



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2025**

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[SBY21]

THURSDAY 22 MAY, MORNING

**MARK
SCHEME**

General Marking Instructions

Introduction

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for Biology.

Candidates should be able to demonstrate:

- AO1** Knowledge and understanding of scientific ideas, processes, techniques and procedures.
- AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures:
- in a theoretical context
 - in a practical context
 - when handling qualitative data
 - when handling quantitative data.
- AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to:
- make judgements and reach conclusions
 - develop and refine practical design and procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17 or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17 or 18-year-old GCE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

/ denotes alternative points
 ; denotes separate points
comments on mark values are given in bold
comments on marking points are given in italics

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Where one response is required to gain a mark, candidates will not gain credit if a correct response is given alongside one or more incorrect responses. This is referred to as listing.

Section A

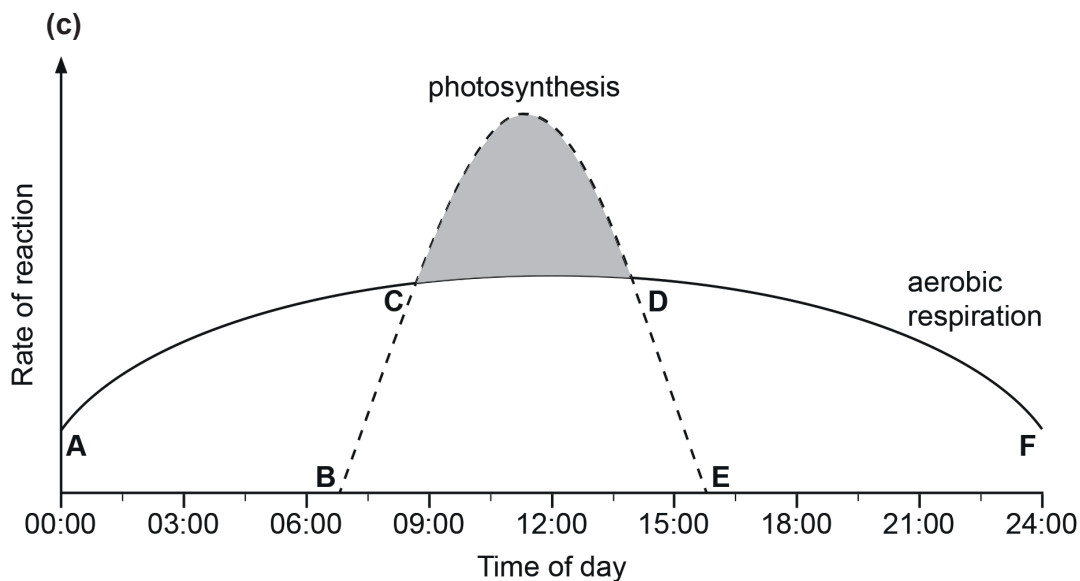
- 1 (a)
- | Statement | Blood component | | | |
|---------------------|-----------------|----------|-----------|--------------|
| | Plasma | Monocyte | Polymorph | B-lymphocyte |
| Contains fibrinogen | ✓ | | | |
| Produces antibodies | | | | ✓ |
| Contains a nucleus | | ✓ | ✓ | ✓ |
- [1] mark for each row correct* [3]
- (b) Tissue fluid;
exchange of metabolites with tissues; [2]
- 2 (a) Legs present (for locomotion); [1]
- (b) (i) Morphology;
cell structure; [2]
- (ii) Any **two** from:
- shows ancestral links
 - is less subjective
 - only recently available
 - produces large amounts of information [2]

5

5

3 (a) C and D; [1]

(b) Increasing light levels;
increasing temperature; [2]



[1]

(d) Any **two** from:

- sufficient still in leaf from (prior photosynthesis)
- stores converted
- diffuses through epidermis/enters by another route
- at night there is a low rate of aerobic respiration

[2]

6

4 (a) (i) A: evaporation;
C: osmosis; [2]

(ii) B: stoma;
D: root hair (cell); [2]

(b) Apoplast; via cell walls;
symplast; via plasmodesmata; [4]

(c) Tension in xylem was reduced/less transpiration;
(comparative language required)
stomata had closed;
to conserve water; [3]

11

			AVAILABLE MARKS	
5	(a)	(i) Artery/arteriole; smooth muscle;	[2]	11
		(ii) Pulmonary artery;	[1]	
	(b)	Raises blood pressure; by causing vasoconstriction/narrowing of arteries;	[2]	
	(c)	Reduced heart rate; P wave unaffected; QRS complex wider; T wave inverted;	[4]	
	(d)	SAN/sinoatrial node; ensures atria completely empty/ensures ventricles completely filled;	[2]	
6	(a)	(i) Some leaves have greater surface area/more stomata; <i>(comparative language required)</i>	[1]	7
		(ii) There is a concentration gradient (or by description);	[1]	
	(b)	(i) Distance moved ÷ time taken e.g. $10 \div 0.75$; 13 cm hr^{-1} ;	[2]	
		(ii) Endodermal cells are pumping ions into the xylem/generating root pressure/carrying out active transport;	[1]	
		(iii) Companion cells; contain many mitochondria;	[2]	

7 (a) (i) Predator strip;	[1]	AVAILABLE MARKS
(ii) Predators control animal pest numbers;	[1]	
(b) Any two from:		
• different plant species provides range of food sources (for variety of animals)		
• presence of large trees/plant variety provides a range of habitats		
• 3-year/late winter trimming avoids nest destruction/allows berries to form	[2]	
(c) (i) Length of hedge planted increases over time, and then decreases; Co. Armagh values always higher than Co. Antrim;	[2]	
(ii) At the start, the scheme was not well publicised/farmers unaware of the scheme;	[1]	
(iii) 19.3 + 23.4;		
x 1000;		
x 12 = £512,400;	[3]	
(d) (i) Any two from:		
• most counties showed an increase in bird diversity over the sample period		
• Derry/Londonderry decreased		
• Fermanagh remained unchanged	[2]	
(ii) Reference to bird life cycle/migration/OAR;	[1]	
(e) Slurry/manure/(inorganic) fertiliser;		
run-off is intercepted/excess minerals absorbed by plants in the buffer/less likely to land in water during spreading;	[2]	15

Section A

60

Section B

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MARKS

8 (a) Indicative content

- haemoglobin is quaternary structure protein
- which is conjugated
- contains 4 haem/prosthetic groups
- containing iron
- located in red blood cells
- haemoglobin unloads oxygen in respiring tissue
- where ppO_2 is low
- and where there is a higher temperature
- and a high carbon dioxide concentration/low pH
- when one oxygen molecule is unloaded, unloading of further molecules is more likely
- myoglobin is located in muscle
- myoglobin unloads oxygen when ppO_2 is very low/when all haemoglobin is fully dissociated
- delays the onset of anaerobic respiration/acts as an oxygen store

Band	Response	Mark
3	Candidates use the most appropriate specialist terms to describe fully the roles of haemoglobin and myoglobin. At least 7 points must be made, with a maximum of eight indicative points relating to haemoglobin. Spelling, punctuation and grammar and the form and style are of a high standard.	[7]–[9]
2	Candidates sometimes use appropriate specialist terms to describe the roles of haemoglobin and myoglobin. At least 4 points must be made. Spelling, punctuation and grammar and the form and style are of a good standard.	[4]–[6]
1	Candidates only briefly describe the roles of haemoglobin and myoglobin. At least 1 point must be made. Spelling, punctuation and grammar and the form and style are of a basic standard.	[1]–[3]
0	Response not worthy of credit.	[0]

[9]

(b) Indicative content

- mass flow/ventilation
- maintains a diffusion gradient
- squamous epithelial wall of alveoli/squamous endothelial wall of capillary
- reduces diffusion distance
- layer of moisture in alveoli
- enables gases to dissolve
- surfactant
- to reduce surface tension/prevent coalescence of alveolar walls

Band	Response	Mark
3	Candidates use the most appropriate specialist terms to describe the gas exchange adaptations. At least 5 points must be made. Spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
2	Candidates sometimes use appropriate specialist terms to describe the gas exchange adaptations. At least 3 points must be made. Spelling, punctuation and grammar and the form and style are of a good standard.	[3]–[4]
1	Candidates may only briefly describe the gas exchange adaptations. At least 1 point must be made. Spelling, punctuation and grammar and the form and style are of a basic standard.	[1]–[2]
0	Response not worthy of credit.	[0]

[6]

15

Section B

15

Total

75

**AVAILABLE
MARKS**