GCE A LEVEL MARKING SCHEME

SUMMER 2025

A LEVEL
BIOLOGY – UNIT 5
1400U50-1

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About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

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WJEC GCE A LEVEL BIOLOGY

UNIT 5 – PRACTICAL EXAMINATION

SUMMER 2025 MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink. One tick must equate to one mark.

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct relevant alternative responses which are not recorded in the mark scheme.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

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EXPERIMENTAL TASK MARK SCHEME

<table>
<tr><th colspan="4" rowspan="2">Question</th><th rowspan="2">Marking details</th><th colspan="6">Marks Available</th></tr>
<tr><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th><th>Maths</th><th>Prac</th></tr>
<tr><td>1</td><td></td><td></td><td></td><td>Teacher Awarded:
Plates are labelled A and B and discs soaked in amylase are positioned equal distances apart on plate (1)</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td>(a)</td><td></td><td></td><td>Table:
<table>
<tr><td rowspan="2">Concentration of amylase / au</td><td colspan="4">Maximum diameter of clear zone / mm</td></tr>
<tr><td>Plate 1</td><td>Plate 2</td><td>Plate 3</td><td>mean</td></tr>
<tr><td>0</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>
• both headings correct and logical organisation (1)
• units correct: (mark) (only present in headings) (1)
IV = au;
DV = mm / millimetres
• all maximum diameters recorded to nearest mm (1)
• means calculated and rounded correctly to 0 or 1 dp (1)</td><td>1
1</td><td>1
1</td><td></td><td>4</td><td>3</td><td>4</td></tr>
</table>

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	*(b)*			**Graph:** use of more than half the graph paper **for both x and y axes** (1)	**1**					
				labels: x axis = concentration of amylase + y axis = **mean** maximum diameter of clear zone (1)		**1**				
				correct units: x = au + y = mm (1)		**1**				
				linear scales correct on both axes with 0,0 at origin (1)		**1**				
				plots correct +/- ½ small square (2)	**2**					
				straight line of best fit drawn through the origin (1)		**1**		**7**	**7**	**7**
	(c)			<table><tr><th>Unknown Sample</th><th colspan="3">Maximum diameter of each clear zone /mm</th><th>Mean maximum diameter of clear zones /mm</th><th>Estimated concentration of amylase in the sample /AU</th></tr><tr><td>**A**</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>**B**</td><td></td><td></td><td></td><td></td><td></td></tr></table> Correct calculation of means to 0 or 1 dp (1) Correct reading from standard curve for concentrations – vertical line must be drawn on graph to x axis (ignore number of dp) Accept correct rounding (1)		**1**	**1**	**2**	**2**	**2**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	*(d)*	(i)		Amylase has <u>diffused</u> (from the filter paper discs into the agar) (1) And has {hydrolysed / digested/ broken down} the starch / conversion of starch to maltose (1)		**1**	**1**	**2**		**2**
		(ii)		Ref to (change of) temperature affecting (maximum) diameters / estimate of enzyme concentration / or description of / owtte (1) Explanation (1) E.g. (At different temperatures) {rate of diffusion / enzyme activity / owtte / rate of digestion (of starch)} would change / enzymes may denature			**2**	**2**		**2**
		(iii)		TEST 1: (Clear zones) may not be a perfect circle / owtte (1) (So max diameter) could give an overestimate (of concentration) / ref to being higher than the true value / owtte (1) Ignore ref to accuracy			**2**	**2**		**2**
				TEST 2: (Clear zones) may not be a perfect circle / owtte (1) Using a mean increases repeatability of results / gives a more reliable value for the diameter / ref to being closer to the true value (1)			**2**	**2**		**2**
				Question Total	**5**	**9**	**6**	**20**	**7**	**20**

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PRACTICAL ANALYSIS TASK

<table>
<tr><th colspan="4" rowspan="2">Question</th><th rowspan="2">Marking details</th><th colspan="6">Marks Available</th></tr>
<tr><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th><th>Maths</th><th>Prac</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td></td><td>Award one mark for correct risk and associated control measure

{Cause injury to {skin / eyes} / owtte} when {{identifying / walking through} plants / collecting data}
And
wear gloves / eye protection / long sleeves / trousers / protective clothing / owtte} (must match risk)
ignore suitable / clothing unqualified</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td></td><td>25.363 or 25.364 (3 marks)
If incorrect award 2 marks for
25.36
25.4
If incorrect award 1 mark for each of the following
(rounding must be correct)
Correct $(O-E)^2$ column (see below) (1)
Correct $\frac{(O-E)^2}{E}$ (see below) (1)

If negative numbers under $(O-E)^2$, max 1 if χ^2 calculated as 4.909

<table>
<tr><th rowspan="2">Category</th><th colspan="2">Number of species</th><th rowspan="2">(O-E)</th><th rowspan="2">$(O-E)^2$</th><th rowspan="2">$\frac{(O-E)^2}{E}$</th></tr>
<tr><th>O</th><th>E</th></tr>
<tr><td>Critically endangered</td><td>13</td><td>22</td><td>-9</td><td>81</td><td>3.682</td></tr>
<tr><td>Endangered</td><td>40</td><td>22</td><td>18</td><td>324</td><td>14.727</td></tr>
<tr><td>Vulnerable</td><td>22</td><td>22</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Near threatened</td><td>10</td><td>22</td><td>-12</td><td>144</td><td>6.545</td></tr>
<tr><td>Least concern</td><td>25</td><td>22</td><td>3</td><td>9</td><td>0.409</td></tr>
</table></td><td></td><td>3</td><td></td><td>3</td><td>3</td><td></td></tr>
</table>

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1		(ii)		{Observed total / 110}{divided by 5 / there are 5 groups} (= 22) (owtte)(1)	**1**			**1**		**1**
		(iii)		9.488 (1)		**1**		**1**	**1**	**1**
		(iv)		Answer must match candidates answers for (i) + (iii) • Calculated value is {greater / >} than the critical value (1) • So, the null hypothesis is rejected (1) • There is a <u>significant</u> difference between the observed and expected (number in each category) / difference between observed and expected is <u>not due to chance</u> / there are not equal numbers of species in each category (1) Reject ref to mean Ecf from (i) + (iii)		**2**	**1**	**3**		**3**
	(c)			Trees are large and would fit in a 10m x 10m quadrat / ORA / owtte (1) Ignore reference to numbers of trees			**1**	**1**		**1**
	(d)	(i)		• Quadrat (1) • at regular intervals / or description of (1) • Count the number of (different coffee) species (1) • Count number of individuals (1) Count the number of (individuals of) each species = 2 marks		**4**		**4**		**4**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1		(ii)		**Any two (x1) from** Temperature (1) water (content) (1) pH (1) {nutrient / mineral} content / named mineral (1) Oxygen levels (of soil) (1) Reject light	**2**			**2**		**2**
	(e)	(i)		Aliicho (1) **Any two (x1) from** *In relation to Aliicho* highest elevation / owtte (1) cooler / lower temperature (1) wettest / most rainfall / owtte (1) **OR** Accept comparison of Gamoojje with Kolla (Max 2) **Any two (x1) from** Cooler (1) Wetter (1) higher (1) (no mark for names alone)		**2**	**1**	**3**		
		(ii)		Grows best in {shade / lower light intensity / owtte} under other plants / owtte			**1**	**1**		
				Question Total	**3**	**9**	**4**	**16**	**1**	**12**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			Hooks (1) Reject hookers Suckers (1)	**2**			**2**		**2**
	(b)			89 µm; (3 marks) Accept range of 79 - 99 µm If incorrect award 2 marks for Answer in range of 79.46 -98.89 (not given to nearest µm) If incorrect award 1 mark for actual height = $\frac{0.980\ x\ \mathrm{h}}{\mathrm{d}}$ mm (substitution) OR magnification = $\frac{Image\ d}{actual\ d}$ **and** actual h = $\frac{image\ h}{magnification}$ (substitution) (values from paper should be in the range of d = 109- 111 mm and h = 9-11 mm)		**3**		**3**	**3**	**1**
	(c)	(i)		$\frac{17\ x\ 1000}{answer\ from\ (b)}$ (1) Accept calculation in mm or µm (both readings must be same unit)		**1**		**1**	**1**	
		(ii)		×4 or ×10 (1)	**1**			**1**		**1**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(iii)		**Any two (x1) from** • lines (showing a boundary) should {meet / should not overlap} / no gaps (1) • lines should not be {sketchy / owtte} draw smoother lines (1) • label lines should not cross (1) • {uterus / internal structure} should be completed (1) • No shading (1)	**2**			**2**		**2**
		(iv)		Increase chance of {infecting / being ingested / owtte} the (secondary) {host / pig} (1)			**1**	**1**		
				Total	**5**	**4**	**1**	**10**	**4**	**6**

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A2 UNIT 5 – PRACTICAL EXAMINATION - SUMMARY OF ASSESSMENT OBJECTIVES

	QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
Experimental task	1	5	9	6	**20**	**5**	**20**
Practical Analysis	1	3	13	4	**20**	**4**	**13**
	2	5	4	1	**10**	**4**	**6**
	TOTAL	**13**	**26**	**11**	**50**	**13**	**39**

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