



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

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**Double Award Science: Biology**

Unit B1

Foundation Tier

**[GSD11]**

**TUESDAY 17 MAY 2016, AFTERNOON**

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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) Kidney failure; eye damage [2]
- (b) (i) One mark for each bar correctly plotted [3]
- (ii) Any **two** from:
- Too much sugar in diet
  - Lack of exercise
  - Obesity/overweight
  - Too much food/too much fatty foods/unhealthy **diet** [2]
- (c) Oxygen/O<sub>2</sub>; carbon dioxide/CO<sub>2</sub>; water/H<sub>2</sub>O [3]

AVAILABLE  
MARKS

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2 (a)

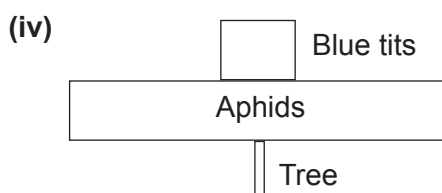
Animal Group	Feature		
	Backbone	Chaetae	Exoskeleton
Annelids		✓	
Insects			✓
Chordates	✓		

One mark for each correct row [3]

(b) (i) Pooter [1]

(ii) So that insects/aphids are not sucked into the mouth [1]

(iii) Tree → aphids → blue tits  
One mark for the three organisms in correct order  
One mark for arrows [2]



One mark for correct shape with narrowest bar at the bottom  
One mark for all labels correct [2]

(v) Need to get mass/weight of organisms/weigh the organisms [1]

(c) (i) Sun/sunlight/light [1]

(ii) Any **two** from:  
Energy is lost as:

- Heat/respiration
- Movement or described
- Waste materials/faeces/urine/slurry/excreta/egestion/manure
- Uneaten parts/hooves/bones/hair/teeth
- Reproduction [2]

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			AVAILABLE MARKS
<b>3</b>	<b>(a)</b> protein; biological; starch	[3]	
	<b>(b) (i)</b> 40 °C	[1]	
	<b>(ii)</b> Any <b>two</b> : Amylase activity is very low/lowest/only 0.5/0.6 arbitrary units/gone to 0.5 or 0.6; Amylase is denatured/destroyed/damaged/substrate no longer fits into the (active site) of the enzyme (amylase)/enzyme substrate complex not formed/bonds broken in enzyme; Activity decreased/dropped/not as fast/fallen/not as effective	[2]	
	<b>(iii)</b> Any <b>two</b> from: <ul style="list-style-type: none"> <li>• pH</li> <li>• volume/amount/concentration of enzyme</li> <li>• volume/amount/concentration of substrate/starch</li> <li>• time of reaction</li> <li>• number of enzyme (molecules)</li> <li>• apparatus</li> <li>• volume of water</li> </ul>	[2]	8
<b>4</b>	<b>(a)</b> Blue → Clear/colourless/pink	[1]	
	<b>(b) (i)</b> 7	[1]	
	<b>(ii)</b> Lemon; smallest number of drops needed/least no. of drops only takes 3 drops/less than others	[2]	
	<b>(iii)</b> Reduces the vitamin C content	[1]	
	<b>(c)</b> Five repeats/replicates/there is an average	[1]	
	<b>(d)</b> Syringe/pipette/burette	[1]	7

			AVAILABLE MARKS	
5	(a)	(i) Root hair (cell)	[1]	8
		(ii) Cell has extension/described; that gives increased surface area	[2]	
	(b)	(i) Protein/amino acids	[1]	
		(ii) Artificial fertiliser: 200 nitrate, FYM 6/(194) ( $\times 33\frac{1}{3}$ ) 100 phosphate, FYM 3.5/(96.5) ( $\times 28.6$ ) 100 potassium, FYM 8.0 (9.2) (12.5 $\times$ ) (Any <b>one</b> ) Data		
		<ul style="list-style-type: none"> <li>• more + 1 data statement</li> <li>• 2 data (N/P/K) statements</li> <li>• Difference</li> <li>• Times more with numbers</li> </ul>	[1]	
	(iii) Any <b>three</b> from: Farmyard manure has: <ul style="list-style-type: none"> <li>• Slower release of minerals</li> <li>• Minerals less likely to be leached/washed out of soil/less soluble/less runoff/less water pollution/less eutrophication</li> <li>• Costs less/'free' byproduct from farms/already on farm</li> <li>• Improves soil structure/crumb structure/adds humus/adds organic matter/improves soil texture</li> <li>• Encourages more earthworms/air in the soil</li> </ul>	[3]	8	
6	(a)	(i) 10 year period: 1990–2000; Decrease: 47 $\mu\text{g}/\text{m}^3$	[2]	6
		(ii) Switch to natural gas/less coal or oil used/less burning of FF/less reliance on FF/more renewable sources used or named, e.g. solar/natural gas contains less $\text{SO}_2$	[1]	
	(b) Crusty lichens; they are the only ones that can grow at 65 $\mu\text{g}/\text{m}^3$ sulfur dioxide/they can grow up to 70/others can't survive at 65 or up to 70	[2]		
	(c) To trigger action if level starts to increase/ensure targets for clean air are being met/avoid fines/in case $\text{SO}_2$ levels start to go up again	[1]		

- 7 (a) (i) In a dark cupboard for 24 hours (or more) [1]
- (ii) To show that any starch made is made during the experiment/  
to ensure that **all** starch has been used up/to ensure there's no starch  
from before/ensure no starch present [1]
- (iii) Bacteria in soil **respire**;  
to stop carbon dioxide entering the flask/around the plant/bacteria  
produce CO<sub>2</sub> [2]
- (iv) • **A** – Leaf is yellow-brown;  
• **B** – Leaf turns blue-black/black **not** blue on own;  
both for first mark  
• No carbon dioxide in **A** or carbon dioxide present in **B**;  
• No starch in **A** or starch in **B**; [3]
- (b) (i) Less/decreased/smaller number of bubbles [1]
- (ii) 23 cm [1]
- (iii) To allow the plant to adjust/acclimatise [1]
- 8 (a) Any **two** from:  
• Large surface area  
• Folds  
• Villi/microvilli  
• Long/length  
• Produces enzymes/named enzyme [2]
- (b) **Indicative content**  
(Reduced hydrochloric acid in the stomach) – in Q:  
• Reduced enzyme/enzyme action  
• Protease (named as enzyme involved)  
• So less digestion (of the meat/protein/food/meal) – rate of breakdown  
slower/more time taken to digest  
• **Meat** remains in the stomach for longer  
• There will be less amino acids produced (credit mention of amino  
acids only once in answer)
- Small intestine:  
• Meat/protein is digested by proteases (do not credit if mentioned above)  
• To amino acids (do not credit if mentioned above)
- Products:  
• They are absorbed/diffused/active transport;  
• Into the blood/capillary/villi/bloodstream;

AVAILABLE  
MARKS

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Response	Marks
Candidates use appropriate terms throughout to explain the effect of reduced hydrochloric acid production on digestion in the stomach and describe protein digestion and absorption in the small intestine. They use <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]
Candidates use appropriate terms throughout to explain the effect of reduced hydrochloric acid production on digestion in the stomach and describe protein digestion and absorption in the small intestine. They use <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]
Candidates use <b>one or two</b> points from the indicative content to explain the effect of reduced hydrochloric acid production on digestion in the stomach and/or describe protein digestion and absorption in the small intestine. They use limited spelling, punctuation and grammar. They make limited use of specialist scientific terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

**Total**

**AVAILABLE  
MARKS**

8

**70**