



Rewarding Learning

**General Certificate of Secondary Education
2013**

Biology

Unit 1

Higher Tier

[GBY12]

WEDNESDAY 5 JUNE, 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.

		AVAILABLE MARKS
1	(a) Any two from Carbon/C, Hydrogen/H, Oxygen/O;	[1]
	(b) Milk/dairy produce/named example; Vitamin; Iron;	[1]
		[1] [1]
		4
2	(a) Any two from Producer; Make own food/photosynthesis/absorb (use) energy from the sun; Provide food energy for rest of food web/chain/consumers/animals;	[2]
	(b) Consumption/eating/feeding/flow of energy/elements (C/N);	[1]
	(c) <u>Stoats</u> have more food; Number of stoats increase;	[2]
		5
3	(a) Auxin;	[1]
	(b) (i) More chemical/auxin on shaded side/dark side;	[1]
	(ii) Longer cells ;	[1]
	(c) More light absorbed; (more) photosynthesis/more/faster growth; } Require "more" once only	[2]
		5

4 Indicative content:

- 1 Mass of substrate broken down/used up by enzyme A (increases with time);
- 2 No substrate broken down/used up by enzyme B;
- 3 Lock and key model;
- 4 Substrate fits/complementary to active site of A;
- 5 Substrate does not fit/complementary to site B;
- 6 Enzymes are specific;
- 7 Increased/greater reaction rate in A;
- 8 Enzymes are proteins/biological catalyst;

Response	Marks
Candidates must use appropriate, specialist terms throughout to explain the shape of the graph using at least five of the above points . They use good spelling, punctuation and grammar and the form and style are of a high standard .	[5]–[6]
Candidates use some appropriate, specialist terms throughout to explain the shape of the graph using at least three of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard .	[3]–[4]
Candidates make little use of specialist terms throughout to explain the shape of the graph using some or all of the above points. The spelling, punctuation and grammar, form and style are of a limited standard .	[1]–[2]
Response not worthy of credit.	[0]

[6]

6

AVAILABLE
MARKS

		AVAILABLE MARKS
5	(a) (i) $(480 \times 100) \div 2000$; 24%;	[2]
	(ii) Higher energy requirement (for muscle contraction)/higher RDA; More <u>muscle</u> ;	[2]
	(b) Exercise/activity; [1] Pregnancy; [1]	[2]
	(c) Any two from 92% (of RDA)/described; Increased risk of heart disease/attack/stroke/high blood pressure/obesity;	[2]
		8
6	(a) Group of organisms with similar features; Reproduce to produce fertile offspring;	[2]
	(b) Lack cellular organisation/not made of cells/non-living;	[1]
	(c) Any one from Compare biodiversity; Conserve/protect <u>species</u> /prevent extinction; Study how organisms change through time; Recognition of a new/unknown species;	[1]
	(d) Kingdom A – Bacteria; [1] Kingdom B – Plants; [1] Kingdom C – Fungi; [1] Kingdom D – Animals; [1]	[4]
		8

- 7 (a) (i) Oxygen/O₂; [1]
- (ii) Count the number of bubbles; per minute; [2]
- (iii) Increase wattage of bulb/lamp move closer to plant; [1]
- (iv) Increased heat (from light)/increasing water temperature;
Use heat sink/place another beaker of water between light and beaker
with water plant; [2]
- (b) (i) Further increase along the same line;
levels off at higher level (above 24); [2]
- (ii) Light intensity; [1]
- (c) Indicative content:
Maximum of three explanations from points 1–5
- ① Sensor monitors/controls conditions;
 - ② Oil burner produces heat/CO₂;
 - ③ Light (sensor) controls/maintains light levels;
 - ④ Ventilators cool/allow gas exchange;
 - ⑤ Sprinkler provides/maintains water;
- Maximum of three explanations from points 6–9
- ⑥ Sensors maintain optimal environment/without limiting factors.
 - ⑦ Maximum/more photosynthesis;
 - ⑧ (Maximum) growth/yield;
 - ⑨ Running costs reduced/no excess costs;

Response	Marks
Candidates must use appropriate, specialist terms throughout to describe how the greenhouse environment is controlled and explain why this may be more profitable using at least five of the above points. They use good spelling, punctuation and grammar and the form and style are of a high standard .	[5]–[6]
Candidates must use appropriate, specialist terms throughout to describe how the greenhouse environment is controlled and explain why this may be more profitable using at least three of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard .	[3]–[4]
Candidates must use appropriate, specialist terms throughout to describe how the greenhouse environment is controlled and explain why this may be more profitable using at least one of the above points. The spelling, punctuation and grammar, form and style are of a limited standard .	[1]–[2]
Response not worthy of credit.	[0]

[6]

AVAILABLE
MARKS

15

			AVAILABLE MARKS	
8	(a)	Lactate/lactic acid; Carbon dioxide; Alcohol/ethanol;	[3]	6
	(b)	Aerobic respiration <u>uses/needs</u> oxygen; Aerobic respiration produces <u>CO₂</u> ; Aerobic respiration produces more energy; Aerobic respiration produces water;	[3]	
9	(a)	Gas produced by <u>burning</u> fossil fuels; NO _x /SO _x ; Reacts with/ <u>dissolves in water</u> (in the atmosphere/clouds);	[3]	8
	(b)	Air pollution produced in one country can be blown into/fall in/affects another country;	[1]	
	(c)	Any one from: Flue-gas desulphurisation/scrubbers; Catalytic convertors/low sulphur fuels; Increased use of public transport/cycling/walking/other example described; Use of renewable energy sources, example described;	[1]	
	(d)	Snail;	[1]	
	(e)	Trout;	[1]	
	(f)	Biodiversity decreased/reduced/falls/goes down/declines;	[1]	
10	(a)	Neurone;	[1]	10
	(b)	Arrow drawn on <u>axon</u> A away from cell body → to cell B;	[1]	
	(c)	Long – connects different parts of the body; Insulating sheath – speeds up impulses;	[1] [1]	
	(d)	Can connect/synapse with more than one/many cells (neurones)/can form network of cells;	[1]	
	(e)	Any five from Transmitter/chemical (produced) at end of <u>cell A</u> ; Transmitter/chemical moves/passes <u>across synapse</u> ; (Transmitter/chemical moves) by diffusion; If transmitter/chemical <u>concentration is high enough in cell B</u> ; <u>Triggers impulse</u> ; <u>Electric impulse</u> ;	[5]	

11 (a) Place the quadrats at random; [1]

(b) **Indicative content:**

- 1 (Percentage cover of) both daisies and dandelions decreases;
- 2 Dandelions decrease faster (than daisies);
- 3 Dandelions recover;
- 4 One correct reference to data in **1, 2 or 3**;
- 5 Rabbits (prefer to) eat the large leaves of dandelion;
- 6 Dandelions can grow (back) from (large) root (which isn't eaten);
- 7 (Once eaten) daisies cannot/don't grow back;
- 8 Because they have shallow roots which do not give rise to new plants;

Response	Mark
Candidates must use appropriate, specialist terms throughout to describe and explain the percentage cover of dandelions and daisies using at least 5 of the above points . They use good spelling, punctuation and grammar and the form and style are of a high standard .	[5]–[6]
Candidates use some appropriate, specialist terms throughout to describe and explain the percentage cover of dandelions and daisies using at least 3 of the above points . They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard .	[3]–[4]
Candidates make little use of specialist terms throughout to describe and explain the percentage cover of dandelions and daisies using at least 1 of the above points . The spelling, punctuation and grammar, form and style are of a limited standard .	[1]–[2]
Response not worthy of credit.	[0]

[6]

(c) (i) Grass (population/percentage cover) increases more rapidly than other species; [1]

(ii) Less competition;
For named resource (e.g. light/space/nutrients/minerals/water); [2]

AVAILABLE
MARKS

10

			AVAILABLE MARKS
12 (a) (i)	A – Nitrogen (gas/in air); B – <u>Ammonium compounds</u> ;	[2]	
(ii)	Nitrification;	[1]	
(iii)	Any four from Root hair cells; <u>Active</u> uptake/absorption/transport; Uses energy; Requires oxygen/aerobic (respiration) (Nitrates/minerals) moved <u>against</u> concentration gradient;	[4]	
(iv)	(Farmyard manure/fertilisers) contain nitrogen compounds/nitrates; Replace (nitrogen compounds/nitrates) lost from soil; Any two from (Removed)/when crop/grain/straw/harvested; Lost by leaching/runoff; Lost by denitrification (in anaerobic conditions);	[4]	
(b) (i)	Supports – Trend shows the deeper the fertiliser the less nitrate uptake/inverse relationship; Appropriate numerical values from graph;	[1] [1]	
	Not justified – No readings between 0 and 0.2 cm depth;	[1]	
(ii)	Repeat same method with fertiliser at more /different depths (between $0 < 0.2$ m or $0.4 < 1.2$ m) below surface;	[1]	15
Total			100