Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/61**

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.

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 schemes will use these abbreviations:

;	separates marking points
/	alternatives
()	contents of brackets are not required but should be implied
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
Ig	ignore (for incorrect but irrelevant responses)
AW	alternative wording (where responses vary more than usual)
AVP	alternative valid point (where a greater than usual variety of responses is expected)
ORA	or reverse argument
underline	actual word underlined must be used by candidate
+	statements on both sides of the + are needed for that mark

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)</td><td>time / minutes ;

test-tube C correct ;

test-tube D correct ;

<table>
<tr><th rowspan="2">time/minutes</th><th colspan="4">observations</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>D</th></tr>
<tr><td>0</td><td>milky</td><td>milky</td><td>milky</td><td>milky</td></tr>
<tr><td>1</td><td>milky</td><td>milky</td><td>milky</td><td>milky</td></tr>
<tr><td>2</td><td>milky</td><td>milky</td><td>milky</td><td>milky</td></tr>
<tr><td>3</td><td>milky</td><td>milky</td><td>milky</td><td>clear</td></tr>
<tr><td>4</td><td>milky</td><td>milky</td><td>milky</td><td>clear</td></tr>
<tr><td>5</td><td>milky</td><td>milky</td><td>clear</td><td>clear</td></tr>
</table>
</td><td>3</td><td></td></tr>
<tr><td>1(b)</td><td>enzyme (solution) needed to digest protein ;

works more quickly when pH solution added ;</td><td>2</td><td>

A acid for pH solution</td></tr>
<tr><td>1(c)(i)</td><td>between 35 and 45 °C inclusive ;

relate to (mammalian) body temperature ;</td><td>2</td><td></td></tr>
<tr><td>1(c)(ii)</td><td>syringe / measuring cylinder ;

(dropping) pipette / dropper ;</td><td>2</td><td>A graduated pipette / burette</td></tr>
<tr><td>1(c)(iii)</td><td>equal volumes in each test-tube ;

as <u>control</u> (for pH and enzyme solutions) ;</td><td>1</td><td></td></tr>
</table>

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Question	Answer	Marks	Guidance
1(d)	**1** same volume / concentration / type of enzyme **;** **2** same volume / concentration / protein solution **;** **3** same volume of pH solutions **;** **4** different pH solutions used **;** **5** suitable range of pH values **;** **6** water bath / same or constant temperature **;** **7** measure time for solution to go clear **;** **8** fastest to clear = optimum pH **;**	**5**	at least 3 pH values including < 7 and > 7
1(e)	goggles / gloves **;** because enzymes / acid / alkali / chemicals used **AW ;**	**2**	

Question	Answer	Marks	Guidance
2(a)(i)	**P** (palisade cell) correctly identified **;** **Q** (guard cell) correctly identified **;**	**2**	
2(a)(ii)	*cuticle* thick + thin **;** *epidermis* cells larger / more rounded v cells smaller / less rounded **;** OR guard cells / stoma absent v guard cells / stoma present **;** OR thick v thin	**2**	**Ig** reference to chloroplasts **A** stomata
2(b)	clear, continuous outline around guard cells and epidermal cell + no shading + only guard cell and epidermal cell drawn together **;** size of guard cell at least 45 mm length **;** epidermal cell at least 2× length of guard cell **;** 3 nuclei with 2 in guard cells clearly drawn **;** 2 distinct guard cells and stoma visible **;**	**5**	
2(c)(i)	line drawn <u>on drawing</u> **;** two correct measurements **;** units **;**	**3**	photo 33mm ± 1 mm
2(c)(ii)	drawing measurement divided by X – Y measurement **;** x 800 **;** correct answer **;**	**3**	**A** formula / expression if stated **R** if units given

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Question	Answer	Marks	Guidance
3(a)	feeling skin / wrist / neck / stethoscope **;** counting per time interval / part minute (and multiplying appropriately) **;**	**2**	**A** use of pulse rate monitor / smart watch **R** reference to vein **Ig** blood pressure monitor
3(b)(i)	time on x-axis + pulse rate on y-axis + labels t / min + pulse rate / beats per min **;** linear scales with values at origin, y-axis not starting at zero / scale break **;** 6 points plotted correctly **;** points joined with ruled, straight lines **;**	**4**	If bar chart drawn, max 3 marks i.e. 1 axes labelled t / min + pulse rate/beats per min with time labels central to bars **;** 2 linear scales with value at the origin of pulse rate axis **;** 3 6 values clearly and correctly represented **;** 4 not awarded
3(b)(ii)	pulse rate falls / decreases / goes down **;** rate of decrease falls **AW** **;**	**2**	

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