GCE AS MARKING SCHEME

SUMMER 2025

AS
BIOLOGY – COMPONENT 2
B400U20-1

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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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EDUQAS GCE AS BIOLOGY – COMPONENT 2

SUMMER 2025 MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

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. Award the middle mark in the level if most of the content statements are given and the communication statement is partially met. Award the lower mark if only the content statements are matched.

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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

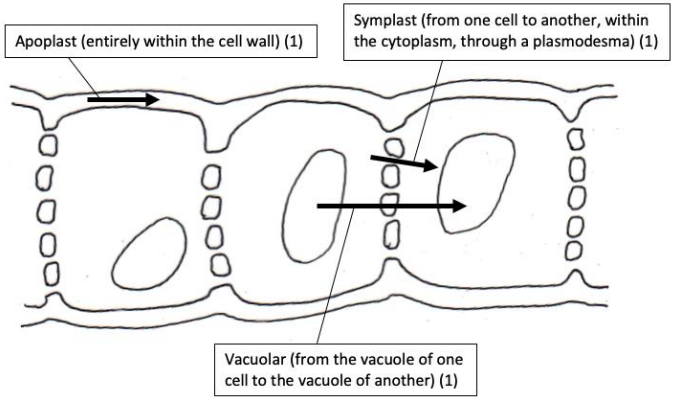
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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)		Flatworm and *Amoeba* have large(r) sa/vol ratio (than earthworm) (1) **Any 3 (x1) from** A. Flatworm and *Amoeba* have {sufficient gas exchange / absorb enough oxygen} over surface (1) B. Flatworm and *Amoeba* have a short diffusion distance / oxygen can diffuse throughout organism (1) C. Earthworm blood vessels transport oxygen away from body surface (in blood) / to body cells / to respiring tissues owtte (1) D. So concentration gradient maintained (1)	2	2		4		
	(b)	(i)	16.8 (2 marks) 16.7 / 16.75 / 17 (1 mark)		2		2	2	
		(ii)	Greater confidence in mean than in a single reading / help identify anomalous results/ owtte (1)		1		1		1
		(iii)	**Any 2 (x1) from** Ref to oxygen dissolving before absorption (1) Higher saturation with oxygen in moist soil (1) So more respiration / more energy available (for movement)/ more ATP available / owtte (1)		2		2		2
		(iv)	(If blood vessels constricted) less blood flows near surface (1) So less oxygen absorbed (by blood)/ use of data (1)			2	2		
		(v)	Reference to sample size being larger/ All worms should have been tested in all conditions / owtte.			1	1		1

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
		(vi)	Difference Higher oxygen saturation (1) Explanation: Faster <u>diffusion</u> at higher temperature / owtte (1) OR Change: None (1) Explanation: Both temperatures within the optimum range (1)			2	2		2
	(c)		Blood and water flow in opposite directions (1) Maintains concentration gradient across whole of gas exchange surface / concentrations do not reach equilibrium / owtte (1)	2			2		
			Question 1 total	**4**	**7**	**5**	**16**	**2**	**6**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)		**Any two (x1) from:** Longer root hairs more efficient water absorption / ORA (1) Longer root hairs gives more surface / membrane / cell wall (for absorption) (1) Some / Very small amount of absorption directly into root (if no root hairs) (1)	1		1	2		**1**
	(b)	(i)			3		3		
		(ii)	{Suberin / Casparian strip} is {impermeable / hydrophobic} (1) so water has to cross cell membranes / cannot continue in apoplast (1) Water is diverted into the cytoplasm / symplast; (1)	3			3		

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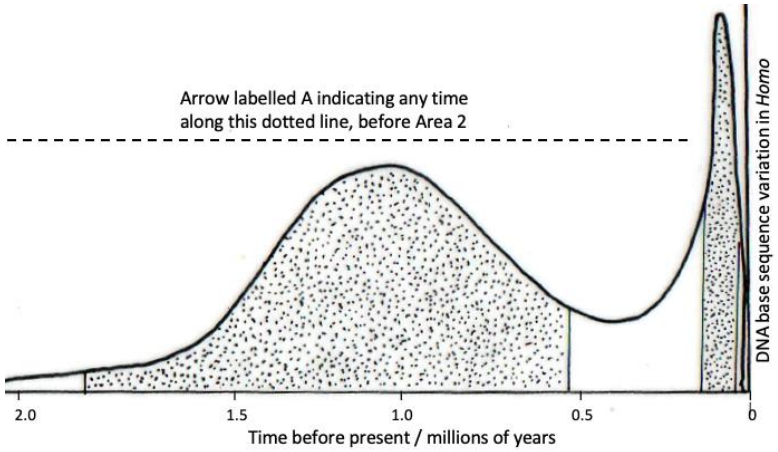
Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)		**Any four (x1) from** A. Reference to active transport (1) B. There is a higher concentration of phosphate ion in the cells than in the soil / use of data (1) C. Phosphate uptake is against a concentration gradient (1) D. More oxygen ∴ higher ATP production/ more respiration (1) E. More ATP / energy ∴ more uptake (1)		3	1	4		1
			Question 2 total	**4**	**6**	**2**	**12**	**0**	**2**

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<table>
<tr><th colspan="3" 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>3</td><td>(a)</td><td>(i)</td><td>
<table>
<tr><td></td><td></td></tr>
<tr><td></td><td>Eukaryota / Eukaryote / Eukarya</td></tr>
<tr><td></td><td></td></tr>
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</td><td>1</td><td></td><td></td><td>1</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Classification depends on available information / may change as new information is available (1)</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>Biological names are used world-wide / common names may be regional / same genus name indicates relatedness / owtte (1)</td><td>1</td><td></td><td></td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>H. sapiens and H. neanderthalensis are more closely related to each other than either is to H. floresiensis (1)

Because H. sapiens and H. neanderthalensis have a more recent common ancestor than either has with H. floresiensis (1)</td><td></td><td>2</td><td></td><td>2</td><td></td><td></td></tr>
</table>

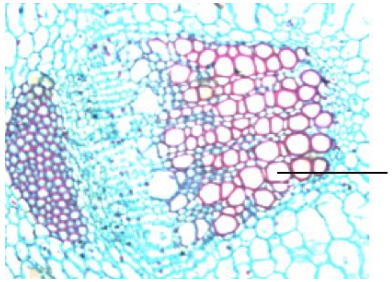
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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)				1	1		
		(ii)	The greatest variation in the base sequence (1)		1		1	0	
		(iii)	(*H. sapiens* + *H. neanderthalensis* and *H. sapiens* + *H. denisova*) were able to interbreed to make fertile offspring (1)			1	1		
	(d)		70 = 3 marks 70.02…. = 2 marks $(5.92 \times 10^6 \times 22)/ 1\,860\,000$ = 1 mark		3		3	3	
			Question 3 total	**2**	**7**	**2**	**11**	**3**	**2**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)	blood volume (1) Contraction of ventricles / heart (1)	2			2		
		(ii)	{Contact with / resistance from} with capillary walls (1) Reduced volume of blood (1)	2			2		
	(b)	(i)	-1.2 kPa (1 mark) (So) fluid / water moves into the capillary (by osmosis) (1) Down water potential gradient/ because the resultant force is negative / osmosis (1)		2	1	3	1	
		(ii)	**X** is a {lymph / lymphatic} vessel / capillary (1) Absorbs excess tissue fluid / fluid not absorbed into capillary (1)	1	1		2		
		(iii)	(Solute potential so high that) resultant force is positive / less negative (1) Fluid is pushed out / does not move back into capillaries (at venous end of capillary bed) (1) Remains bathing the tissues (1)		1	2	3		
	(c)		Blood contains red blood cells/haemoglobin (so red) but tissue fluid does not (so pale yellow) / RBCs too big to pass out (1) The large protein molecules are too big to pass out through capillary walls (1)	2			2		
			Question 4 total	**7**	**4**	**3**	**14**	**1**	**0**

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)	Vascular bundles are round the periphery / not in the centre (1)	1			1		1
		(ii)	Any suitable vessel labelled e.g.  (1)		1		1		1
		(iii)	Xylem vessels have {a large diameter / thick cell walls} (1)		1		1		1
	(b)		**Any four (x1) from** A. <u>In spruce</u>, water must move laterally / not vertically (1) B. Ends of tracheids are closed / end walls present (1) C. Tracheids only / no vessels so more resistance to flow (1) D. In beech, water moves vertically (and laterally) (1) E. {Open ends of vessel elements/ no end walls} (in beech) provide less resistance (1)		2	2	4		
	(c)	(i)	Air movement enhances transpiration / owtte (1) So transpiration stream faster (1)		2		2		

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
		(ii)	3.25 / 3.3 (2 marks) $\frac{19.5}{6}$ (1 marks) Unit = mm minute^{-1} hour^{-1}(1 mark) 0.542 / correct rounding (2 marks) $\frac{19.5}{360}$ (1 mark) Unit = mm minute^{-1} minute^{-1} / mm minute^{-2} (1 mark)		3		3	3	
		(iii)	Stomata open more (widely) + because of increased {light intensity / temperature}			1	1		
			Question 5 total	**1**	**9**	**3**	**13**	**3**	**3**

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Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
6	A1. Autotrophs convert an external energy source into chemical energy / make their own {food / energy-containing compounds / glucose} / A2. make complex / large organic molecules from simple / small inorganic molecules A3. Photoautotrophs use light as an energy source; A4. Chemoautotrophs use energy released from chemical reactions as an energy source; B1. Heterotrophs cannot convert external energy source / light into chemical energy / B2. rely on autotrophs or other heterotrophs for {energy-containing compounds / food / biological compounds} B3. Heterotrophs convert the chemical energy in food into chemical energy in their cells; B4. 'Holozoic' refers to digesting food internally / ingestion, digestion and egestion B5. Parasitic – living in or on another organism gaining nutrition at the expense of the host / owtte. C1. Saprotrophs / saprobionts; C2. digest dead / decaying organic material C3. {External / extracellular} digestion / secrete enzymes on to substrate; C4. absorb digested nutrients	9					

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			7-9 marks *The candidate constructs an articulate, integrated account, correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses scientific conventions and vocabulary appropriately and accurately.* **4-6 marks** *The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate usually uses scientific conventions and vocabulary appropriately and accurately.* **1-3 marks** *The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate has limited use of scientific conventions and vocabulary.* **0 marks** *The candidate does not make any attempt or give a relevant answer worthy of credit.*						
			Question 6 total	**9**	**0**	**0**	**9**	**0**	**0**

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COMPONENT 2 - Biodiversity and Physiology of Body Systems

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	4	7	5	**16**	**2**	**6**
2	4	6	2	**12**	**0**	**2**
3	2	7	2	**11**	**3**	**2**
4	7	4	3	**14**	**1**	**0**
5	1	9	3	**13**	**3**	**3**
6	9	0	0	**9**	**0**	**0**
TOTAL	**27**	**33**	**15**	**75**	**9**	**13**

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