GCE AS MARKING SCHEME

SUMMER 2025

AS
BIOLOGY – COMPONENT 1
B400U10-1

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.

EDUQAS GCE AS BIOLOGY – COMPONENT 1

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.

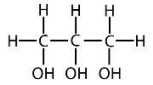
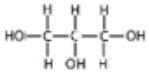
Extended response question

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.

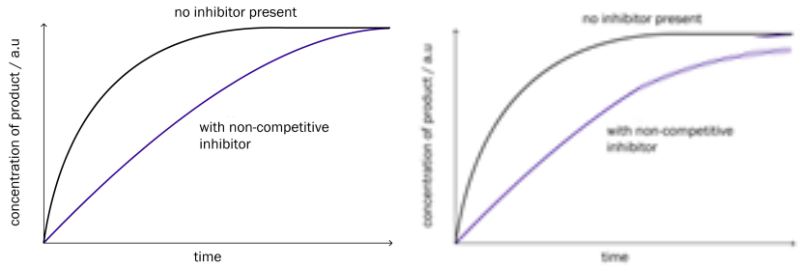
cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		X = glycerol AND Y = fatty acid Both needed for 1 mark	1			1		
		(ii)		**Any 2 (x1) from:** R = variable group/ owtte (1) (up to 3) different {R / Y / groups / description of }1) (All bonded to) glycerol / X (1) Ignore references to position of bonding on glycerol	1	1		2		
		(iii)		 /  /$CH_2OHCHOHCH_2OH$	1			1		
	(b)	(i)		A solid + BCD liquid (1)		1		1		
		(ii)		A has only single C-C bonds / max. number of H atoms (so saturated) (1) B, C, D (unsaturated) as they have fewer H atoms (1) have double C=C bonds (1) Allow reverse argument for each marking point Allow 1 mark for unqualified description of saturated have only single carbon-carbon bonds and unsaturated have at least 1 C=C double bond	1	1	1	3		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iii)		D is unsaturated so {lowers the {low density lipoprotein (LDL) / cholesterol} / increases HDL level (1) lower incidence of atheromas / lower risk of heart disease (1) Reject improves health unqualified	2			2		
		(iv)	I	mix food sample with ethanol, (shake and) {add/ pour into} (cold) water (1) Reject references to heating Allow mix with ethanol and water Reject mix with water and then add to ethanol produces {an emulsion / a cloudy white suspension} (1)	2			2		2
			II	**(**Emulsion) is the same colour as milk (1) OWTTE			1	1		1
				Question 1 total	**8**	**3**	**2**	**13**	**0**	**3**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			**Any four (x1) from** A. phospholipids form a bi-layer (1) B. phosphate heads in contact with water + fatty acids in middle (1) OWTTE C. Tissue fluid/ cytoplasm contain water + water is polar (1) D. Phosphate head hydrophilic + attracted to water / OWTTE (1) E. fatty acid tails hydrophobic + repelled by water / OWTTE (1) To award D and E phosphate heads and fatty acid tails must be described somewhere in the answer	4			4		
	(b)	(i)		Cholesterol	1			1		
		(ii)		1.1×10^5 (3) **If incorrect award:** **2 marks for:** 1.0 / 1.07 / 1.066…..x 10^5 (2) 106 666.66…. / 106 666.7 / 110 000 (2) **1 mark for:** Conversion of 0.8mm to {0.8×10^6 or 800 000} nm (1) Sight of 0.8mm ÷ 7.5nm (1)		3		3	3	
		(iii)		(rate of diffusion would) decrease		1		1	1	
				Question 2 total	**5**	**4**	**0**	**9**	**4**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	i		For **one** mark any two from: (1) volume of milk volume of lipase volume of sodium carbonate volume of phenolphthalein time {to equilibrate / in waterbath (before mixing)}		1		1		1
		ii		temperature would not be constant + affect rate of reaction / molecules would different KE (1)	1			1		1
		iii		colour change is subjective / difficult to determine {end-point / loss of pink colour} (1) OWTTE	1			1		1
	(b)	i		63.3 (1) only accept to 1dp to match the other means in the table.		1		1	1	
		ii		correct axis labels: X = Temperature (of water bath) + °C Y = **Mean** time taken for solution to lose its pink colour + s (1) correct plots +/- ½ a small square (2) suitable line (1)		4		4	4	
		iii	l	{large difference in temperature / did not test temperatures} between 45°C and 75°C / temperature intervals are too large (1) {shortest time could be / time could continue to decrease} between {35 and 45°C / 45°C and 75°C} (1) optimum temperature could be (between 35 and 45°C / 45°C and 75°C) (1)			2	2		2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
			II	repeat using (water baths at) temperatures between {35 - 45ºC / 45ºC and 75ºC} (1) linked to answer to I Ignore wider range if temperatures unqualified			1	1		1
	(c)	(i)		1 mark for correct position of line (1)  Accept lines showing an increase if do no touch the mac concentration of product. Reject any lines that show a plateau			1	1		
		(ii)		(non-competitive inhibitor) changes shape of active site + by binding {to allosteric site / away from active site} (1) fewer ESCs formed / substrate cannot bind to active site / fewer enzyme molecules available to {form product / break down lipid / break down substrate} / (1) takes longer to {break down lipid / substrate}/ make the product (1)	1		2	3		
				Question 3 total	**3**	**6**	**6**	**15**	**5**	**6**

<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>4</td><td>(a)</td><td>(i)</td><td></td><td>A: viruses do not carry out any life processes / rely on other cells for {metabolism / reproduction / replication of DNA or RNA / protein synthesis} (1) Accept named life process

B: viruses do not have {cell membranes / cell organelles / cytoplasm} (so are not cells / are acellular) (1)

Reject viruses can only reproduce unqualified</td><td></td><td>2</td><td></td><td>2</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td></td><td>viruses can {transfer genetic material to / be replicated by another host cell (1) owtte

Reject viruses can self-replicated unqualified</td><td></td><td>1</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td></td><td>1 mark (x3) for each correct row (3)

<table><tr><td rowspan="2">Life Process</td><td colspan="2">Where the life process takes place in a cell</td></tr><tr><td>prokaryote</td><td>eukaryote</td></tr><tr><td>ATP synthesis</td><td>cytoplasm / mesosomes</td><td>mitochondria</td></tr><tr><td>protein synthesis</td><td>ribosomes</td><td>ribosomes</td></tr><tr><td>DNA replication</td><td>cytoplasm</td><td>nucleus</td></tr></table></td><td></td><td>3</td><td></td><td>3</td><td></td><td></td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td></td><td>(meiosis) produces {4 / genetically different} daughter cells (1)
Ignore references to haploid / diploid</td><td></td><td>1</td><td></td><td>1</td><td></td><td></td></tr>
</table>

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		Any 1 (x1) from: no nucleus in prokaryotes / no chromosomes involved in binary fission / binary fission does not involve spindle apparatus / spindle fibres / centrioles (1)	1			1		
		(iii)	I	prokaryotic cells are {much / about x10} smaller than eukaryotic cells (1)		1		1		1
			II	the value of 1epu is different at different magnifications / owtte (1)			1	1		1
	(d)	(i)		(anaphase started at) 15 minutes (1) the distance between the centromeres of sister chromatids starts to increase as they are drawn to opposite poles of the spindle / the distance between the centromeres and the poles of the spindle starts to get smaller as the chromatids are drawn towards the poles (1)			2	2		1
		(ii)		Telophase NOT cytokinesis			1	1		
	(e)	(i)		plant: presence of chloroplasts (1) animal: {presence of eyespot / light receptor} / {has a flagellum / can move itself} (1) Reject if answer includes organelles found in other cell types		1	1	2		
		(ii)		Protoctista / protista (1) Accept protist / protoctist		1		1		
				Question 4 total	**1**	**10**	**5**	**16**	**0**	**3**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		template: TAC GGC CGT GCC TAA GAC (1)	1			1		
		(ii)		Degenerate / multiple codes for the same amino acid / triplet / owtte	1			1		
	(b)	(i)	I	guanine (1)		1		1		
			II	GTP → GDP + Pi (1) Ignore H_2O and references to energy		1		1		
		(ii)	I	Golgi body / apparatus (1)	1			1		
			II	**Both for 1 mark**: (1) Carbohydrate/ or example Lipid/ fatty acids Protein / polypeptides / amino acids Cofactors prosthetic groups	1			1		
		(iii)	I	Tertiary (1)	1			1		
			II	formation of {hydrogen / covalent or disulfide / ionic} bonds / Hydrophobic interactions (1) Between R / variable groups (1)	2			2		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)			Mutation produces STOP codon (1) (so) translation stops prematurely/ owtte (1) Reject stops transcription		2		2		
	(d)			post transcriptional modification/ splicing/ owtte (1) (in context of splicing) If theory was true then only one polypeptide could be produced from a single gene/ owtte (1)		2		2		
				Question 5 total	**7**	**6**	**0**	**13**	**0**	**0**

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
	Types of transport: A1 osmosis + facilitated diffusion + active transport (+ co-transport) A2 water (+ osmosis) A3 glucose / Na^+ / Cl^- (+ facilitated diffusion) A4 glucose / Na^+ / K^+ (+ active transport) A5 glucose + Na^+ + cotransport **Key Features:** **Osmosis**: B1 (water) moves from high water potential to lower water potential / {passive / no ATP / relies on kinetic energy} **Facilitated diffusion / co-transport**: B2 particles move from high concentration to lower concentration / {passive / no ATP / relies on kinetic energy} B3 requires a channel protein / transports {charged / polar / ionic} particles **Active transport:** B4 particles can move from low concentration to higher concentration / {active / requires ATP /} B5 requires a carrier protein / transports {charged / polar / ionic} particles **Efficiency of glucose transport:** C1 glucose absorbed into {cytoplasm / cell} C2 absorption into cell does not rely on glucose concentration gradient / glucose transported with Na+ C3 (so) higher concentration of glucose in {cytoplasm / cell} than tissue fluid / greater concentration gradient between {cytoplasm / cell} and tissue fluid C4 active transport out of cell {increases concentration gradient of {Na+ / glucose} between {cytoplasm / cell} and gut lumen} / results in more {Na+ / glucose} entering {cytoplasm / cell} C5 active transport ensures continued absorption of glucose if low concentration in the {cytoplasm / cell} (than tissue fluid) / maintains concentration gradients owtte	**3**	**4**	**2**	**9**	**0**	**0**

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
	7-9 marks Indicative content of this level is… detailed description of all three areas of indicative content *The candidate constructs an articulate, integrated account, 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… description of at least two areas of indicative content *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… description of at least one area of 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.*						
	Question 6 total	**3**	**4**	**2**	**9**	**0**	**0**

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	8	3	2	**13**	**0**	**3**
2	5	4	0	**9**	**4**	**0**
3	3	6	6	**15**	**5**	**6**
4	1	10	5	**16**	**0**	**3**
5	7	6	0	**13**	**0**	**0**
6	3	4	2	**9**	**0**	**0**
TOTAL	**27**	**33**	**15**	**75**	**9**	**12**
TARGET	**27**	**33**	**15**	**75**	**8**	**12**