Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **October/November 2019**

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.

Cambridge International is publishing the mark schemes for the October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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.

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)(i)</td><td>6 values entered ;
3 values for 3% correctly rounded 8 7 9 ;
3 correctly calculated means 30 13 8 ;

<table>
<tr><td rowspan="2">concentration</td><td colspan="4">time</td></tr>
<tr><td>disc 1</td><td>disc 2</td><td>disc 3</td><td>mean</td></tr>
<tr><td>1</td><td>–</td><td>–</td><td>–</td><td>30</td></tr>
<tr><td>2</td><td>–</td><td>–</td><td>–</td><td>13</td></tr>
<tr><td>3</td><td>8</td><td>7</td><td>9</td><td>8</td></tr>
</table>
</td><td>3</td><td></td></tr>
<tr><td>1(a)(ii)</td><td>goggles / safety spectacles ;
gloves / lab coat / wash off any spilt on skin or bench / test-tube holder or rack AW ;
forceps / tweezers / tongs to put discs in test-tubes AW ;</td><td>2</td><td></td></tr>
<tr><td>1(a)(iii)</td><td>syringe / measuring cylinder / graduated pipette ;</td><td>1</td><td></td></tr>
<tr><td>1(a)(iv)</td><td>time decreases / takes less time / speeds up the process AW ;</td><td>1</td><td></td></tr>
<tr><td>1(a)(v)</td><td>use more discs / repeat + mean / average ;</td><td>1</td><td></td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)(vi)</td><td>
<table>
<tr><th>source of error</th><th>explanation</th></tr>
<tr><td>discs not all same size / thickness / surface area ;</td><td>different amount of enzyme in discs ;</td></tr>
<tr><td>discs not all same mass ;</td><td>different mass requires different amount of gas to float ;</td></tr>
<tr><td>recording time accurately / consistently / stopping at right time ;</td><td>times not reliable / end point not clear ;</td></tr>
<tr><td>H_2O_2 used up by discs AW ;</td><td>concentration of H_2O_2 not the same for replicate discs ;</td></tr>
<tr><td>temperature not controlled ;</td><td>variation will affect rate of enzyme reaction ;</td></tr>
<tr><td>discs taken from different parts of tuber / different tubers AW ;</td><td>amount of enzyme in disc may vary ;</td></tr>
</table>
</td><td>2</td><td>1 mark for suggestion and 1 mark for relevant explanation.
source of error and explanation must be related</td></tr>
<tr><td>1(a)(vii)</td><td>no H_2O_2 or substrate present / catalase or enzyme does not react with water + no bubbles / O_2 / gas produced ;</td><td>1</td><td></td></tr>
<tr><td>1(b)</td><td>(fresh and) boiled discs / boiled potato ;
enzyme denatured / inactivated / made ineffective ;
same surface area / thickness / mass / size / number of discs used ;
use same concentration / volume of H_2O_2 ;
(without enzyme) no bubbles / no O_2 / no floating / no reaction AW ;</td><td>4</td><td></td></tr>
</table>

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Question	Answer	Marks	Guidance
1(c)(i)	number of discs on x-axis **+** time on y-axis **;** axes fully labelled **;** continuous linear scales with values at origin **+** over half grid used **;** 5 points plotted accurately **;** smooth curved line drawn through all points + not extrapolated beyond one small square **;**	**5**	
1(c)(ii)	decreases time taken OR increases / speeds up rate of reaction / O_2 production **;** (at 4 discs) then reaction becomes constant **AW ;**	**2**	
1(c)(iii)	enzyme is working as fast as it can / maximum enzyme being used **;** hydrogen peroxide is limiting factor **;**	**1**	

Question	Answer	Marks	Guidance
2(a)	A and B curved / curled / bent **+** in different directions **AW ;** movement of <u>water</u> ; <u>osmosis</u> **;** A gained water **+** B lost water **;** A cells or tissue got larger / expanded / swelled OR B cells or tissue got smaller /contracted / shrunk **;** epidermis / outer layer stayed same length / did not absorb / lose water **;**	**5**	
2(b)(i)	drawing of pollen grain **+** tube at least 11 cm long **;** outer line drawn with sharp pencil **+** continuous lines **+** no shading **;** pollen tube clearly turned downwards **+** approx. consistent width along length **;** two nuclei drawn at end of tube **;**	**4**	
2(b)(ii)	length of tube in photo (between **C** and **D**) 70–75 mm **;** measured length / 600 **;** correct answer **+** units **;**	**3**	

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Question	Answer	Marks	Guidance
3(a)	draw margin of leaf section that was removed ; count up grid squares making up this area ;	**2**	
3(b)	12–14 squares × 16 ; correct answer (between 192 and 224) ; correct units (mm^2) ;	**3**	

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