



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2018**

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[SBY21]

WEDNESDAY 30 MAY, AFTERNOON

**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

<p>1 Surfactant; thrombin; suberin; myoglobin; sucrose;</p>	[5]	5
2 (a) Any two from:		
<ul style="list-style-type: none"> • the arteries have thicker muscular walls to withstand the high pressure blood/smooth muscle allows for vasodilation/constriction • veins have a larger lumen which reduces friction/resistance to blood flow • arteries have more elastic tissue to allow for distension/stretch and recoil [allow converse] 	[2]	
<p>(b) (i) Atherosclerosis is the disease that is caused by the thickening/hardening/reduced elasticity of the artery wall through the development of atheromas/plaques; atheroma is a term used to describe the build-up of fatty deposits under the endothelium layer of the artery; they narrow blood vessels and restrict blood flow/making blockages more likely;</p>	[3]	
<p>(ii) Angiograph; coronary arteries;</p>	[2]	
<p>(c) (Plasma) minus blood cells (and large proteins);</p>	[1]	8

- 3 (a) Any **one** pair:
- both have a large surface area;
 - in plants provided by the spongy mesophyll of the leaf, in mammals millions of lobed alveoli
- or
- both have large concentration gradients;
 - maintained in plants by respiration/photosynthesis in mesophyll layer and in mammals by close blood supply/ventilation
- or
- both have thin membranes (to provide a short diffusion pathway);
 - for example one layer of squamous epithelium in alveoli/plants a few cell layers in leaf [2]
- (b) (i) Graph drawn in an approximate mirror image of first 12 hours; reaching compensation point at approximately 18 hours and dropping to approximately same point below the x-axis; [2]
- (ii) Any **two** pairs:
- From 0–4 hours (0–6 hours) carbon dioxide is given out (negative intake) by the plant;
 - the plant is in darkness/low light so only respiration occurring/ respiration exceeds photosynthesis;
- or
- At 6 hours CO₂ intake is 0/no net intake or output of CO₂;
 - where rates of photosynthesis and respiration are equal;
- or
- From 6–12 hours, CO₂ intake increases;
 - light intensity increases, so photosynthesis exceeds respiration; [4]
- (iii) Shade part of graph above dotted line and under solid line; production of glucose in photosynthesis must exceed the loss of glucose in respiration; [2]

AVAILABLE
MARKS

10

			AVAILABLE MARKS
4	(a) (i)	252; 252 ÷ 756 / 0.33;	[2]
	(ii)	(Field) B;	[1]
	(iii)	The number of each species is similar in B; Field A is dominated by ryegrass;	[2]
4	(b)	Any two from: <ul style="list-style-type: none"> • misidentification of species • difficult to identify individual plants • plants missed due to coverage by other plants/not in season/eaten by herbivores • miscalculation of Simpson's index 	[2]
	(c)	Morphological; prevents leaves being damaged due to trampling/grazing/cutting;	[2]
5	(a) (i)	A – AV valve/bicuspid; B – semi-lunar/pocket/arterial valve;	[2]
	(ii)	AV valves are open and semi-lunar valves are closed; diastole/atrial systole;	[2]
	(b)	Any three from: <ul style="list-style-type: none"> • ventricles contract from bottom up • increasing pressure in the ventricle forcing blood upwards • blood is prevented from entering back into the atrium as the AV valves close • when the pressure in the ventricle exceeds the pressure in the artery the semi-lunar/pocket/arterial valves are blown open (and blood exits the heart); 	[3]
5	(c)	Reduced cardiac output (or by description) so less oxygen reaching the brain/tissues;	[1]
			9
			8

		AVAILABLE MARKS
6	<p>(a) Support – In areas which are more industrialised the amount of atmospheric CO₂ is much higher than in non-industrialised areas;</p> <p>reject – even in non-industrialised countries the amount of CO₂ is still increasing over time (it is not just human activity); [2]</p> <p>(b) (i) Animalia Phylum Order Nymphalidae Pararge aegeria;;; (all 6 = [3] marks, 4/5 = [2] marks, 3/2 = [1] mark) [3]</p> <p>(ii) Eukaryota/Eukarya; [1]</p> <p>(iii) Capable of reproducing with each other to produce fertile offspring/ DNA analysis/genetic fingerprinting; [1]</p> <p>(c) Any two from:</p> <ul style="list-style-type: none"> • increased food sources for birds/their predators • more frequent pollination • more plants eaten/damaged by caterpillars • increased competition with other caterpillars/butterflies/species [2] 	9
7	<p>(a) (i) The plant steadily loses mass over the 12 hour period; water evaporates from the (spongy) mesophyll into the air space; water then diffuses out the stomata along a water potential gradient; [3]</p> <p>(ii) The rate of water/mass loss remains constant/uniform; [1]</p> <p>(b) (i) Line below graph shown, same trend of constant water loss; [1]</p> <p>(ii) Water molecules have less kinetic energy; water evaporates/diffuses out slower; [2]</p> <p>(c) (i) Negative pressure of transpiration; walls (impregnated) with lignin; [2]</p> <p>(ii) Spiral lignification; which allows the xylem to stretch as the plant grows; [2]</p>	11
Section A		60

Section B

**AVAILABLE
MARKS**

8 Indicative content

- use of monoculture
 - reduces species diversity due to fewer niches/limits the number of herbivores
 - growing the same crop in one field year after year reduces the nutrient content
 - so artificial fertilisers are needed
 - these encourage fast growth of the crop, which will outcompete and eliminate slower growing native species
 - may lead to loss of soil crumb structure which results in the reduction of edaphic invertebrates/species of plant that can grow in this soil (allow once only)
 - (can leach into waterways) and cause eutrophication
 - use of slurry/organic fertiliser
 - this reduces aquatic biodiversity due to reduction in oxygen levels/increase BOD (once only)
 - removal of hedgerows
 - mismanagement of hedgerows, e.g. cutting at wrong time
 - reduces habitats and food sources for plants and animals
 - removes wildlife corridors (that link different habitats so affects dispersal of a range of organisms)
 - increased use of pesticides
 - kills organisms other than the target species such as natural predators/ bioaccumulation
 - herbicides
 - reduction in plant species/habitats
 - (harvesting to edge of fields), removing predator strips
 - poor biological control
 - reduction in non-target species
 - increased stocking rates/heavy grazing
 - reduction in plant biodiversity due to grazing/trampling
 - drainage schemes
 - removal of (wetland) habitats
 - Special Areas of Conservation/SAC
 - Biodiversity action plans/BAP
 - DAERA agri-environmental schemes
 - Northern Ireland priority and species lists
- (maximum of [2] from last four bullet points)

Band	Response	Mark
3	Candidates use the most appropriate specialist terms to describe fully the agricultural practices that reduce biodiversity. At least 11 points must be made. Spelling, punctuation and grammar and the form and style are of a high standard.	[11]–[15]
2	Candidates sometimes use appropriate specialist terms to describe the agricultural practices that reduce biodiversity. At least 7 points must be made. Spelling, punctuation and grammar and the form and style are of a good standard.	[6]–[10]
1	Candidates may only briefly describe some agricultural practices that reduce biodiversity. At least 2 points should be made. Spelling, punctuation and grammar and the form and style are of a basic standard.	[1]–[5]
0	Response not worthy of credit.	[0]

[15]

15

Section B

15

Total

75