



*Rewarding Learning*

**General Certificate of Secondary Education  
2014–2015**

---

**Double Award Science: Biology**

Unit B1

Higher Tier

**[GSD12]**

**WEDNESDAY 12 NOVEMBER 2014, 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.

			AVAILABLE MARKS	
1	(a)	(i) Nervous/nerve system	[1]	8
		(ii) Hormone	[1]	
		(iii) By the circulatory system/in blood/plasma	[1]	
	(b)	(i) Pancreas	[1]	
		(ii) <ul style="list-style-type: none"> <li>• More/greater/increased respiration;</li> <li>• (Conversion of) glucose to glycogen/turns into or stores as glycogen.</li> </ul>	[2]	
	(c)	Any <b>two</b> from: Amy's blood glucose was <u>higher</u> before the meal/resting/normally; After eating, Amy's blood glucose rises to a <u>higher</u> level; <b>or</b> Amy's blood glucose is <u>higher</u> ; Amy's blood glucose takes a <u>longer</u> time to return to normal/fall/decrease; Amy's blood glucose rises <u>faster</u> after eating.	[2]	
2	(a)	(i) 18	[1]	8
		(ii) $(21 \times 20 \times 4.2) \div 2 =$ ; <u>882 J</u> 3 marks on own 2 marks: 18 → 756; 28 → 1176; 35 → 1470; must show working	[3]	
		(iii) Raised water temperature the <u>most</u> /temp goes <u>highest</u>	[1]	
		(iv) Reliability/calculate average	[1]	
	(b)	Heat energy lost to surroundings/environment/tongs/glass tube in classroom experiment/or converse/fat drips off nothing to stop heat escaping (to environment)	[1]	
	(c)	Obesity/CHD/diabetes/stroke/high blood pressure/high cholesterol/overweight/heart attack	[1]	
3	(a)	Starch: Blue/black <b>or</b> Black; Protein: Blue	[2]	

- (b) Any 2 from 3 of first three points  
 1st 2 marks:  
 Make a suspension of food sample/mix some sandwich in water/add H<sub>2</sub>O/  
 make solution;  
 Add ethanol/alcohol;  
 Mix/shake;  
 3rd mark:  
 Observe a **white emulsion** (nothing else) if fat is present [3]
- (c) (i) All 5 points plotted correctly for 2 marks (3 correct for 1 mark)  
 Straight line from point to point drawn/smooth curve acceptable [3]
- (ii) pH 7 [1]
- (iii) Activity increases from pH 4–7;  
 from pH 7–10, activity decreases;  
 • higher as goes to neutral = 1 mark  
 lower as it goes away from neutral = 1 mark  
 • increases then decreases with no data = 1 mark  
 • goes up to max. 96% = 1 mark  
 goes back down to zero = 1 mark [2]
- (d) Indicative content – Any 6 points
- Amylase works in the mouth
  - Amylase does not work in stomach
  - Amylase works in the small intestine
  - Starch digestion incomplete in the mouth
  - Amylase is destroyed in the stomach (by acid conditions)
  - So amylase needs to work again in the small intestine/by pancreas to complete the digestion of starch
  - Amylase digests starch into glucose

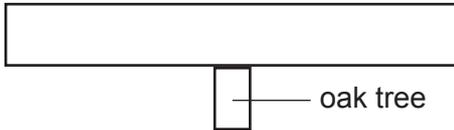
Band	Response	Mark
A	Candidates use appropriate terms throughout to explain the activity of amylase in the various regions of the intestine using <b>five to six</b> points from the indicative content. They use good spelling, punctuation and grammar. Form and style are of a high standard.	[5–6]
B	Candidates use appropriate terms throughout to explain the activity of amylase in the various regions of the intestine using <b>three to four</b> 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 <b>one to two</b> points from the indicative content to explain the activity of amylase in the intestine. They use limited spelling, punctuation and grammar. They make limited use of specialist science terms.	[1–2]
D	Response not worthy of credit.	[0]

[6]

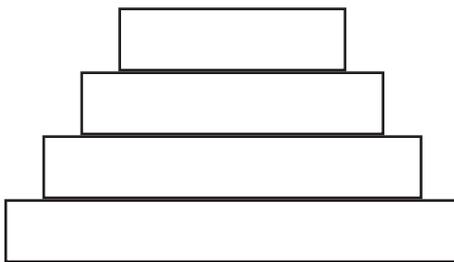
17

- 4 (a) (i) Light [1]
- (ii) Trophic Level 2 [1]
- (iii) Economic: Timber industry will lose its supply of oak  
Environmental: Biodiversity reduced [2]

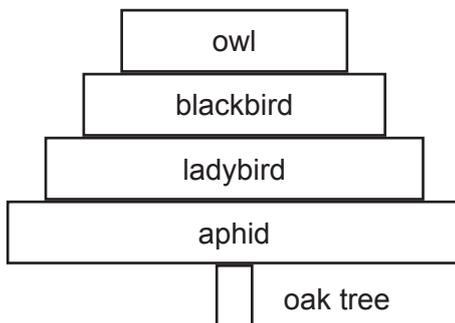
(b) (i)



1st mark: oak smaller than next level and labelled oak



2nd mark: top 4 boxes symmetrical and decreasing in size  
(labels not needed for this mark)



owl

blackbird

ladybird

aphid

3rd mark: labels in order above [3]

- (ii) Less energy lost;  
as there are less steps in the food chain/less trophic levels [2]

- (c) (i)  $3 \times 30 \text{ g} = 90 \text{ g}$ ;  
 $90 \times 8 = 720 \text{ kJ}$   
or  
 $30 \times 8 = 240$   
 $240 \times 3 = 720$  [2]

- (ii)  $720 \times \frac{25}{100}$ ; 180kJ [2]

- (iii) Reproduction/respiration/excretion/egestion/faeces/movement/heat/  
mating [1]

AVAILABLE  
MARKS

14

			AVAILABLE MARKS	
5	(a) (i)	Root hair cells/root hair	[1]	10
	(ii)	Active uptake/transport; Movement of minerals from area of low to high concentration/against concentration gradient; Respiration/Energy needed	[3]	
	(b) (i)	Light/sunlight	[1]	
	(ii)	1st mark: from zero and extension of incline line from B/from zero with steeper incline; 2nd mark: line plateau above current line	[2]	
	(c) (i)	No need to pay for heating fuel less electricity needed	[1]	
	(ii)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• Geothermal heating does not produce CO<sub>2</sub>/less CO<sub>2</sub> produced/ doesn't contribute to GW/doesn't produce GH gases</li> <li>• Helps Iceland meet treaty <u>targets</u> <b>or</b> conserves fossil fuels <b>or</b> is renewable/no more energy than 1990</li> </ul>	[2]	
6	(a)	Nitrifying bacteria/nitrifying	[1]	7
	(b)	Any <b>two</b> from: The food/protein is converted to ammonia/more ammonia produced; which is toxic/poisonous	[2]	
	(c)	Any <b>four</b> from: Increase in algae/plants/algal bloom; or described shading; causes plants/algae to die; bacteria decompose plants/decomposers/algae; bacteria use up oxygen	[4]	

**7 Indicative content**

A CO<sub>2</sub> increases  
 A respiration only or respiration with no photosynthesis

B rate of respiration = rate of photosynthesis  
 compensation point in B  
 CO<sub>2</sub> in/absorbed equals CO<sub>2</sub> out/produced  
 no net movement CO<sub>2</sub>

C photosynthesis greater/more/faster than respiration  
 C CO<sub>2</sub> decreases or more CO<sub>2</sub> in than out

[6]

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

**Total**

**AVAILABLE  
MARKS**

6

**70**