



General Certificate of Secondary Education  
2015–2016

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## **Double Award Science: Biology**

Unit B1

Higher Tier

[GSD12]

WEDNESDAY 9 NOVEMBER 2016, MORNING

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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.

- 1 (a)** Any **three** from:  
 put down transect line/tape/line/string/belt transect/described;  
 use quadrat;  
 at different distances/placing of quadrats front to back of dunes/sampling  
 across the dunes;  
 measure % cover marram grass in each quadrat/measure marram grass in  
 quadrat; [3]
- (b) (i)** increases then decreases/increases then exception or anomaly at 40 [1]
- (ii)** salt content 2.5;  
 pH 8.1; [2]
- (c)** pH paper/pH probe or pH sensor/soil testing kit/universal indicator/  
 pH meter/pH indicator [1]
- (d)** animals or named, e.g. snails eating marram grass/disease/  
 competition (from other species)/organisms that feed on the  
 marram grass/humans/predators/insects [1]

AVAILABLE  
MARKS

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## 2 (a) Accept:

- one Petri dish into box; } Petri dish; with lamp
- shine lamp from one side } from one side = OK for 2 marks
- take 2nd Petri dish;
- shine light from above/put into box with opening only at the top;
- time
- record results

Band	Response	Mark
A	Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give at least three or four points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use appropriate terms throughout to give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

- (b) seedlings grow straight up with light from above;  
seedlings in box grow to side with the hole/or to where light coming from;  
one bent to light and other straight = 1 mark

[2]

- (c) Any **two** from:  
type/variety/species of seedling/number/size;  
time/light exposure;  
distance of lamp from seedlings/light intensity/bulbs/brightness;  
temperature/heat;  
water

[2]

- (d) (i) tip

[1]

- (ii) auxin

[1]

AVAILABLE  
MARKS

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- 3 (a) (i) Accept:  
1st mark: lignin;  
2nd and 3rd mark: can be 'comparison + 1 data' or '2 data'
- comparison**  
most/more remaining (after 15 weeks) than starch/cellulose  
**or**  
starch/cellulose have much less remaining (after 15 weeks)  
**or**  
only starts to be broken down after 10 weeks/only starts to break down at 15 weeks
- data**  
lignin: 90% remaining after 15 weeks  
10% broken down after 15 weeks
- starch: 90% broken down at 15 weeks  
10% remaining after 15 weeks  
80% more starch (than lignin) broken down at 15 weeks
- cellulose: 40% broken down by 15 weeks  
60% remaining after 15 weeks  
30% more remains after 15 weeks [3]
- (ii) type 2 [1]
- (iii) 90/60/30 = 1 mark  
6 = 2 marks [2]
- (iv) glucose **not**: sugar [1]
- (b) (i) root hair (cells) [1]
- (ii) water/H<sub>2</sub>O [1]
- (iii) amino acids/proteins [1]
- (c) (i) Any **three** from:  
long;  
folds;  
villi;  
microvilli; [3]
- (ii) Any **two** from:  
short diffusion distance/thin/ one cell thick/thin wall/thin lining  
permeable;  
moist;  
good blood supply/diffusion gradient/described blood supply,  
e.g. network of capillaries; [2]

AVAILABLE  
MARKS

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			AVAILABLE MARKS
4	<p>(a) • most carbon dioxide produced/or more/most CO<sub>2</sub>; • (most) respiration; need <b>word most only once</b> • enzymes worked best • best temp/optimum temp/highest temp</p> <p>(b) (i) at start brick red/red; because glucose present;</p> <p>(ii) at end no glucose – blue or less glucose – blue/green or green or orange;</p> <p>(c) ethanol/alcohol</p>	<p>[3]</p> <p>[2]</p> <p>[2]</p> <p>[1]</p>	8
5	<p>(a) (i) brain and spinal cord</p> <p>(ii) muscle or named/gland</p> <p>(b) (i) anomalous result/significantly departs from the mean/does not fit the trend/doesn't follow pattern</p> <p>(ii) <math>0.9 + 0.25 = 1.15</math>; <math>1.15/0.156 = 7.37</math>;</p> <p><math>\left( \begin{array}{l} 7.37 \text{ [2] marks} \\ 7.371 \text{ [1] mark} \\ 7.4 \text{ [1] mark} \end{array} \right)</math> correct answer = 2 marks</p> <p>(c) hormonal</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[1]</p>	6

	AVAILABLE MARKS
<p>6 (a) not all absorbed/not all the wavelengths of light can be used/some light passes through/some light is reflected off the leaves/some light shines on areas where there are no phytoplankton/light reflected off water/light doesn't hit chloroplasts or chlorophyll [1]</p>	
<p>(b) (i) Any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>increasing sunlight/more sunlight;</li> <li>greater nos. of phytoplankton or bloom or reproducing. or fewer zooplankton (to consume phytoplankton)</li> </ul> <p>[2]</p>	
<p>(ii) 10 000 and 780;</p> $\frac{780}{10\,000} \times 100 = 7.8;$ <p>correct answer = [2] marks 7.8 78 = 1 mark as working out ok [2]</p>	
<p>(iii) • less zooplankton/less phytoplankton for zooplankton • for fish to feed on [2]</p>	
<p>(c) (i) Any <b>four</b> from:</p> <p>eutrophication; increase in numbers of algae/plants/phytoplankton; because of more nitrates/minerals; shading by algae/plants/phytoplankton/mineral depletion; causes algae/plants/phytoplankton to die; algae/plants/phytoplankton decomposed by bacteria; the bacteria use up the oxygen; [4]</p>	
<p>(ii) Any <b>two</b> from:</p> <p>more heat/light; (more algae) to decompose/more decomposition; <b>or</b> higher light/temperature; (more bacteria) for decomposition; <b>or</b> less water in lake in summer; so minerals more concentrated</p> <p>or less O<sub>2</sub> in warmer water = [1] mark [2]</p>	13

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			AVAILABLE MARKS	
	Boiling tube	Colour	Explanation	
(a)	A	yellow	no photosynthesis but respiration occurs/respiration only; carbon dioxide given out/increases; more CO <sub>2</sub> /high levels CO <sub>2</sub> any two	[3]
(b)	B	purple	greater photosynthesis rate than respiration rate; carbon dioxide taken in/decreases; any two	[3]
(c)	C		no photosynthesis and no respiration; so no change in carbon dioxide level/ normal CO <sub>2</sub> levels;	[2]
Total				8
				70