



*Rewarding Learning*

**General Certificate of Secondary Education  
2017**

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**Biology**

Unit 1

Higher Tier

**[GBY12]**

**FRIDAY 9 JUNE, 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.

			AVAILABLE MARKS
1	Sugar/glucose; [1] Energy source/respiration; [1] Fatty acids <b>and</b> glycerol; [1] Amino acids; [1]	[4]	4
2	(a) Producers; [1] Use (trap/absorb) energy from sunlight/photosynthesis; [1] Provide food/energy for animals in food web; [1]	[3]	
	(b) Field mice decrease; [1] More eaten by hawk, fox and weasel; [1] <b>or</b> Field mice increase; [1] due to less competition (from red squirrels)/more food; [1] <b>or</b> Field mice stay the same; [1] more food but more predation; [1]	[2]	5
3	(a) Phototropism;	[1]	
	(b) More auxin on shaded side; [1] Auxin causes cells to grow/elongate; [1]	[2]	
	(c) More light; [1] For photosynthesis/growth; [1]	[2]	5
4	<b>Indicative Content</b> 1. colour change in tube A to yellow/brown; 2. shows amylase breaks down starch (into simple sugars); 3. amylase has active site (/ molecule) shape that fits (/complimentary) with starch; 4. lipase/tube B remains blue/black showing starch still present/not digested; 5. lipase has (active site which is) different shape/does not fit starch; 6. result demonstrates enzyme specific(ity); 7. appropriate reference to lock and key model; <b>Accept:</b> bullet points which start with capital letter, contain a verb and end in full stop as sentences.		
Band	Response	Mark	
A	Candidates <b>must use appropriate, specialist terms</b> throughout <b>using at least 5 of the points</b> . They use <b>good</b> spelling, punctuation and grammar and the form and style are of a <b>high standard</b> .	[5]–[6]	
B	Candidates use <b>some appropriate, specialist terms</b> throughout <b>using at least 3 of the points</b> . They use <b>satisfactory</b> spelling, punctuation and grammar and the form and style are of a <b>satisfactory standard</b> .	[3]–[4]	
C	Candidates make <b>little use of specialist terms</b> throughout <b>using at least 1 of the points</b> . The spelling, punctuation and grammar, form and style are of a <b>limited standard</b> .	[1]–[2]	
D	Response not worthy of credit.	[0]	6

			AVAILABLE MARKS	
5	(a)	Similarity – both reduce (over the 5 years); [1] Difference – SO <sub>2</sub> reduces continuously, NO <sub>x</sub> fluctuates/ Less NO <sub>x</sub> than SO <sub>2</sub> ; [1]	[2]	8
	(b)	Burning/combustion; [1] of fossil fuels/named example; [1]	[2]	
	(c)	Reacts/combines with/dissolves in; [1] water (vapour); [1]	[2]	
	(d)	Describe – acid rain causes death of plants/biodiversity reduced/ described/reduced animal habitats; [1] Explain – defoliates trees; [1] or Describe – causes death of aquatic animals (species); [1] Explain – builds up acidity in lakes; [1]	[2]	
6	(a)	Group of organisms with shared features/characteristics/DNA; [1] Can interbreed to produce fertile offspring; [1]	[2]	8
	(b)	<b>A</b> – Bacteria; [1] <b>B</b> – Protoctista; [1] <b>C</b> – Animal/Animalia; [1] <b>D</b> – Fungi; [1]	[4]	
	(c)	Any <b>two</b> from: • Compare biodiversity; • Conservation of species; • Study how animals have changed over time;	[2]	
7	(a) (i)	Accurate plots (× 2); [2] Line; [1]	[3]	15
	(ii)	9.8; 13.2 < 14.2;	[1] [1]	
	(iii)	Manure – no added minerals/calcium/nitrogen/magnesium/ Composition of manure may not meet the needs of the crop; [1] Manure – insoluble/must be broken down/decomposed before absorption; [1]	[2]	
	(b)	Forms humus;	[1]	
	(c)	Exact composition is known; [1] Easier to handle/apply/store/no smell; [1]	[2]	
	(d) (i)	Surface runoff/percolation through the soil (described);	[1]	
	(ii)	Any <b>four</b> from: • (Aquatic) plant/algae growth/algal bloom; • Uses up minerals/block light and die; • Decomposition/decay of (dead) plants/algae by bacteria; • Bacteria/decomposers are aerobic/use up oxygen so aquatic animals die;	[4]	

			AVAILABLE MARKS
<b>8</b>	<p><b>(a)</b> [Constantly] monitors blood glucose concentration; [1] Production/release of insulin; [1]</p>	[2]	6
	<p><b>(b)</b> Any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• Absorbs glucose from blood;</li> <li>• Converts glucose to glycogen;</li> <li>• Storage (of glycogen/fat);</li> <li>• Causes increased respiration;</li> </ul>	[3]	
	<p><b>(c)</b> Glucagon;</p>	[1]	
<b>9</b>	<p><b>(a)</b> Height; [1] squared/2; [1]</p>	[2]	9
	<p><b>(b) (i)</b> <math>16.5 &lt; 16.75</math>;</p>	[1]	
	<p><b>(ii)</b> Falls; [1] then rises; [1]</p>	[2]	
	<p><b>(iii)</b> 8/8–20 (years)</p>	[1]	
	<p><b>(iv)</b> (Energy) intake/consumption greater than energy used in exercise;</p>	[1]	
	<p><b>(v)</b> Individual – Linked to diabetes/heart disease/stroke/arthritis/high blood pressure; [1] Society – Increased costs for the NHS/days of work; [1]</p>	[2]	
<b>10</b>	<p><b>(a) (i)</b> Synapse;</p>	[1]	9
	<p><b>(ii)</b> Any <b>four</b> from:</p> <ul style="list-style-type: none"> <li>• Chemical/transmitter released from neurone <b>A</b>;</li> <li>• Chemical diffuses across synapse;</li> <li>• Large enough concentration of chemical/transmitter present at <b>B</b>;</li> <li>• Electrical impulse triggered in neurone <b>B</b>;</li> </ul>	[4]	
	<p><b>(b) (i)</b> Many branched ends;</p>	[1]	
	<p><b>(ii)</b> Any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• Insulating sheath pulls away from neurone fibre;</li> <li>• Nerve fibre/neurone breaks down;</li> <li>• Cell body swells;</li> <li>• Branching ends reduced;</li> </ul>	[2]	
	<p><b>(iii)</b> Slower/no transmission of nerve <u>impulses</u> Slower/no responses/lack of sensitivity;</p>	[1]	9

## 11 (a) Indicative Content

Max **three** trends from 1–5

1. Percentage of marram grass increases, then decreases/  
Only marram found on dunes **1 and 2**;
  2. Heather **and** gorse absent in **1 and 2**/  
Heather **and** gorse increase from 3–5;
  3. More heather than gorse (on dunes 3, 4 **and** 5)/  
Heather is dominant on dunes 4 **and** 5;
  4. Total percentage cover increases 1 – 5;
  5. Dune 4 has more even distribution of species;
- } Any 3
6. More competition on dunes 3/4/5 **because** all three species present;
  7. Appropriate data, e.g. Dune 2 has most marram – 60% cover/  
Heather has highest percentage cover – 65%;  
Total percentage cover increases from 40, (60, 80, 95) to 100;

**Accept:** bullet points which start with capital letter, contain a verb and end in full stop as sentences.

Band	Response	Mark
A	Candidates <b>must use appropriate, specialist terms</b> throughout <b>using at least 7 of the points</b> . They use <b>good</b> spelling, punctuation and grammar and the form and style are of a <b>high standard</b> .	[5]–[6]
B	Candidates use <b>some appropriate, specialist terms</b> throughout <b>using at least 5 of the points</b> . They use <b>satisfactory</b> spelling, punctuation and grammar and the form and style are of a <b>satisfactory standard</b> .	[3]–[4]
C	Candidates make <b>little use of specialist terms</b> throughout <b>using at least 3 of the points</b> . The spelling, punctuation and grammar, form and style are of a <b>limited standard</b> .	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

- (b) (i) Soil water; [1]  
Soil humus; [1]

[2]

- (ii) Humus increases; [1]  
More plants to decompose/breakdown; [1]

[2]

10

		AVAILABLE MARKS
<p><b>12 (a) (i)</b> Any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• Active transport;</li> <li>• Ions absorbed against concentration gradient/described;</li> <li>• Aerobic/requires oxygen;</li> <li>• For respiration/energy;</li> </ul>	[3]	
<p><b>(ii)</b> Root hair cells; [1] Increase surface area; [1]</p>	[2]	
<p><b>(b) (i)</b> Nitrification;</p>	[1]	
<p><b>(ii) Beaker 2:</b> Waterlogging stops/slows/decreases the process; [1] Accept converse for Beaker 1</p> <p><b>Beaker 2:</b> Very little ammonium changed to nitrates; [1]</p> <p>(Nitrification) is an aerobic process/requires oxygen; [1]</p>	[3]	
<p><b>(iii) Beaker 3 –</b> Decomposition; [1] Proteins converted to ammonium; [1] Ammonium (increases) from 30 to 120 au (/4 times); [1]</p> <p><b>Beaker 4 –</b> Denitrification; [1]</p> <p>Any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• Waterlogged/anaerobic conditions;</li> <li>• Nitrates converted to nitrogen gas;</li> <li>• Nitrates (decrease) from 200 to 120 au;</li> </ul>	[6]	15
<b>Total</b>		<b>100</b>