Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/31**

Paper 3 Practical Test **May/June 2016**

MARK SCHEME

Maximum Mark: 40

Published

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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 (grammatical variants excepted)
max	indicates the maximum number of marks that can be given
+	statements on both sides of the + are needed for that mark

Question	Expected answers	Additional guidance	Marks
1 (a) (i)	all boxes completed **;** no colour change in test-tube **B ;** colour change in test-tube **A** at both temperatures **;** more rapid colour change at 35 °C than at 25 °C for test tube **A ;**		[4]
(ii)	use a thermometer **;**	**A** temperature probe	[1]
(iii)	suitable method of heating / add cold water / add ice **;**		[1]
(iv)	to allow yeast / enzyme / contents of test-tube to adjust to temperature / equilibration / **AW ;**		[1]
(v)	in tube **B** enzymes inactive / enzymes denatured / yeast dead / inactive **;** in tube **A** enzymes active / working **;** (in tube **A**) at 35 °C increased enzyme activity **ORA ;**	**A** enzyme becomes active more quickly (at 35 °C) / works faster / closer to optimum temperature	[3]

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Question	Expected answers	Additional guidance	Marks
(b)	(prepare) solutions with different pH values / use of buffers / acid and alkali **;** appropriate range of pH values (minimum 3 values) **;** add (buffer) to yeast (suspension) **;** use stated / equal volume(s) of yeast (suspension) / buffer solution / methylene blue **;** kept at stated temperature **;** record time taken for blue colour to disappear / colour change **AW ;**		[max 5]
(c) (i)	time on x-axis and concentration on y-axis, both axes fully labelled **;** linear scale starting at 0 with more than ½ grid used on both axes **;** all points plotted correctly **;** smooth curve through all plotted points **;**		[4]
(ii)	6.2 **;** g per dm^3 **;**	answer consistent with graph	[2]
			[Total 21]

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Question	Expected answers	Additional guidance	Marks
2 (a)	all five leaflets shown **+** drawing at least 90 mm wide **;** lower two leaflets smaller than the other three **;** outline drawn with clean lines, serrated margin indicated, no shading **;** pointed tips to the leaflets **;** realistic representation of veins **;**		[5]
(b)	**shape:** laurel elongated / long / oval **;** oak irregular / non-uniform / lobes / indentations / **AW ;** **edge:** laurel smooth **;** oak smooth / **AW ;**		[4]
(c) (i)	appropriate line drawn on Fig. 2.1**;** maximum with of leaf = 18 mm **;**	tolerance 17–19 mm units required for mark	[2]
(ii)	magnification = 18 ÷ 40 / correct formula stated **;** (×) 0.45 **;**	**A** measurement from 2(c)(i)	[2]
			[Total 13]
3 (a) (i)	as cycling speed increases, breathing rate also increases / **AW ;**		[1]
(ii)	1. more energy needed **;** 2. more oxygen needed **;** 3. more carbon dioxide produced **;** 4. (CO_2 removed) at a faster rate **;** 5. correct reference to <u>respiration</u> **;**	**A** uses more energy **A** uses more oxygen **A** lactic acid	[max 3]
(b)	(minute volume =) 27 × 3000 **;** = 81 000 (cm^3) **;**	correct answer only gains 2 marks	[2]
			[Total 6]

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