;**	**2**	**I** time unqualified

Question	Answer	Marks	Guidance
1(d)	subjective nature of deciding on clotting point ; three test-tubes observed at different times (step 11) / **Q** and **R** longer in water-bath before being tested / different mixing times (step 9) ; no repeats ; insufficient time intervals / AW ; drops (of acid / water / alkali) could be of different volumes / sizes / amounts ; some contents remain in the test-tube when adding to other tube, so volumes vary ; tip and rotate not standardised ; same dropping pipette (for acid / water / alkali) could have been used, leading to contamination ; temperature of water-bath not maintained ; no control (to show that milk does not clot without rennin) ;	**4**	
1(e)	use of acid / alkali / enzyme ;	**1**	
1(f)	add biuret (reagent) (to liquid part) ; purple / mauve / lilac, colour indicates, presence of protein / is a positive result ;	**2**	
1(g)	ethanol emulsion test / add ethanol and white emulsion forms ;	**1**	

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Question	Answer	Marks	Guidance
1(h)	at least 3 stated temperature values: 37 °C and at least one above and one below **;** method of maintaining temperature given **;** clot / white solid / changed milk, from same sample of milk **;** same pH (pH 7) of solutions **;** same concentration / volume, of enzyme / (named) protease **;** equilibrate temperature of enzyme and milk solutions before mixing **;** time how long for samples to become colourless **or** shortest time has, greatest activity / is the optimum **or** if optimum is 37 ºC the hypothesis is correct **;** repeat at least twice (and calculate the mean) **;** valid safety precaution, e.g. eye protection / gloves **;** AVP **;** e.g. crush / blend, clotted milk sample **or** valid control experiment described	**6**	max 2 from mp 4, 5 and 6

Question	Answer	Marks	Guidance
2(a)(i)	**A** 6, **B** 3, **C** 4, **D** 6, **E** 8, **F** 9 **;** (total) 36 **;**	**2**	
2(a)(ii)	6 **;**	**1**	
2(a)(iii)	612 **;**	**1**	
2(a)(iv)	variation in insect populations in different parts of garden / unrepresentative sample / some webs difficult to see / AW**;** some insects eaten by spiders / or fallen off web **;** some insects, too small to be visible / difficult to count **;** some caught organisms may not be insects **;** AVP **;**	**1**	
2(b)(i)	**O** (outer line) single, clear, continuous lines with no shading **;** **S** (size) occupies at least half the space provided (must be at least 75 mm in length) **;** **D** (detail) two body parts <u>and</u> 2 chelicerae (on the cephalothorax) **or** 2 spinnerets (on abdomen) **;** 8 jointed legs, attached to the body in the correct position and in the correct orientation **;** **L** (label) <u>line</u> labelled *abdomen* ending on the abdomen **;**	**5**	

Question	Answer	Marks	Guidance
2(b)(ii)	length of **XY** on Fig. 2.2 given as 38.5 mm – 41 mm **;** line **XY** shown on the candidate's drawing in correct position **;** correct calculation **;**	**3**	max 2 if no units given
2(c)(i)	**A** (axes) labelled with units **S** (scale and size) even scale bars to occupy at least half the grid in both directions **;** **P** (plotting) all five bars plotted accurately ± half a small square bars same width (at least 1 small squares wide) gaps between bars	**3**	
2(c)(ii)	3 : 1 **;;**	**2**	