



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2014**

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[AB121]

FRIDAY 20 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 marking points
 ; denotes separate marking points
Comments on mark values are given in bold
Comments on marking points are given in italics

**AVAILABLE
MARKS**

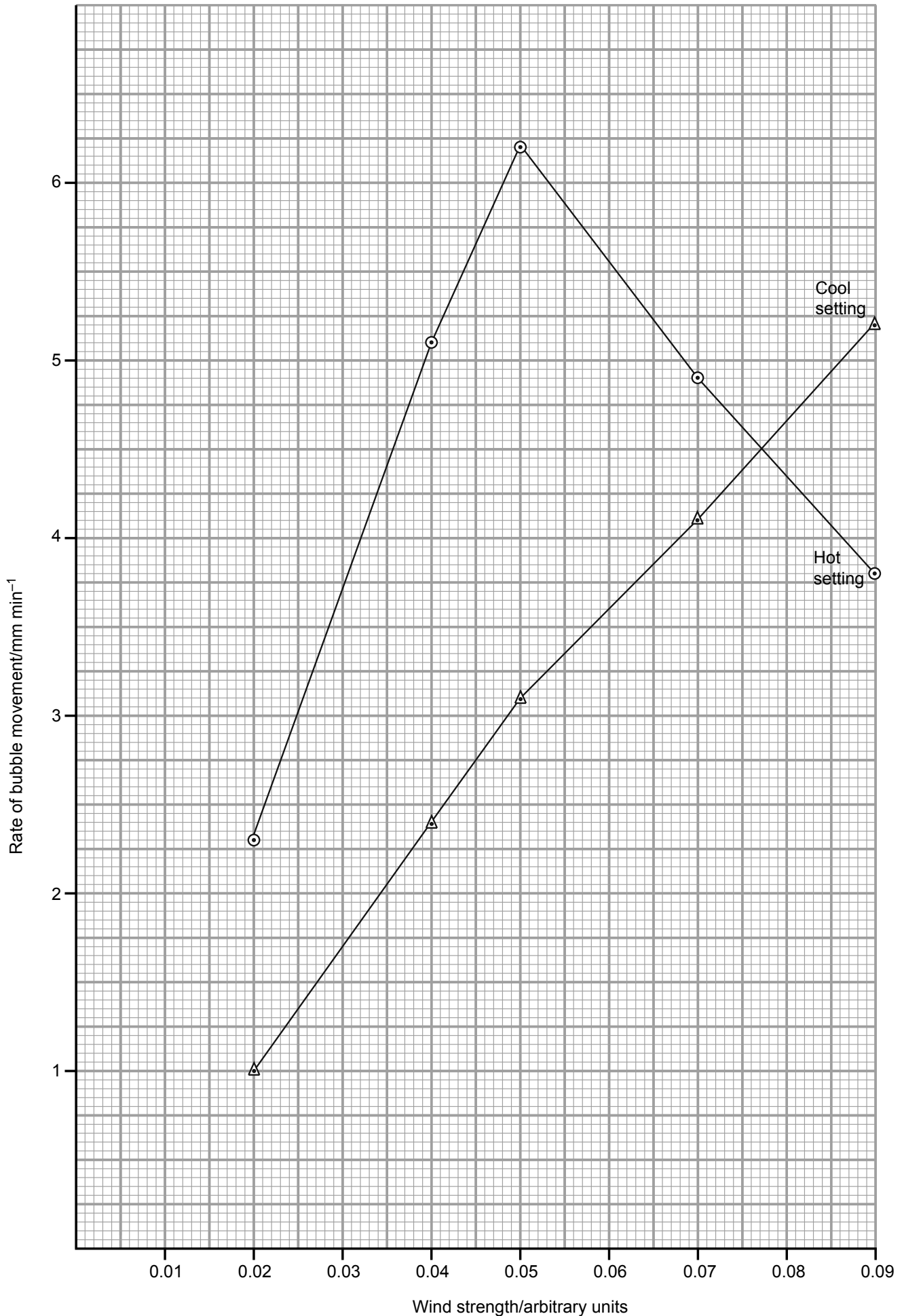
Section A

1	Factor	Large	Small		
	Surface area of the membrane	✓			
	Thickness of the membrane		✓		
	Concentration gradient across the membrane	✓		[3]	3
2	(a) Special area of conservation;			[1]	
	(b) Any two from				
	• there is a wide variety of plant species				
	• there is a range of habitats/vertical zonation (layering)/one of few semi-natural woodlands remaining and so needs protected				
	• there is a rare plant species found here			[2]	
	(c) Native animals will use them as a source of food;			[1]	4
3	Any five from				
	• measure the length of the column of air				
	• expel most of the water from the open end (by pressing the syringe plunger)				
	• draw up some concentrated KOH into the capillary tube				
	• with the end of the J tube submerged in KOH shuttle the air column back and forth (so that it comes contact with glass wetted with KOH)				
	• re-measure the length of the column of air				
	• $\% \text{CO}_2 = (\text{change in length of air sample} \div \text{original length}) \times 100$				
	• reference to maintaining temperature (by not touching tube/waterbath)/time to equilibrate			[5]	5

		AVAILABLE MARKS
4	<p>(a) Identify plant species using a key (identification guide)/subdivide the quadrat into smaller areas to assist estimation of percentage cover; [1]</p> <p>(b) The grazed area has higher biodiversity; grazing reduces the effect of taller vegetation outcompeting lower growing/prevents dominance of a few species/sheep faeces increase soil fertility allowing greater species diversity/other appropriate response; [2]</p> <p>(c) Higher numbers in the grazed area suggest that the sheep have been hosting the parasite; higher numbers in sweep net suggest that the parasite remains in the vegetation/does not crawl around on the ground; <i>[accept converse]</i> [2]</p> <p>(d) B-lymphocytes; produce antibodies; or T-lymphocytes; promote cell-mediated immunity; or polymorphs/monocytes; carry out phagocytosis; [4]</p>	9
5	<p>(a) Organisms which secrete enzymes onto a substrate and absorb the digested/soluble products; [1]</p> <p>(b) Plantae/plant; green colour indicates presence of chlorophyll/chloroplasts; [2]</p> <p>(c) Any three from</p> <ul style="list-style-type: none"> • hyphae create a large surface area for absorption • avoid desiccation by living mainly within the host • elevated/external reproductive structure where spores are easily released into the wind • late summer/early autumn temperatures/moisture levels provide favourable conditions for spore germination [3] <p>(d) Any three from</p> <ul style="list-style-type: none"> • water evaporates off the mesophyll cells/into air spaces • water vapour diffuses out through stomata • replaced by water from a continuous column (in the xylem) • water molecules exhibit cohesion • the whole column is pulled up/creates negative pressure/tension [3] 	9

		AVAILABLE MARKS
6	<p>(a) A group of apparently related families; [1]</p> <p>(b) 1: Kingdom/Animalia; 2: Class/Mammalia; 3: Order/Carnivora; [3]</p> <p>(c) Ligers would be infertile/tiger and lion habitats do not overlap; [1]</p> <p>(d) (i) Cytochrome-c occurs in all eukaryotes; [1]</p> <p>(ii) 62, 63, 68; [all three needed] [1]</p> <p>(iii) $3 \div 10$ [consequential to part (ii)]; $(3 \div 10) \times 100 = 30\%$; [correct answer for 2] [2]</p> <p>(iv) Humans are more closely related to the Rhesus monkey than to the chicken; [1]</p>	10
7	<p>(a) Axes the correct way round (wind strength on x-axis) and labelled including units; selection of appropriate scale; points plotted accurately and joined by short straight lines; lines labelled/legend included; [4]</p> <p>(b) As the wind strength increases the rate of bubble movement increases;</p> <p>Any two from</p> <ul style="list-style-type: none"> • diffusion shells are disrupted/water vapour blown away from leaf surface • increases water vapour diffusion gradient/evaporation • creates more negative pressure/increases pull of water into the shoot [3] <p>(c) Difference: at hot setting, the rise in rate of bubble movement at lower wind strengths is steeper than at cool setting; Explanation: higher temperatures cause increased rate of water evaporation; <i>[accept converse]</i> <i>[do not accept references to time]</i></p> <p>Difference: at hot setting the rate of bubble movement decreases after a certain wind strength but with cool setting it keeps on rising; Explanation: hot setting provokes stomatal closure to prevent desiccation; [4]</p>	11

How the rate of bubble movement in a potometer containing a sycamore shoot is affected by wind strength at two different environmental temperatures



- 8 (a) Any three from**
- before 2006/vegetation clearance, bird numbers remained relatively constant/similar at both channels
 - after 2006 bird numbers decreased for both channels/channel 1 showed a more marked decline
 - after 2006 bird numbers at channel 1 continued to decline but began to rise from 2010 onwards
 - after 2007 bird numbers at channel 2 increased beyond their initial value
- [3]
- (b)** For channel 1, the clearance of both sides reduces food availability/shelter/nest sites;
For channel 2, a greater range of habitats/food/shelter is created; [2]
- (c) (i)** Increased soil erosion/decrease of soil crumb structure leads to death of soil organisms/plants;
promotes the growth of a few plant species at the expense of many others; [2]
- (ii)** Waterplant growth will be promoted/channels will become overgrown;
provides more food/shelter for wetland birds; [2]

Section A

**AVAILABLE
MARKS**

9

60

Section B

AVAILABLE
MARKS

9 (a) Any nine from

- all blood vessels possess squamous endothelium
- providing a smooth lining/reducing friction to aid blood flow

Capillaries have

- walls composed of a single layer of endothelium
- to reduce diffusion distance/maintain permeability/enable diffusion of materials
- a very narrow lumen
- to promote 'single-file' passage of erythrocytes thereby reducing diffusion distance

Arteries have

- numerous elastic fibres in their walls
- allowing distension/stretch and recoil since they are subject to pressure surges from the heart
- a thick layer of muscle in their walls
- to control blood supply to organs/to facilitate vasoconstriction (and vasodilation)
- a narrow lumen
- to maintain high blood pressure/to cope with high blood pressure

Veins have

- large lumen
- to facilitate return of blood to the heart
- pocket valves which close by backward flowing blood being trapped against them
- to ensure unidirectional flow of blood
- fibrous outer layer for protection (arteries/veins)

[9]

(b) Any four from

- platelets/thrombocytes adhere to damaged blood vessel wall
- thromboplastins/thrombokinase is released
- so that prothrombin is converted to thrombin
- this causes fibrinogen to be converted to fibrin
- red blood cells trapped in the mesh of fibres
- clotting factors involved/calcium/vitamin K required

[4]

Quality of written communication

2 marks

The candidate expresses ideas clearly and fluently, through well linked sentences and paragraphs. Arguments 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. Arguments may sometimes stray from the point. There are some errors in grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.

0 marks

The candidate expresses ideas satisfactorily, but without precision. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling are sufficiently intrusive to disrupt the understanding of the passage. [2]

Section B

Total

**AVAILABLE
MARKS**

15

15

75