GCE A LEVEL MARKING SCHEME

SUMMER 2018

A LEVEL (NEW)
BIOLOGY - UNIT 5
1400U50-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2018 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

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WJEC GCE A LEVEL BIOLOGY

UNIT 5 - PRACTICAL EXAMINATION

SUMMER 2018 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.

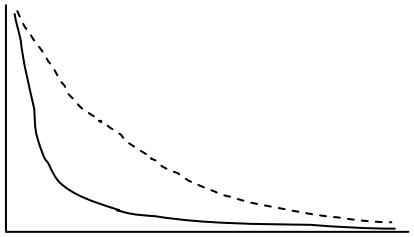
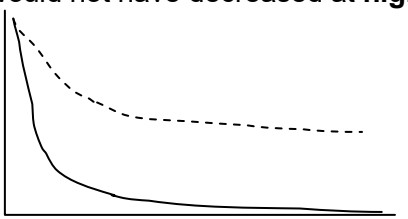
cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

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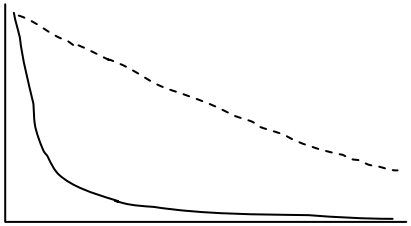
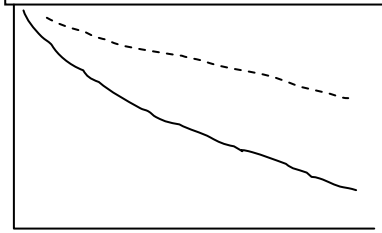
Unit 5 – EXPERIMENTAL TASK MARK SCHEME

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1				**Teacher Awarded:** Volumes measured accurately seen once (1) Time for disc to drop and rise measured to accurately to nearest second seen once (1)		**1** **1**			**2**	**2**
	(a)			**Table:** • headings for IV and DV correct [Concentration of H_2O_2 or hydrogen peroxide + Time taken to sink and rise] + clear indication of which trials were with water and which copper sulfate (1) • correct units for concentration (vol), time (s/ seconds/ e/ eiliadau) (1) Reject mol dm^{-3}/ v/ vols/ % vol/ secs/ sec/ minutes/ minutes + seconds • all times recorded to nearest second (1) Ignore numbers of repeats • means for both with and without inhibitor calculated correctly(to nearest second) (1) Accept to 1d.p. Penalise if only one set of readings for either with or without inhibitor unless explained Same marking points if in 1 table or 2 tables If 2 tables BOTH tables must be correct to get the marks	**1** **1**	**1** **1**			**4**	**4**
	(b)			• labels x axis = concentration of peroxide + y axis = **mean** time for disc to fall and rise (1) • correct units x= vol, y = s (1) • at least half the grid used in both directions (1) • linear scales correct on both axes (1) • plots correct +/- ½ small square (2) [-1 each error] • suitable **labelled lines** drawn for each (1) Accept suitable key	**1** **1** **1**	**1** **1** **2**		**7**	**2**	**7**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		Correct conclusion **from their results/ graph** – {competitive/non-competitive/cannot tell } (1)			1			
				Any one from: If **competitive**, time taken with copper sulphate decreases as concentration of peroxide increased (1)			1	2		2
				 **Ideal competitive inhibitor:** • no $CuSO_4$ has reached fastest time/V_{max} • time with $CuSO_4$ slower but starts to approach fastest time/V_{max} at highest concentration						
				if **non-competitive** inhibitor, time taken with copper sulphate would not have decreased at **higher** concentration of peroxide (1)  **Ideal non-competitive inhibitor:** • no $CuSO_4$ has reached fastest time/V_{max} • time with $CuSO_4$ slower and does not start to reach fastest time/V_{max} at highest concentration						

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Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
	Competitive because still getting faster with increased concentrations **/ Can't tell** because {with/without competitor} time does not level off (1)  **Competitive inhibitor/ inconclusive results re type of inhibitor:** • no $CuSO_4$ has reached fastest time/V_{max} • time with $CuSO_4$ slower, gets faster but highest concentration not enough to show if it will reach fastest time/V_{max}  **Competitive inhibitor/ inconclusive results re type of inhibitor:** • no $CuSO_4$ has not reached fastest time/V_{max} • time with $CuSO_4$ slower, gets faster but can't tell which type of inhibitor as no $CuSO_4$ has not reached fastest time/V_{max} **Can't tell (results too variable)** + some indication of what they would have expected to reach a valid conclusion(1)						

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		3 inaccuracies + 1 improvement for each (1 mark each) The following are examples. Allow other sensible sources of inaccuracy as long as a suitable and valid improvement is given. **inaccuracy** — **improvement** different quantity of yeast/potato extract on paper discs — soak disc for same length of time (1) used the same H_2O_2 for both readings — use fresh H_2O_2 for each reading (1) temperature could have changed — use a thermostatically controlled water bath (1) pH was not controlled — use a pH buffer (1) did not stir yeast/potato extract — stir consistently Accuracy of measuring cylinder/ syringe (only measures to …./ low resolution) — use {graduated pipette/ measuring cylinder/ syringe} with higher resolution Paper discs not uniform area — Use paper discs which are identical Do not accept human error or the following as they are told to do these in the method: • did not wash forceps • used more than 1 disc at the same time • did not remove first disc from the H_2O_2 • paper sticking to side			**3**	**3**		**3**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iii)		Correct comment on their results (1) {only repeated once/only 2 results for each concentration/large variation between repeats} + repeat more times to improve reliability (1) Reject reference to accuracy			1 1	2		2
				Question Total	**5**	**8**	**7**	**20**	**4**	**20**

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Unit 5 Practical Analysis 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></td><td></td><td>A Larva/ pupa killed by a parasitic wasp
B <u>Larva or pupa</u> still inside
C Larva eaten by a bird
All correct for 2 marks
2 correct for 1 mark
0/1 correct = 0 marks</td><td></td><td>2</td><td></td><td>2</td><td></td><td>2</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td></td><td>Risk factor: {Holly spines/ holly leaves are sharp and} can pierce the skin (1)
Precaution: Wear {protective/eq} gloves/long sleeves (1)

Risk factor: Holly spines can damage eyes (1)
Precaution: Wear goggles/ eye protection (1)

Accept
Risk factor: Wasp sting/ allergy to holly (1)
Precaution: Wear gloves/long sleeves (1)</td><td>1</td><td>1</td><td></td><td>2</td><td></td><td>2</td></tr>
<tr><td></td><td></td><td>(ii)</td><td></td><td>They have the same susceptibility to leaf miner attack/They would be susceptible to the same species of leaf miner</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td></td><td>
<table>
<tr><th>(O-E)</th><th>$(O-E)^2$</th><th>$\frac{(O-E)^2}{E}$ (1)</th></tr>
<tr><td>10</td><td>100</td><td>7.69</td></tr>
<tr><td>-5</td><td>25</td><td>1.92</td></tr>
<tr><td>-5</td><td>25</td><td>1.92</td></tr>
</table>
Correct $(O-E)^2$ (1)
Correct $\frac{(O-E)^2}{E}$ (1)
[If last column correct + $(O-E)^2$ blank award 2 marks]
χ^2 = 11.53 / 11.54(1)
If use -25 (not 25) then max 1 if answer = 3.85</td><td></td><td>3</td><td></td><td>3</td><td>3</td><td></td></tr>
</table>

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		(ii)		2		1		1		
		(iii)		Critical value = 5.99 (1) ecf from (ii) [3.85 critical value = 7.82] Reject null hypothesis (1) ecf from (ii) [accept null hypothesis if 3.85] The calculated value of χ^2 is greater than the critical value (at 5%/ 0.05 probability) (1) ecf from (i) [reverse argument] **Any one x (1) from** ecf from (ii) [reverse argument] • {Deviation is/ differences are} not due to chance alone/ • Individuals do not die equally at all life cycle stages/ • more die as eggs than as larvae or pupae/ • there is a significant difference between the observed and expected results Reject Results are not due to chance alone		1	3	4		

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Question				Marking Details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(d)			Have a larger sample of holly leaves/ more leaves (1) Repeat investigation {using another tree/ the same tree} (1) Ensure leaves all observed within a short time/ same time of year (1) ensure all leaves grow at the same height on the tree/ age of tree /age of leaves (1) Reject use a lower probability e.g. 0.01/ repeat experiment	1	1	1	3		3
	(e)	(i)		Any 2 (x1) of: same altitude/ same distance from sea/ same side of tree e.g. north facing	1	1		2		2
		(ii)		Any 2 (x1) of: number of predators/ birds (1) number of parasites/ wasps (1) {nutrient/ water} availability for holly/ {size/ surface area} of leaves(1) Accept disease qualified e.g. holly miner disease		2		2		2
Question Total					**3**	**14**	**3**	**20**	**4**	**11**

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Question				Marking Details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			3 correct labels [pollen sac, line of dehiscence and vascular tissue] with label lines ending within the structure labelled, not on its margin. (3) Accept words or letters Accept brackets to show position if clear	3			3		3
	(b)	(i)		A = 8 + B = 9 + C = 7(1) 24 ÷ 3 = 8.0 (1) /ecf from measurements in epu(1) Accept if measured in mm and correctly converted to epu and mean calculated A = 11mm x 0.714 = 7.854 epu B = 13mm x 0.714 = 9.282 epu C = 10mm x 0.714 = 7.140 epu mean = 8.0/8.1 (2) Accept ecf if measure in mm, convert to epu incorrectly but calc mean based on incorrect conversion (1) Reject if measured in mm and mean calculated in mm (0)		2		2	1	2
		(ii)		1 epu = $\frac{96}{100}$ x 10 = 9.6 µm		1		1	1	
		(iii)		8.0 x 9.6 = 76.8 µm /ecf from (b) (i) (should be the same number of dp as (ii))		1		1	1	
	(c)	(i)		Accept any value between x40 and x100	1			1		
		(ii)		*Triticum aestivum* is likely to be wind pollinated (1) {Small / light / smooth/ large quantity of} pollen/ {anthers/ stigma} outside flower/ lack of {brightly coloured petals/ scent/ nectar} (1)	1		1	2		
Question Total					**5**	**4**	**1**	**10**	**4**	**5**

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A2 UNIT 5 – PRACTICAL EXAMINATION - SUMMARY OF ASSESSMENT OBJECTIVES

Experimental Task	**Question**	**AO1**	**AO2**	**AO3**	**TOTAL MARK**	**MATHS**	**PRAC**
	TOTAL	**5**	**9**	**6**	**20**	**4**	**20**
Practical Analysis Task	1	3	13	4	20	2	11
	2	5	4	1	10	4	5
	TOTAL	**8**	**17**	**5**	**30**	**6**	**16**
	OVERALL TOTAL	**13**	**26**	**11**	**50**	**10**	**36**

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