



**ADVANCED SUBSIDIARY (AS)**  
**General Certificate of Education**  
**2017**

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## **Biology**

**Assessment Unit AS 2**

*assessing*

**Organisms and Biodiversity**

**[AB121]**

**TUESDAY 6 JUNE, AFTERNOON**

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## **MARK SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

/ denotes alternative points  
 ; denotes separate points

**Comments on mark values are given in bold**  
*Comments on marking points are given in italics*

AVAILABLE  
MARKS

### Section A

1	A – Prokaryotae; B – Protocista; C – Fungi; D – Animalia; E – Plantae;	[5]	5
2	(a) (i) Herbicide;  (ii) Description – increasing the concentration of chemical correlates with an increase in the value for Simpson's index; reduction in plant biodiversity; chemicals kill plants removing food sources/habitats for animals; reduction in animal species/numbers;	[1]  [4]	
	(b) Cut hedges Sept–Feb; nesting season is over/other appropriate response, e.g. don't cut when berries are there; or don't cut when nests/berries are there; more birds/chicks survive;	[2]	7
3	(a) (i) Ventilation removes carbon dioxide or supplies oxygen; blood flow replaces oxygenated blood with deoxygenated blood;  (ii) Squamous epithelium/endothelium cells present;  (iii) Large surface area; large number of/sacculation of alveoli;	[2]  [1]  [2]	
	(b) Reduces surface tension in the moisture layer/alveoli walls stick together/ prevent collapsing; reducing surface area for gas exchange/reducing concentration gradient due to inefficiency of ventilation;	[2]	7

		AVAILABLE MARKS
4	(a) (i) To pull the column of gas to the scale for measurement/reset the apparatus;	[1]
	(ii) Change the distance of the lamp from the pondweed/use different intensity bulbs;	[1]
	(iii) Temperature; heat shield/boiling tube in a beaker; or $\text{CO}_2$ ; keep the concentration of the potassium hydrogencarbonate the same; or leaf surface area; use the same section of pondweed; or wavelength of light; same bulb/filter;	[2]
(b) (i)	10; $10 \div 15 \times 60$ ; $40 \text{ cm}^3 \text{ hour}^{-1}$ ;	[3]
	(ii) Oxygen may be used in respiration/dissolved into the solution/escapes to the air;	[1]
(c)	Use a smaller scale i.e. $\text{mm}^3$ /flared capillary tube end to cover whole/more of the boiling tube opening;	[1]
5	(a) <b>Drawing:</b> Clean unbroken lines; block diagram/no individual cells; proportional;	9
	<b>Labelling:</b> epidermis; xylem; phloem; endodermis; other correct labelling, e.g. cortex/paranchyma; (4 correct labels = [2], 3/2 correct labels = [1])	[5]
(b)	Cohesion – water is polar so molecules attract each other;  Tension – any <b>two</b> from: • evaporation of water from spongy mesophyll; • pulls continuous column of water upwards; • creating negative pressure/a pull;	[3]
(c)	Lymphocyte – antibody production/cell-mediated immunity/production of B and T cells; Polymorph – Microphage/engulfs and digests small particles; Monocyte – Macrophage/engulfs and digests large particles;	[3]

			AVAILABLE MARKS
6	(a) (i) Biston;  (ii) Reproduce to produce fertile offspring;	[1] [1]	
	(b) (i) Moths on branches not counted/moths elsewhere not counted;  (ii) Directional selection;  plus any <b>three</b> from: <ul style="list-style-type: none"><li>• after 1970 soot/smoke pollution reduced so trees are no longer black</li><li>• light form is now better adapted/has selective advantage/fittest as it is camouflaged</li><li>• more light forms will survive to pass on genes/alleles to next generation</li><li>• light form of the moth becomes predominant/adaptive norm</li></ul>	[1] [4]	
	(c) Caterpillar is camouflaged/looks like a twig (so safer from predators);	[1]	8
7	(a) (i) A – AV/bicuspid valve; B – Chordae tendinae;  (ii) AV valve (A) closes during ventricular systole (as pressure forces blood upwards stopping blood re-entering the atrium); chordae tendinae (B) stop AV valves opening back into the atrium;  (iii) To create greater pressure/force; to pump blood further (allow converse for atrial muscle);  (iv) Pressure in the ventricle exceeds the pressure in the artery;	[2]  [2]  [2]  [1]	
	(b) (i) Wall of the right atrium;  (ii) Any <b>four</b> from: <ul style="list-style-type: none"><li>• SAN fires a wave of depolarisation/excitation across the atria (causing them to contract)</li><li>• wave cannot pass directly to the ventricle, due to the non-conductive tissue (of the AV valves)</li><li>• wave reaches the AVN (in the septum)</li><li>• travels down the bundle of His</li><li>• and up the Purkinje fibres (causing ventricular systole)</li></ul>	[1]  [4]	
	(c) Oxygen supply to tissues is reduced as there are fewer heartbeats per min;	[1]	13

## Section B

AVAILABLE  
MARKS

8 (a) Any **four** from:

- Belt transect/long tape placed
- from dunes close to shore to further away from shore
- using quadrats
- at regular intervals or uninterrupted transect/interrupted transect described
- estimate the percentage cover

[4]

(b) Any **seven** from:

Temperature

- increasing temperature increases the rate of transpiration
- water molecules have more kinetic energy
- more evaporation of water from the spongy mesophyll cells

Humidity

- increasing humidity decreases the rate of transpiration
- abundance of water molecules outside the stomata/leaf
- smaller/no diffusion gradient

Air currents

- increasing the wind speed increases the rate of transpiration
- wind removes diffusion shells outside the stomata
- this increases the diffusion gradient

Light intensity

- higher the light intensity the greater the rate of transpiration
- (more) stomata open
- (more gateways) for water molecules to diffuse out of the leaf

Any **two** from:

- soil water
- lack of soil water reduces transpiration
- stomata close
- thick waxy cuticle
- several upper epidermal cell layers
- sunken stomata
- leaf hairs
- curled leaves
- reduced leaf surface area/succulent

[9]

**Quality of written communication****2 marks:**

The candidate expresses ideas clearly and fluently through well-linked sentences, which present relationships and not merely list features. Points are generally relevant and well-structured. There are few errors of grammar, punctuation and spelling.

**1 mark:**

The candidate expresses ideas clearly, if not always fluently. The account may stray from the point or may not indicate relationships. There are some errors of grammar, punctuation and spelling.

**0 marks:**

The candidate produces an account that is of doubtful relevance or obscurely presented with little evidence of linking ideas. Errors in grammar, punctuation and spelling are sufficiently intrusive to disrupt the understanding of the account.

[2]

15

**Total****75**