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# **GCSE MARKING SCHEME**

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**SUMMER 2019**

**GCSE  
BIOLOGY - COMPONENT 2  
C400U20-1 AND C400UB0-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2019 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.

**EDUQAS GCSE BIOLOGY**  
**COMPONENT 2 - CONCEPTS IN BIOLOGY**  
**SUMMER 2019 MARK SCHEME**  
**GENERAL INSTRUCTIONS**

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (except for the extended response question).

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 and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement.

## 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

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)	Drawing - wall wider than vein		1		1		1
		(ii)	Thick (muscular) walls/ thicker walls (than vein) / small lumen (1) (Carry blood at) high pressure/ increased pressure (1)	2			2		
		(iii)	Valves	1			1		
	(b)	(i)	26/27mm		1		1		1
		(ii)	67.5/ 68 = 2 marks 27 / 0.4 = 1 mark Ecf from (i) (if use 26 = 65)		2		2	2	2
			<b>Total for Question 1</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>7</b>	<b>2</b>	<b>4</b>

Question			Marking details	Marks available						
				AO1	AO2	AO3	Total	Maths	Prac	
2	(a)	(i)	Crush (in plastic bag)/ use pestle and mortar / use blender (1)  To release the {contents/ DNA} from the {(living) cells/ nucleus} (1)	2			2		2	
		(ii)	Washing up liquid /detergent	1			1		1	
		(iii)	Removing the {cell debris/ residue} from the sample/ owtte		1		1		1	
		(iv)	I	White {material /strands} in layer at the top of the sample in the tube		1		1		1
			II	Stirring would disrupt the {layers/strands}/ stop the contents of the tube being mixed up		1		1		1
(b)		Nucleus present in white cells / no nucleus in red cells (1) DNA contained in the {chromosomes / nucleus} (1)	2			2				
(c)		X = Phosphate <b>and</b> Y = sugar (1) T and A (any order) (1)	1 1			2				
<b>Total for Question 2</b>				<b>7</b>	<b>3</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>6</b>	

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)		Stopclock/ watch	1			1		1
	(b)	(i)	6 plots correct = 2 marks, 4/5 plots correct = 1 mark $\pm$ 1 small square Line quality (1)		2 1		3	3	3
		(ii)	As the temperature rises {the activity of the enzyme/ it} increase <b>and then</b> decreases (or eq. wording but sequence must be correct)		1		1		1
		(iii)	60 ( $^{\circ}$ C is optimum temp) (1) This is the temperature which gives the highest {recorded activity of urease/ point}/ because 99 is the highest reading (1)		1	1	2		2
		(iv)	Any <b>one</b> ( $\times$ 1) from Same concentration of enzyme (1) Same concentration of urea solution (1) Same volume of indicator solution (1)			1	1		1
	(c)	(i)	Do the investigation again /check repeatability of results Ask another group to carry out the same investigation / check if the results are reproducible.			1	1		1
		(ii)	Use of electronic/ thermostatic water bath	1			1		1
			<b>Total for Question 3</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>10</b>	<b>3</b>	<b>10</b>

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)		{Reaction times /catching distance} would decrease with practice			1	1		1
	(b)	(i)	3 or more students Reason – to give adequate sample size/ range of people/ large number of people to compare results			1	1		2
		(ii)	3 or more attempts to test effect of practice			1	1		
	(c)	(i)	7 cm		1			1	1
		(ii)	Measurement in cm lacks precision / {Unmarked region of ruler / position of fingers at start} not accurate			1	1		1
	(d)	(i)	Dotted line decreasing with increase in attempts then plateau		1		1		
		(ii)	The speed of reaction increases with repeated attempts/ catching distance decreases with practice (1) So results support the hypothesis (1) 2 <sup>nd</sup> marking point linked to first  OR  As after a point repeated attempts do not give further change (1) only supported {to an extent / not conclusive } (1) 2 <sup>nd</sup> marking point linked to first  relevant reference to age/gender (1)			1  1	2		
	(e)		automatic/ protective (1) blink reflex/ diameter of pupil/ withdrawal reflex (1)	1 1			2		
			<b>Total for Question 4</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>5</b>



Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
5	(a)	<p><u>Hazard</u> – plant spines are sharp (1)  <u>Risk</u> – scratches/ punctures of skin/ damage to skin when handling holly  + <u>control</u> ensure cover of skin on arms and legs/ wear gloves (1)</p>		2		2		2
	(b)	<p><b>Indicative content:</b></p> <ul style="list-style-type: none"> <li>• Place quadrats</li> <li>• Ref to random / avoiding bias</li> <li>• Ref to grid/ tapes</li> <li>• e.g. Use dice/ random number table to find co-ordinates</li> <li>• Suitable {number of quadrats/ sample size}</li> <li>• Count the plants in the quadrat/ record results</li> <li>• Calculate the mean per quadrat</li> <li>• Repeat in both areas</li> <li>• Compare the results for both areas</li> </ul> <p><b>5-6 marks</b>  7-9 points of indicative content</p> <p><i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p>	4	2		6		6

Question			Marking details	Marks available						
				AO1	AO2	AO3	Total	Maths	Prac	
			<p><b>3-4 marks</b> 4-6 points of indicative content <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p><b>1-2 marks</b> 1-3 points of indicative content <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p><b>0 marks:</b> No attempt made or no response worthy of credit.</p>							
			<b>Total for question 5</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>8</b>	

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
6/ 1	(a)	(i)	The variety of species and the number of each (in an area) (1)	1*			1		
		(ii)	Any <b>two</b> (×1) from: <ul style="list-style-type: none"> <li>• food (1)</li> <li>• potential foods<sup>1</sup> (1)</li> <li>• industrial materials (1)</li> <li>• new medicines (1)</li> <li>• human well-being (1)</li> </ul>	2*			2		
		(iii)	Any <b>one</b> (×1) from <ul style="list-style-type: none"> <li>• CITES (1)</li> <li>• SSSI (1)</li> <li>• Captive breeding programme (1)</li> <li>• National Parks (1)</li> <li>• Seed/Sperm bank (1)</li> <li>• Local biodiversity action plan/ nature reserve (1)</li> <li>• legislation (1)</li> <li>• Or any detailed example from the above (1)</li> </ul>	1			1		
	(b)	(i)	Algae carry out photosynthesis (1) that provide {biomass/glucose/sugars} (for corals) (1)		2		2		
		(ii)	Algae only provide 90% of food / they are not 100% dependent on algae for food (1)			1	1		
		(iii)	422.82 / 422.8 / 423 = 2 marks Award <b>one</b> mark for 0.81 × 522 422 (incorrect rounding)		2		2	2	

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(b)	(iv)	Sea temperatures (in March) are always higher than the mean since 2000 (1) Sea temperatures (in March) are not higher than the mean all the time before 1980 (1) Corals bleach (more often in 2000s) because sea temperature is {rising/ high} for a long period of time (1)		2		3		3
		(v)	(Long term monitoring allows scientists) to {identify trends / predict changes in the future} (1)			1	1		
	(c)		Plants that have been introduced into areas where they do not naturally occur/ non- native <u>species</u> (1) They {grow faster / outcompete} native species/ they carry diseases (1)	2			2		
			<b>Question 6/1 total</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>3</b>

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)		Add equal volume of Benedict's reagent (to glucose solution) (1) strongly heat/ boil / heat to 60°C(for set period of time) (1)	2			2		2
	(b)	(i)	x-axis = concentration/ g/litre + y-axis = percentage of light/ light passing through/ % (1) appropriate scale on both axes: (1) all point correct = 2 marks 4 points correct = 1 mark 3 or less points = 0 mark; drawing acceptable line of best fit; (1)	1 1	2 1		5	5	1
		(ii)	Correct reading from graph; (1) $\pm 1$ small square Reading from graph $\times 1$ ; (1) (Reading from graph $\times 10$ ) / 2 (1)		3		3	3	1
		(iii)	Type 2 diabetes/cardiovascular disease (1)	1			1		
			<b>Question 2 total</b>	<b>5</b>	<b>6</b>	<b>0</b>	<b>11</b>	<b>8</b>	<b>9</b>

Question			Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
3	(a)	<p><b>Indicative content</b></p> <p><i>Potato A</i></p> <ul style="list-style-type: none"> <li>• B has destroyed/ damaged the cell membranes.</li> <li>• So no osmosis can take place/ no movement of water into cavity</li> </ul> <p><i>Potato B</i></p> <ul style="list-style-type: none"> <li>• Water has moved into the cavity/ water moves along its concentration gradient</li> <li>• Lower water concentration in the cavity compared to the Petri dish/ ORA</li> <li>• Because the salt has dissolved in cavity B</li> <li>• Any correct reference to semi permeable membrane</li> <li>• Correct use of the word osmosis</li> </ul> <p><i>Potato C</i></p> <ul style="list-style-type: none"> <li>• This is a control experiment</li> <li>• to show that it is the presence of salt in the cavity of the fresh potato that causes the effect observed</li> </ul> <p><b>5-6 marks</b> 7-9 indicative content points <i>There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant to the argument.</i></p> <p><b>3-4 marks</b> 4-6 indicative content points <i>There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included in the response but there may be some minor errors or the inclusion of some information not relevant to the argument.</i></p>	2	2	2	6		6

Question			Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
		<p><b>1-2 marks</b> 1-3 indicative content points <i>There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of information not relevant to the argument.</i></p> <p><b>0 marks</b></p>						
		<b>Question 3 total</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>0</b>	<b>6</b>

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)	Prevent {bacteria/ fungi/ microbes} getting into the agar/ prevent bacteria from escaping into the environment (1)	1			1		
		(ii)	Any <b>two</b> (×1) from: <ul style="list-style-type: none"> <li>• use sterilised forceps (1)</li> <li>• work next to a lit Bunsen burner (1)</li> <li>• lid of petri dish not to be lifted too high (1)</li> <li>• lid of petri dish sealed with adhesive tape (1)</li> </ul>	2			2		2
		(iii)	20-25 (°C)	1			1		1
	(b)		{Honey/solution} has diffused out (of disc into agar)(1) Bacteria has been {killed/prevented from growing}; (1)		2		2		
	(c)		Any <b>one</b> (×1) from: <ul style="list-style-type: none"> <li>• Can solve problems of being greater demand than of supply(1)</li> <li>• Overcome problems of 'fake' Manuka honey being sold:(1)</li> <li>• No need to ship honey over long distances;(1)</li> <li>• Reference to economic gain for Scotland (1)</li> </ul>			1	1		
			<b>Question 4 total</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>3</b>



Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)		Clear drawing showing tunica externa, tunica media and lumen (endothelium neutral); (1) Correct labelling of: <ul style="list-style-type: none"> <li>• (Tough) outer layer / tunica externa (1)</li> <li>• Muscle layer / elastic fibres / tunica media (1)</li> <li>• Lumen (1)</li> </ul>	3	1		4		4
	(b)		6.875 (22) / 7.1875 (23)= 3 marks <b>If incorrect award 2 marks for</b> calculation of magnification =22 000 / 3 200 or 23 000/ 3 200 incorrect rounding of answer above <b>If incorrect award 1 mark for</b> 22-23 mm (1)	1	2		3	2	3
	(c)		{value of x -y/ lumen} would be {smaller/ narrower} (1) presence of {plaque / atheroma/ blockage} (1)			2	2		
			<b>Question 5 total</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>7</b>

Question				Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	pH (1)	1			1		1
		(ii)	Time taken for photographic film to become clear (1)	1			1		1
	(b)	(i)	Trypsin {breaks down / digests} gelatin (1) Silver halides released (from plastic sheet of film) (1)		2		2		
		(ii)	Trypsin denatured/ inactivated (1) Shape of active site is changed (1) {gelatin / protein/ substrate} cannot {bind / fit into} active site (1)	1	1		3		
	(c)		pH 8 (1)		1		1		1
	(d)		to get a more accurate value for the optimum pH (1) {increases confidence / confirms} pH8 is the optimum (1)			2	2		
	(e)		Temperature may fluctuate (1) Carry out experiment in thermostatically controlled water bath (1) OR Film size may be different (1) Use same area of film (1)			2	2		2
				OR Difficult to tell when film is clear (1) Use a light meter (1)					
			<b>Question 6 total</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>5</b>

**COMPONENT 2 – CONCEPTS IN BIOLOGY****FOUNDATION TIER****SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES**

<b>Question</b>	<b>AO1</b>	<b>AO2</b>	<b>AO3</b>	<b>TOTAL MARK</b>	<b>MATHS</b>	<b>PRAC</b>
<b>1</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>7</b>	<b>2</b>	<b>4</b>
<b>2</b>	<b>7</b>	<b>3</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>6</b>
<b>3</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>10</b>	<b>3</b>	<b>10</b>
<b>4</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>5</b>
<b>5</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>8</b>
<b>6</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>3</b>
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>8</b>	<b>36</b>

## HIGHER TIER

### SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

<b>Question</b>	<b>AO1</b>	<b>AO2</b>	<b>AO3</b>	<b>TOTAL MARK</b>	<b>MATHS</b>	<b>PRAC</b>
1	6	6	3	15	2	3
2	5	6	0	11	8	4
3	2	2	2	6	0	6
4	4	2	1	7	0	4
5	4	3	2	9	2	7
6	3	5	4	12	0	5
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>12</b>	<b>29</b>