GCE AS MARKING SCHEME

AUTUMN 2020

AS LEVEL
BIOLOGY - COMPONENT 2
B400U20-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2020 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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EDUQAS AS COMPONENT 2

BIODIVERSITY AND PHYSIOLOGY OF BODY SYSTEMS

MARK SCHEME AUTUMN 2020

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)	(i)		(At the end of the) tracheole/at the cell/ at the tissue/ at the muscle	1			1		
		(ii)		**Any two (x1) from:** Spiracles can close/ are small (1) Internal (tracheal) system (1) Hairs in the spiracles (1)	2			2		
		(iii)		1200 = 2 marks 12000 µm/10µm = 1 mark Allow 1mm either way		2		2	2	2
	(b)	(i)		**Any two (x1) from:** Temperature/ Time left to equilibrate / Length of time in the apparatus/ volume of gas in syringe/ volume of length of exhalation into the syringe/ same grasshopper		2		2		2
		(ii)		Abdomen movements cause change in pressure in the insect/ accept description (1) Pressure changes/differences cause air movement through tracheal system/ draw air through tracheal system (1)		2		2		
		(iii)		5 separate bars with correct plots of height (1) Axes labels and units (1)		2		2	2	2

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
		(iv)		**Any four (x1) from:** A. As number of breaths increases number of abdomen movements increases (1) B. Begins to level off at 3 to 4 breaths (1) C. Increased movements = increased ventilation/increased air flow (1) Accept inhalation/ exhalation D. Increased ventilation due to {high level of CO_2/ low level of O_2} in the test tube (1) E. Maximum rate of abdominal movements achieved (1)		2	2	4		2
				Question 1 total	**3**	**10**	**2**	**15**	**4**	**8**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		A. Explanation of cohesion - water molecules are polar so attract each other/ xylem wall / form hydrogen bonds with each other/ xylem wall (1) B. Explanation of adhesion – water attracted to lignin/ capillarity (1) C. {Loss of water/ transpiration} from the {leaves/stomata} creates tension (1) Accept drop in pressure D. Water is pulled up xylem/ref to transpiration stream (1)	4			4		
		(ii)		Active transport of ions into the root (1) Lowers the water potential in the xylem / owtte (1)	2			2		
	(b)	(i)		Accept any answer between184 – 185.57 mm^3/hr = 3 marks $\frac{60}{12}$ x 36.9 or $\frac{60}{12}$ x 36.895 = 2 marks 3.14 x $(0.5)^2$ x 47 = 36.9/36.895 = 1 mark		3		3	3	3
		(ii)		Some water used in {photosynthesis/ support/ hydrolysis reactions}/ turgidity (1)	1			1		1
		(iii)		A. Less transpiration/ the bubble will move less/ lower volume of water lost (1) B. Adaptations of the leaves reduce water loss (1) C. e.g. adaptation + explanation: thick waxy cuticle + to reduce evaporation/sunken stomata + increase humidity (1) NOT adaptations related to roots NOT prevent water loss (penalise once only)		1	2	3		

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)			**Any three (x1) from:** Only did one repeat / should do repeats (1) Hair dryer generates heat so temperature not controlled (1) Should have used more air speeds (1) Other variables not controlled e.g. light/ humidity/ CO_2 (1) Accept descriptions			3	3		3
				Question 2 total	**7**	**4**	**5**	**16**	**3**	**7**

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<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>3</td><td>(a)</td><td>(i)</td><td></td><td>
<table>
<tr><th>Statement</th><th>Letter(s)</th></tr>
<tr><td>AV valve closes</td><td>A</td></tr>
<tr><td>Left ventricle is relaxed</td><td>(B), D/A</td></tr>
<tr><td>Left ventricle pressure is greater than in the aorta</td><td>C/ E</td></tr>
<tr><td>Semilunar valves close</td><td>B</td></tr>
</table>
</td><td></td><td>1

1</td><td>1

1</td><td>4</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td></td><td>70x80 = 5600 = 2 marks
SV calculation: 120-50 = 70 (1)</td><td></td><td>2</td><td></td><td>2</td><td>2</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td></td><td>Chordae tendineae/ tendons/ tendineae/ tendinous cords (1)</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></td><td>Ventricular systole/contract increasing pressure > aorta pressure (1)
Causing SL valves open (1)
causes AV valves to close so blood can’t flow back into atria (1)
Accept reverse answer for each mp</td><td>3</td><td></td><td></td><td>3</td><td></td><td></td></tr>
</table>

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		A. Mixing of oxygenated and deoxygenated blood/ smaller volume of blood delivered to left ventricle (1) B. Less oxygenated blood to the body tissues/accept lower volume of blood to transport oxygen (1) C. Less {respiration/ ATP}/ correct reference to oxygen demand (1) D. Oxygenated blood to the lungs, so less oxygen picked up at the alveoli (1)		2	2	4		
		(ii)		Less blood passing into the (left) ventricle/less blood passing out of the (left) ventricle into the aorta (1) Accept greater volume left in the heart			1	1		
				Question 3 total	**4**	**6**	**5**	**15**	**2**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			**Holozoic**: involves the processes of ingestion, digestion, absorption, assimilation and egestion/ holozoic nutrition is the internal digestion of food substances (1) **Heterotrophic:** cannot manufacture own organic molecules from inorganic substances/ eats other organisms to gain (organic) molecules (1) NOT takes in inorganic molecule as a source of energy	2			2		
	(b)	(i)		is used by biologists worldwide/ universal/ international (1)	1			1		
		(ii)		Any three (x1) from: Canines are present / teeth used for killing prey/ ORA (1) Carnassials are present/ teeth used for shearing flesh/ ORA (1) No diastema (1) Accept molars not ridged Correct description of incisors/ pad (1)	2	1		3		
		(iii)		A. Stomach is less complex in giant panda/no rumen (1) B. Short small intestine in giant panda/longer in herbivores (1) Accept overall length of tract/intestines C. Less time needed/ easier to digest proteins in carnivores / gives longer time for digestion of plant material in herbivores (1) D. Shorter/smaller caecum (from diagram) (1) Accept ORA for cow		4		4		

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)			A. Before duodenum e.g. Stomach/ oesophagus (1) B. Cellulose digestion before duodenum (1) C. So can be absorbed in {ileum/ small intestine}/ more efficient digestion and absorption (1) OR A. After stomach (1) B. Acid in stomach will kill bacteria (1) C. So can be absorbed in {ileum/ small intestine}/ more efficient digestion and absorption (1) OR A. Caecum (1) B. Acid in stomach will kill bacteria (1) C. Correct reference to copraphagy (1)			3	3		
	(d)	(i)		85 million years ago		1		1		
		(ii)		A. Sequence of amino acids (1) B. Compare the similarity in the sequences between different organisms (1) C. More similarities the more closely related/ closer together on phylogenetic tree/ ORA (1) D. Length of branch is linked to when they diverged/ Mutation rate will allow time since divergence to be calculated/ correct reference to how recent common ancestors are (1)	3	1		4		
	(e)			Multiple phenotypes within the populations / OWTTE (1) Because of a high number of alleles at each locus/ for each gene (1)		2		2		
				Question 4 total	**8**	**9**	**3**	**20**	**0**	**0**

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5				**Indicative content** A. Similarities • Contain blood/ transport medium • Contain heart to generate pressure/ maintain flow Open vs closed • No blood vessels vs blood vessels Single vs double • Single through heart once in each circulation, double through heart twice in each circulation • Higher pressure in double circulation • More complex heart in double B. Advantages • Single - lower pressure (as low activity level) – less energy needed to power the heart • Single - high pressure to gills • Double - generates higher pressure to body cells • Double - allow lower pressure at alveoli • Double - separation of oxygenated and deoxygenated blood is possible for more efficient • Double - higher rate of blood flow C. Disadvantages • Single - oxygenated blood at lower pressure, • Single - slower rate of blood flow to body organs • Double - greater pressure greater risk of problems – damage to heart • Double - greater complexity – greater risk of problems, heart structure/ valve issues	5	4	0	9	0	0

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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 explanation of similarities and differences Detailed explanation of advantages Detailed explanation of disadvantages *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… Any two from explanation of similarities and differences explanation of advantages explanation of disadvantages *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.*						

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Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				1-3 marks Indicative content of this level is… description of similarities and differences Detailed explanation of advantages Detailed explanation of disadvantages *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 5 total	**5**	**4**	**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	3	10	2	15	4	8
2	7	4	5	16	3	7
3	4	6	5	15	2	0
4	8	9	3	20	0	0
5	5	4	0	9	0	0
TOTAL	27	33	15	75	8	14

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