



*Rewarding Learning*

**General Certificate of Secondary Education  
2015–2016**

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**Double Award Science: Biology**

Unit B1

Higher Tier

**[GSD12]**

**WEDNESDAY 24 FEBRUARY 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.

			AVAILABLE MARKS	
1	(a)	A: glucose/sugar B: starch C: protein	[3]	6
	(b)	(i) Boiling/heat; in a water bath/beaker of water  (ii) Blue to brick red (orange/yellow/green)	[2]  [1]	
2	(a)	(i) Phototropism/tropism	[1]	7
		(ii) Auxin	[1]	
		(iii) More light; for more photosynthesis (more must be once)	[2]	
	(b)	Area 2: same as cell in Area 1 (exactly same) Area 3: longer Area 4: longer or same as cell in Area 1 but not as long as cell in Area 3	[3]	
3	(a)	(i) Any <b>two</b> from: Biological catalyst; speeds up the rate of a reaction; protein	[2]	10
		(ii) Small intestine/ileum/pancreas	[1]	
	(b)	– Small molecules/soluble molecules; – Into the bloodstream/blood/capillary	[2]	
	(c)	(i) Alkali tube stayed/remained cloudy	[1]	
		(ii) Any <b>two</b> from: – Albumin is broken down/digested; – Enzyme active site is the correct shape/complementary (to substrate)/ albumin fits into the enzyme/lock and key/optimum pH/best pH	[2]	
		(iii) – Albumin not broken down/digested/no reaction; – Enzyme changes shape/denatured/damaged/incorrect shape/ albumin will not fit enzyme/lock and key doesn't work/ not at optimum pH	[2]	

**4 (a) Indicative content**

- Use a quadrat;
- Placed in a line/along belt/transect random placement;
- Move quadrat/place at different distances;
- Use a key/identification book to identify barnacle species;
- For each quadrat estimate the percentage cover/count the number of barnacles of **each** species (leave in number of species);
- Record results/data;
- Repeat/replicate whole experiment

[6]

Response	Marks
Candidates use appropriate terms throughout in describing the sampling method. This must include 5–6 points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout in describing the sampling method. This must include 3–4 points from the indicative content. They use satisfactory spelling, punctuation and grammar skills. Form and style are of a satisfactory standard.	[3]–[4]
Candidates include 1–2 points from the indicative content when describing the sampling process. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

- (b) (i)** 50 species **A** present at 0 m; (at water’s edge);  
 No species **A** at 25 m/only 2 at 20 m/none at furthest point  
 Any **two** correct pieces of evidence [2]
- (ii)** 2 and 48; [1] for reading graph correctly  
 4; 96; [1] each for doubling  
 4 and 96 [3] [3]
- (c) (i)** Flow of energy/energy transfer [1]
- (ii)** Less trophic levels/shorter food chain;  
 less energy lost/less energy wasted [2]
- (d)** Any **three** from:  
 – less energy lost;  
 – through respiration/movement/keeping warm;  
 – more energy available for growth/grows fast/more eggs;  
 – more profit/makes more money;  
 – can control food intake/amount/type traceability of food;  
 – less land used/land can be used for other things/fit in more birds/in garden;  
 – protects from predators;  
 – easier to find/collect eggs;  
 – easier to look after chickens/stops them from straying [3]

AVAILABLE  
MARKS

17

			AVAILABLE MARKS	
5	(a)	(i) Villus	[1]	5
		(ii) Capillary/bloodstream/blood	[1]	
		(iii) Glucose/amino acids	[1]	
		(iv) Fatty acids/glycerol	[1]	
	(b) Thin single layer of cells/microvilli/permeable/thin/large S A/thin walls/ layer <b>B</b> one cell thick (walls)	[1]		
6	(a)	(i) Scale [1]; 5 points correct [2]/4 or 3 points correct [1]; line [1]	[4]	13
		(ii) At 0 min, 20 cm <sup>3</sup> and at 30 mins, 60 cm <sup>3</sup> ; $[(60 - 20)/20] \times 100 = 200\%$ [3]	[3]	
		(iii) Dough rises higher/more/faster/increases in volume; Glucose <b>respired</b> by yeast/quicker respiration; More <b>carbon dioxide</b> or gas given off	[3]	
		(iv) Amylase breaks down starch/more glucose produced	[1]	
	(b) Any <b>two</b> from: Aerobic releases more energy; Carbon dioxide produced in aerobic/not in anaerobic, Lactic acid produced in anaerobic/not in aerobic; Or converse	[2]		
7	(a)	<b>A</b> – yellow; <b>B</b> – yellow; <b>C</b> – purple;	[3]	7
		(b) Seeds don't photosynthesise/only respire; Pondweed photosynthesises; At a faster rate than it respire;	[3]	
	(c) Any changes are as a result of the organisms in the other test tubes	[1]		

- 8 Any **five** – need process and explanation for each mark
- Plants use CO<sub>2</sub> for **photosynthesis**/to make glucose or starch/  
**photosynthesis** takes in CO<sub>2</sub>/**photosynthesis** decreases CO<sub>2</sub>/  
plants use CO<sub>2</sub> to make glucose/starch;
  - Animals **feed/eat** plants/animals;
  - **Egestion/excretion** (not of food);
  - **Decay/decomposition** of dead organisms by **decomposers**;
  - **Respiration** releases CO<sub>2</sub> from organisms (**not** breathing);
  - **Fossilisation**/formation of **fossil fuels** from dead organisms (**not** CO<sub>2</sub> into fossil fuels);
  - **Combustion/burning** of fossil fuels releases CO<sub>2</sub>;
  - **Global warming/greenhouse** effect from burning **fossil fuels**/as a result of increased CO<sub>2</sub> in the atmosphere;
  - **Deforestation** increases CO<sub>2</sub> levels/less CO<sub>2</sub> taken up by trees

[5]

**Total**

**AVAILABLE  
MARKS**

5

**70**