



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2015**

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[AB121]

WEDNESDAY 17 JUNE, MORNING

**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 | Myogenic;
bundle of His;
chordae tendinae;
semi-lunar (valves)/arterial;
coronary (artery); | [5] | 5 |
| 2 | (a) Quaternary structure/four polypeptide chains;
with (Fe ²⁺ /iron containing) haem groups/conjugated protein; | [2] | |
| | (b) (i) Letter X written on x-axis between 9 and 14 kPa; | [1] | |
| | (ii) 3.6 kPa; | [1] | |
| | (c) (i) Pig; | [1] | |
| | (ii) The lugworm (haemoglobin has a high affinity for oxygen) to cope with
a low oxygen environment; | [1] | |
| | (d) Any two from: <ul style="list-style-type: none">• low partial pressure of oxygen• high partial pressure of carbon dioxide• decreased pH• increased temperature | [2] | 8 |
| 3 | (a) Melanitta; | [1] | |
| | (b) (i) Females tend the nest;
vulnerable to predation by mink/fewer feeding opportunities; | [2] | |
| | (ii) Any two from: <ul style="list-style-type: none">• introduction of roach resulting in direct competition for food• mink eat eggs/young birds/females so reducing potential
breeding populations
[need to link loss of eggs or loss of females to reduced
breeding potential-bullet 2]• pollution leading to reduction in invertebrate biomass and loss of
food | [2] | |
| | (c) <ul style="list-style-type: none">• drainage removes habitats;• ploughing destroys existing species/habitat/food chains;• introduction of reseeded leads to monoculture; | [3] | 8 |

- 4 (a) As body mass increases the cell respiration rate decreases; [1]
- (b) $0.03 \text{ kg} \times 1000 = 30$;
 $1518 \times 30 = 45\,540$; [2]
- (c) (i) The mouse would have a larger surface area:volume/dog would have a smaller surface area:volume; [1]
- (ii) The larger the surface area:volume the greater the metabolic activity; [1]
- (d) Any **three** from:
- numerous alveoli
 - alveolar sacculation/rounded shape/infolding
 - extensive capillary network in lungs/tissue
 - erythrocytes have biconcave shape [3]
- 5 (a) (i) Seaweeds are absent from the region of the shore which is never covered in water (*or converse*); [1]
- (ii) Channelled wrack/spiral wrack; [1]
- (b) Biotic: they may be grazed upon by organisms in zones A–D/outcompeted by more suitably adapted seaweeds;
 Abiotic: cannot withstand desiccation/temperature extremes/varying salinity/ other appropriate response; [2]
- (c) **Essential point and any four other** from:
- rope/tape measure placed on ground running down the shore/from zone A to zone D
 - quadrat placed at first sample point on rope
 - identify species present within the quadrat
 - estimate percentage cover of each species
 - move the quadrat along the rope/tape measure and repeat sampling (to generate a belt transect)
 - move the rope/tape measure to a different position on the shore (to increase reliability of sampling)
 - be cautious walking on rocky(slippery) terrain/at sample points close to the water line/of breaking waves [**essential point**] [5]

AVAILABLE
MARKS

8

9

			AVAILABLE MARKS		
6	(a)	(i) Two or three distinct layers; relative thickness of layers; clearly drawn (no unbroken lines); labels: any two from fibrous/collagen layer, smooth muscle, elastic tissue, squamous endothelium (tunica intima);	[4]		
		(ii) Any one from: <ul style="list-style-type: none"> • fibrous/collagen offers protection or support • smooth muscle allows vasoconstriction/vasodilation/control of blood flow • elastic tissue allows stretch/recoil • endothelium/smooth lining reduces friction 	[1]		
	(b)	(i) Presence of atheroma reduces rate of blood flow;	[1]		
		(ii) Any three from: <ul style="list-style-type: none"> • endothelium becomes damaged • damage due to high blood pressure/toxins in smoke • macrophages migrate to site of damage • accumulation of materials, e.g. cholesterol/dead muscle cells/salts/fibrous tissue • atheroma hardens in the wall of the artery/forms a (atherosclerotic) plaque 	[3]		
		(c) (i) As the total cross-sectional area of the blood vessel increases the flow rate decreases (allow converse);	[1]		
	(c)	(ii) Any two from: <ul style="list-style-type: none"> • decrease in blood pressure as the cross-sectional area increases; • as distance from the heart increases blood pressure decreases; • increase in friction as individual vessels have narrower lumen; 	[2]		
		(iii) Slower flow means more time is available for exchange; enables more exchange of materials to occur;	[2]	14	
	7	(a)	(i) 8.22 stomata mm ⁻² ;	[1]	
			(ii) D; (fewer stomata per unit area (mm ⁻²) of leaf) fewer stomata reduces transpirational loss;	[2]	
(b)		(i) The evaporation of water from the mesophyll surface/leaf cells; the diffusion of the water (vapour) into the atmosphere via the stomata/cuticle	[2]		
		(ii) Hairs disrupt air flow over leaf surface/traps air; creation of diffusion shells/humid atmosphere; reduces diffusion/transpiration/evaporation;	[3]	8	

Section B

**AVAILABLE
MARKS**

- 8 (a) Any 5 from:**
- (genetic) variation exists within a population
 - individuals at an extreme are more suited (adapted) to the environment/ fitter than others
 - adapted individuals survive better/survival of the fittest
 - and reproduce/pass on their genes
 - frequency of selected feature increases in future generations
 - leads to new adaptive norm
 - occurs in changing environments

- (b) Any 8 from:**
- Prokaryotae reproduce by division
 - lack a true cell nucleus/membrane-bound organelles/other prokaryote cell feature
 - cell wall murein/peptidoglycan
 - Protoctista are unicellular or show limited differentiation
 - some heterotrophic, others autotrophic
 - Fungi are lysotrophic (decomposers)/description of lysotrophy
 - consist of hyphae with chitinous cell walls
 - Plantae are autotrophs (producers)/description of autotrophy
 - possess chloroplasts containing chlorophyll
 - possess a cellulose cell wall
 - Animalia are heterotrophic/description of heterotrophy
 - capable of locomotion
 - Fungi, Plantae, Animalia are multicellular
 - Protoctista, Fungi, Plantae, Animalia are eukaryotic [13]
- At least one from each of the 5 kingdoms (deduct one mark if all kingdoms not represented)

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]

Total

15

75