GCE A LEVEL MARKING SCHEME

SUMMER 2025

A LEVEL
BIOLOGY – COMPONENT 2
A400U20-1

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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 A LEVEL BIOLOGY

COMPONENT 2: CONTINUITY OF LIFE

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.

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)			<table><tr><td>Sperm is normally deposited during sexual intercourse</td><td>E</td></tr><tr><td>Fertilisation of the ovum normally occurs</td><td>A</td></tr><tr><td>The blastocyst normally implants</td><td>D</td></tr><tr><td>The placenta normally forms</td><td>D</td></tr></table> All 4 for 3 marks 3 for 2 marks 2 for 1 mark	3			3		
	(b)	(i)		X = Prolactin (1) Y = Oxytocin (1)	2			2		
		(ii)		{The more/ when} the baby feeds, the more hormone is {produced / released / owtte} and the more milk is {produced / released / owtte}		1		1		
		(iii)		more <u>lactose</u> (1) Less saturated (fatty acids) / more unsaturated (fatty acids) (1)		2		2		
				Question 1 total	**5**	**3**	**0**	**8**	**0**	**0**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			2 marks for a drawing that resembles the photo - has six plates and nothing extra 1 mark for a granum drawing /drawing with shading 0 marks if additional structures drawn Ignore ribosomes 1 mark for stroma correctly labelled 1 mark for thylakoid membrane correctly labelled	2	2		4		2
	(b)	(i)		B **and** palisade (mesophyll)	1			1		
		(ii)		Glycerate 3-phosphate (allow GP)	1			1		
		(iii)		**Any three (x1) from** A. Uptake of CO_2 {reaches max faster / lasts longer when going from dark to light} / use of data (e.g. tobacco takes 1and a half minutes to reach max but wheat takes 19 minutes) / owtte (1) B. {Increased rate of / more} {LDR/ (non) cyclic photophosphorylation} (1) C. (Therefore) {rate of photosynthesis increases / more photosynthesis} / {Light Independent Stage / Calvin cycle} occurs (1) D. More {products / named product (e.g. glucose / amino acids)} for {growth / protein synthesis} (1)		2	1	3		

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iv)		**Any three (x1) from** A. {Restriction enzyme / endonuclease / named enzyme e.g. EcoR1} used to {cut out / isolate} {genes / DNA} (1) Reject cut genes unqualified Accept cut at the start and the end of the gene B. Sticky ends / or description of (1) C. Same restriction enzyme used to {open (DNA in) {vector / plasmid} / cut plasmid} (1) D. Ligase used to {insert / anneal / splice / owtte} genes into {vector / plasmid} (1)	3			3		
		(v)		Benefit: higher yield / more produced/ produced faster / owtte (1) Concern: may be spread to other plants causing them to grow faster / reduction {in biodiversity / or description of} / outcompete other plants / unknown effects of eating (new protein produced in) crop (1)	2			2		
	(c)	(i)		**Any two (x1) from** Petals present / Increased petal size / {brightly coloured / colourful} {petals / flowers / corolla} (1) Anthers / stigma {inside (flower) / not exposed} (1) Stigma is {not feathery / or description of} (1) Reject {inside / outside} plant Reject nectaries / scent		2		2		2
		(ii)		{Ensures / increases chance of / owtte} {cross-pollination takes place } / {reduces chance of / prevents} {self-pollination / self-fertilisation} / Prevents inbreeding (1) Leads to greater genetic {variation / diversity} (1)		2		2		
				Question 2 total	**9**	**8**	**1**	**18**	**0**	**4**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		**Any two (x1) from** • Could be allergic / named health concerns e.g. sugar and diabetes / owtte (1) • Religious concerns (1) • Example of {Ethical concerns / personal choices/ dietary choices} (1)			2	2		
		(ii)		**Similarities** **Any two (x1) from** • Use (DNA) polymerase (1) • Complementary base pairing (1) • Semi conservative replication / owtte(1) • Requires the breaking of hydrogen bonds (1) **Differences** **Any two (x1) from** • uses {higher temperature / or given temperatures higher than 37°C} / temperatures vary / {DNA/ taq} polymerase is thermostable in PCR (1) • PCR uses Taq polymerase rather than the polymerase in the cell (1) • Heat used to {separate strands / break hydrogen bonds} instead of enzymes (1) • (DNA) primers are added (to start replication) but not in cell (1) • PCR replicates small pieces of DNA not whole chromosomes (1)		4		4		

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iii)		Vertical and horizontal lines shown on graph (½ way between 3 and 4 hours) (1) Reject if more than two lines drawn 1 122 to 1 600 ug. / 1.1 x10^3 to 1.6x10^3 (1)		2		2	2	
		(iv)		Not all primers bind / run out of {primers / nucleotides} / some non target sections present / DNA strands rejoin rather than with primer (1) Accept enzymes start to denature after numerous cycles			1	1		1
	(b)	(i)		Arrow drawn down (1) {Smallest molecules / fragments with the smallest number of base pairs } move {furthest / fastest} / {Largest / fragments with the largest number of base pairs} move {less / slower} (1)		1	1	2		
		(ii)		{Identify / estimate} the {number of base pairs / fragment size} / Fragment size can be compared against known sizes (1)		1		1		1
		(iii)		**Any two (x1) from** Do not need to know size of fragments (1) (Only) need comparison with {pure samples / known meats} / owtte (1) To identify which meat is in the pie (1)			2	2		2
		(iv)		Pie meat contains horse **<u>and</u>** beef. (1) Another {unidentified meat / source of DNA / contamination present / organism} (1)			2	2		
		(v)		**Any one (x1) from** (Bands) do not give quantitative data/ owtte (1) Sample may not be representative of whole pie (1)			1	1		1
				Question 3 total	**0**	**8**	**9**	**17**	**2**	**5**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		Water / H_2O	1			1		
		(ii)		Gibberellin / gibberellic acid (1) Diffusion (1)	2			2		
	(b)	(i)		**Any one (x1) from** Cut away from body (onto a tile) (1) use {forceps / tweezers} to hold grain (1)	1			1		1
		(ii)	I	{Secretes / synthesises / owtte} <u>amylase</u> (1) {Hydrolyses / digests / breaks down} the starch (to give clear zone) (1)			2	2		
			II	Enzymes denatured (so starch not hydrolysed)			1	1		
			III	no water for hydrolysis / no {activation / synthesis} of gibberellin / seed still dormant / {enzymes} {remain inactive / not mobilised} / {hormone / gibberellin} not mobilised			1	1		

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		290g (3 marks) 2.9 x 10^2 (3 marks) **If incorrect award 2 marks for** 294 (not to 2sf) 420 – 126 **If incorrect award 1 mark for** 30% of 420g = 126g or 130 70/100 x 420		3		3	3	
		(ii)		**Any two (x1) from** • Uses the {glucose / starch / oil} (1) • For {respiration / production of ATP} (1) • So CO_2 lost (1)			2	2		
				Question 4 total	**4**	**3**	**6**	**13**	**3**	**1**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		Glycocalyx	1			1		
		(ii)		• {N-acetyl and galactose / both substrates / they} have different {structures / shapes} (1) • The enzymes are specific to these shapes / different shape active sites / active sites are complementary (to substrates) (1)		1	1	2		
	(b)	(i)		<table><tr><td>Blood group</td><td>Genotype(s)</td></tr><tr><td>A</td><td>$I^A I^A$ and $I^A I^O$</td></tr><tr><td>B</td><td>$I^B I^B$ and $I^B I^O$</td></tr><tr><td>AB</td><td>$I^A I^B$</td></tr><tr><td>O</td><td>$I^O I^O$</td></tr></table> 2 for all correct 1 for 2 or 3 correct Award max 1 all correct but use only AA etc		2		2		
		(ii)		Genotype parents, $I^A I^O$ $I^B I^O$ (1) Genotypes children, $I^A I^O$ $I^A I^B$ $I^O I^O$ $I^B I^O$ (1)		2		2		
		(iii)		0.25/ ¼ /1 in 4/ 25% Reject ratios		1		1		
	(c)	(i)		Discontinuous / discrete	1			1		

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		frequency of I^O= 0.7 (1) frequency of dominant alleles= 0.3 (1) frequency of heterozygotes = 0.42 (1) % frequency of heterozygotes = 42% (1) If first two frequencies are 70% and 30% award 1 Mark If line 4 is a % of the frequency on line 3 allow 1 mark.		4		4	4	
		(iii)		Immigration/ emigration / migration / or description of	1			1		
		(iv)		One blood group may donate more than another/ {universal donor / owtte} may be {encouraged to donate more than others / more needed} owtte			1	1		1
	(d)	(i)		GAC CTG ATG CCC		1		1		
		(ii)		Leu Asp Tyr Gly		1		1		
		(iii)		**Any three (x1) from** A. Base {sequence / order} is changed (1) B. Different (sequence of bases in) {mRNA / codon} / or example of (1) C. {Attracts / owtte} different {tRNA / anticodon} (1) D. different amino acid (sequence / inserted / coded for) / may produce different length protein (if mutation codes for a stop codon) (1)	3			3		

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iv)		• More than one {triplet / codon} codes for the same amino acid / code is degenerate (1) • Suitable example of codons giving same amino acid(1)	1	1		2		
		(v)		• FUT1 enzyme not {produced/ functional}/ carbohydrate H not made/ only precursor carbohydrate present (1) • So cannot {produce/ create} carbohydrate A or B/ no {substrate/ carbohydrate H} for enzymes {A/B} (1)			2	2		
				Question 5 total	**7**	**13**	**4**	**24**	**4**	**1**

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)		{Reduce / prevent} bias	1			1		
		(ii)		Both 8 (1)		1		1		1
		iii		D = 0.87 = 3 marks Allow 0.866667 correctly rounded If incorrect award 2 marks for 0.13 (not taken away from 1) 0.866667 incorrectly rounded If incorrect award one mark for either of: $\sum$ n(n-1) = 886 (1) *N*(*N*-1) = 6642 (1)		3		3	3	3
		(iv)		**Any two (x1) from** (Biodiversity also includes) species evenness (1) Richness same for both sites (BUT index of diversity is different) (1) Richness does not describe {how dominant species are / spread of species number / the abundance of species / owtte} / ORA for species evenness (1)		1	1	2		2
	(b)			**Any four (x1) from** A. only vegetation / {invertebrates / animals} not taken into account (1) B. Only carried out in March / may change during the year / Only carried out once (1) C. Only 20x20m used / only 400m^2 used / may change over the {whole area / different habitats / owtte} (1) D. Does not take into account rarity of organisms (1) E. 10 quadrats not {enough / representative} / quadrats too small / owtte (1)			4	4		4
				Question 6 total	**1**	**5**	**5**	**11**	**3**	**11**

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Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
7	**Pollen formation** A1 Mitosis to produce pollen mother cells Accept microspores mother cells / microsporocytes A2 (Followed by) meiosis to produce a {tetrad / four {cells / grains / gametes / microspores}} A3 That are haploid A4 then {mitotic divisions of the / mitosis of the} nucleus A5 to produce {two male nuclei / generative nucleus} A6 (and) a (pollen) tube nucleus **Stages This must be clearly referring to B and C** B1 (B) Condensation of {chromosomes / chromatin} B2 (B) (Formation of) bivalents / pairing of homologous chromosomes B3 (B/C) {Chiasmata / chiasma formation / crossing over} B4 (C) {bivalents / homologous pairs / chromosomes} arranged across {equator / or description of} B5 (C) spindle fibres attach to centromeres B6 (C) {Independent assortment / random assortment / or description of} **The importance of meiosis** C1 (Meiosis is important because it) produces genetically {different / variation in} C2 cells / gametes / offspring / plants / grains can only be awarded with C1 C3 Any ref to {evolution/ natural selection/ selective advantage} C4 Comment on advantage in event of {environmental change / or example e.g. <u>new</u> disease} C5 Maintains chromosome number (down generations) / haploid cells fertilise giving diploid cells						

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Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
				7-9 marks Indicative content of this level is detailed statements from all three areas of the indicative content. *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** Indicative content of this level is detailed statements from two areas of the indicative content or less detail from three *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** Indicative content of this level is any correct statement from the indicative content *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 7 total	**4**	**5**		**9**		

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COMPONENT 2: Continuity of Life

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	5	3	0	8	0	0
2	9	8	1	18	0	4
3	0	8	9	17	2	5
4	4	3	6	13	3	1
5	7	13	4	24	4	1
6	1	5	5	11	3	11
7	4	5	0	9	0	0
TOTAL	**30**	**45**	**25**	**100**	**12**	**21**
TARGET	**30**	**45**	**25**	**100**	**10**	**15**

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