GCE A LEVEL MARKING SCHEME

SUMMER 2024

A LEVEL
BIOLOGY – UNIT 5
1400U50-1

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.

WJEC GCE A LEVEL BIOLOGY

UNIT 5 – PRACTICAL EXAMINATION

SUMMER 2024 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

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:
Award 1 mark if both of the following are seen once:
any volume smaller than 10 cm^3 is measured using the 10 cm^3 measuring cylinder
and
the volume measured at eye level with the measuring cylinder placed on the bench.</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><th rowspan="2">Concentration of {hydrogen peroxide/ H_2O_2}/ Vol</th><th colspan="4">Time taken (for filter paper disc) to {fall/sink} and rise/ s</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>Mean</th></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 (1)
• units correct in headings: (mark) (1)
▪ IV = Vol;
▪ DV = s/ seconds/ e/ eiliadau
Reject if units in body of table
• all times recorded to nearest s (1)
• all means calculated and rounded correctly to same number of dp as table (1)
Accept one more or one fewer decimal place</td><td>1
1</td><td>1
1</td><td></td><td>4</td><td>3</td><td>4</td></tr>
</table>

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			**Graph:** use of more than half the graph paper **for plotted points/ range bars on both x and y axes** (1)	1					
				labels: x axis = concentration of hydrogen peroxide		1				
				+ y axis = **mean** time taken for filter paper disc to fall and rise (1)						
				correct units: x = Vol (1)		1				
				+ y = s						
				linear scales correct on both axes with a number at each origin (1)		1		7	7	7
				plots correct +/- ½ small square (2) All plots correct = 2 marks One error = 1 mark More than one error = 0 marks	2					
				Line drawn between points (1)		1				
	(c)	(i)		TEST 1 and 2 As concentration increases the time taken decreases (must match candidates results) (1) Correct reference to {length of range bars/ range of data} linked to consistency (must match graph) (1) (e.g. all range bars are short therefore my results are consistent)		1	1	2		2
		(ii)		Use boiled and cooled potato (1) Would expect the discs (would fall and) not to rise/ owtte (1) Control experiment shows that the disc won't rise without catalase/ ORA/ Shows that the catalase breaks down the hydrogen peroxide/ owtte (1)			3	3		3

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iii)		**Test 1** (The buffer would) keep the pH constant/ pH not controlled in the experiment (1) {pH affects enzymes (activity)/ or description of/ enzymes have a narrow pH range over which they work} (1) **Test 2** (Water bath would) keep the temperature constant/ temperature not controlled in the experiment (1) {temperature affects enzyme activity/ reference to kinetic energy/ owtte} (1)			2	2		2
	(d)			Hydrogen peroxide { would increase in concentration/ levels would build up/ would reach toxic levels} (1)			1	1		1
				Question 1 Total	**5**	**8**	**7**	**20**	**10**	**20**

PRACTICAL ANALYSIS 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>(a)</td><td>(i)</td><td></td><td>Any two (x1) from:
{Size/ area} of net (1)
length of flat side of net(1)
{size/ area} of quadrat (1)
time of kicking (1)
distance between quadrats (1)
mesh size of net (1)
{force/ speed} of kicking (1)
Reject environmental factors</td><td></td><td>2</td><td></td><td>2</td><td></td><td>2</td></tr>
<tr><td></td><td></td><td>(ii)</td><td></td><td>So the {organisms/ samples} are {washed/ carried/ flow} into the net/ owtte</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td></td><td>(iii)</td><td></td><td>a single sample will give an {under/ over} representation of {the biodiversity/ species} present/ owtte/
single sample may not allow you to identify all species present/ ora/</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td>(b)</td><td></td><td></td><td>Correct hazard (1)
Correct risk + control measure (1)
<table><tr><th>Hazard</th><th>Risk</th><th>Control measure</th></tr><tr><td>Uneven ground/ plant roots</td><td>{Trip/ fall} when entering/ approaching river</td><td>Do not run/ wear sensible shoes</td></tr><tr><td>Slippery riverbed</td><td>Trip/ fall when {collecting samples/ kicking}</td><td>Wear suitable shoes</td></tr><tr><td>Biohazard in river</td><td>Suitable risk when handling organisms/ collecting samples</td><td>Wash hands/ wear gloves</td></tr><tr><td>Sharp objects in river</td><td>Injure feet when kicking</td><td>Wear suitable shoes</td></tr></table></td><td></td><td>2</td><td></td><td>2</td><td></td><td>2</td></tr>
</table>

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		Simpson's diversity index = 0.87 (2.d.p.) 3 marks If incorrect award 2 marks for 0.8713…../ 0.9 (incorrect number of decimal places) 0.13 (not taken away from 1) If incorrect award 1 mark for either of N(N-1) = 44732 $\Sigma n(n\text{-}1) = 5756$		3		3	3	
		(ii)		Biodiversity is high (1) Simpson's diversity index value is close to 1 (1) Ecf from (i)			2	2		
		(iii)		**Any two (x1) from** Sample a larger area/ more quadrats/ more samples/ larger net (1) Carry out in different part of river (1) Repeat at same time of year/ day (1) Compare results with other groups (1) kick for longer/ decreased mesh size (1)			2	2		
		(iv)		Any **two** for **one mark** Water depth/ rainfall/ water flow rate/ temperature/ pH level/ {oxygen/ carbon dioxide} concentration/ Minerals/ pollution or named pollutant/ light intensity or sunlight	1			1		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(d)	(i)		Kite diagram	1			1		
		(ii)		Shows the abundance across two environments/ compare relative {frequencies/ abundance/ percentage cover} over distance/ owtte	1			1		1
		(iii)		{Percentage cover/ it} decreases as {less light / more competition for light/ or description of}			1	1		
		(iv)		(Denitrification leads to) low levels of nitrate/ owtte (1) Digest proteins (1) Accept nitrogen containing compounds/ or named example To synthesise nitrogen containing compounds/ or named example (1)	1	2		3		
				Question 1 total	**4**	**11**	**5**	**20**	**3**	**8**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2.	(a)	(i)		A = tunica externa/ adventitia B = endothelium C = tunica media All 3 correct 2 marks 2 correct 1 mark 0/1 correct 0 marks	2			2		2
		(ii)		1 epu = 25 µm (2 marks) If incorrect award 1 mark for $\frac{100x\ 0.01\ x\ 1000}{40}$ 0.025		2		2	2	2
		(iii)		2.2 for 2 marks If incorrect award 1 mark for $\frac{88\ x\ 25}{1000}$ = 2 Ecf (ii)		2		2	2	1
		(iv)		Award 2 marks Accept any values between 43 – 44.1 If incorrect award 1 mark $\frac{95\ or\ 96\ or\ 97}{2.2}$ Ecf (iii)		2		2	2	2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			**Any one from** Vein would have thinner (muscular) walls (compared with the artery)/ Vein would have thinner tunica media/ valves would be present in the vein but not in the artery/ larger lumen in a vein Accept it for vein	1			1		1
	(c)			The {resolution/ magnification} of the light microscope is not high enough Reject power unqualified	1			1		1
				Question 2 total	**4**	**6**	**0**	**10**	**6**	**10**

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	4	11	5	**20**	**3**	**8**
	2	4	6	0	**10**	**7**	**10**
	Total	**13**	**26**	**11**	**50**	**13**	**39**