

New  
Specification



General Certificate of Secondary Education  
2018

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**Double Award Science  
Biology**

Unit B1

Higher Tier

[GDW12]

WEDNESDAY 21 FEBRUARY 2018, MORNING

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**MARK  
SCHEME**

## General Marking Instructions

### **Introduction**

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

### **Assessment objectives**

Below are the assessment objectives for GCSE Double Award Science.

Candidates must:

- AO1** Demonstrate knowledge and understanding of:
- scientific ideas; and
  - scientific techniques and procedures;
- AO2** Apply knowledge and understanding of and develop skills in:
- scientific ideas; and
  - scientific enquiry, techniques and procedures; and
- AO3** Analyse scientific information and ideas to:
- interpret and evaluate;
  - make judgements and draw conclusions; and
  - develop and improve experimental procedures.

### **Quality of candidates' responses**

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

### **Flexibility in marking**

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

### **Positive marking**

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. The exception to this for GCSE Double Award Science is when examiners are marking complex calculations when the Examiners are briefed to mark by error or omission. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

### **Awarding zero marks**

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

### **Marking Calculations**

In marking answers involving calculations, examiners should apply the 'carry error through' rule so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

**Types of mark schemes**

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

**Levels of response**

In deciding which level of response to award, examiners should look for the number of indicative content points in candidate responses to ensure that the answer has been written to coincide with the question. In deciding which mark within a particular level to award to any response, quality of communication will be assessed and examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

**Quality of written communication**

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of bands of response. The description for each band of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within bands of response as follows:

Band A: Quality of written communication is excellent.

Band B: Quality of written communication is good.

Band C: Quality of written communication is basic.

Band D: Response not worthy of credit.

In interpreting these band descriptions, examiners should refer to the more detailed guidance provided below:

**Band A (Excellent):** Excellent reference to scientific terminology. The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

**Band B (Good):** Good reference to scientific terminology. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

**Band C (Basic):** Basic reference to scientific terminology. The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

- 1 (a) (i) high blood glucose/glucose in urine/lethargy [1]
- (ii) eye damage/kidney failure/heart disease/strokes [1]
- (b) Type 1 – pancreas stops producing insulin/no insulin produced; [2]  
Type 2 – pancreas produces less insulin/insulin less effective
- (c) injection of insulin [1]

AVAILABLE  
MARKS

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2 **Indicative content**

has a large surface area;  
has a layer of moisture;  
has thin layer of cells in air sac;  
good blood supply;  
permeable;  
diffusion gradient/concentration gradient;  
capillary wall is thin

Band	Response	Mark
A	Candidates use appropriate terms throughout to give <b>at least five</b> points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give <b>at least three or 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 appropriate terms throughout to give <b>1 or 2</b> points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

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- 3 (a) (i) abiotic [1]
- (ii) Decreased as moved inland [1]
- (b) competition/eaten by animals/disease/human activity described [1]
- (c) Any **two** from: [2]
- more moisture at sand dune 5/less moisture at sand dune 1; need H<sub>2</sub>O for photosynthesis
  - more minerals at sand dune 5/less at sand dune 1; need nitrate for protein
  - lower pH at sand dune 5

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		AVAILABLE MARKS
4	<p><b>(a) (i)</b> more enzyme molecules/more pectinase/more collisions/enzymes work at faster rate/apple juice produced faster [2]</p> <p><b>(ii)</b> 24 and 6 read from graph;  <math>24 - 6 = 18</math>;  <math>18 \div 6 \times 100 = 300</math> [3]</p> <p><b>(b)</b> No more juice left in the pulp/all pectin broken down [1]</p> <p><b>(c) (i)</b> 6; [1]</p> <p><b>(ii)</b> Any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• Enzymes are specific;</li> <li>• Active site does not fit with substrate (pectin);</li> <li>• Lock and key;</li> <li>• Pectin not broken down [3]</li> </ul>	10
5	<p><b>(a)</b> for respiration [1]</p> <p><b>(b)</b> remove oxygen/kill other microorganisms [1]</p> <p><b>(c)</b> Any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• cloudy</li> <li>• less glucose</li> <li>• presence of carbon dioxide/bubbles</li> <li>• more yeast</li> <li>• temperature increased</li> <li>• ethanol produced [2]</li> </ul> <p><b>(d)</b> layer of oil; to stop oxygen entering [2]</p> <p><b>(e)</b> remains clear; no respiration; no carbon dioxide produced [3]</p>	9
6	<p><b>(a)</b> Improve reliability of results/identify anomalies [1]</p> <p><b>(b) (i)</b> Between sites C and D [1]</p> <p><b>(ii)</b> Number of species falls most from 13 at C to 1 at D [1]</p> <p><b>(c) (i)</b> nitrates present [1]</p> <p><b>(ii)</b> shading/nitrate depletion [2]</p> <p><b>(iii)</b> (more) decomposition [1]</p> <p><b>(iv)</b> bacteria use up the oxygen; for respiration [2]</p>	9

			AVAILABLE MARKS		
7	(a) (i)	filters; reabsorption	[2]		
	(ii)	in food	[1]		
	(iii)	respiration	[1]		
	(b) (i)	$20 + 25 + 35 = 80$ ; $130 - 80 = 50$	[2]		
	(ii)	C; $110 \text{ cm}^3$ less than B or $130 \text{ cm}^3$ less than A	[2]		
	(iii)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• (water lost in) sweating</li> <li>• (water lost in) breathing</li> <li>• student was dehydrated</li> <li>• ADH produced</li> </ul>	[2]		10
8	(a) (i)	A feeding/eating/consumption B decomposition/excretion	[2]		
	(ii)	nitrites	[1]		
	(iii)	nitrifying	[1]		
	(iv)	There are denitrifying bacteria in soil/ anaerobic conditions/denitrifying bacteria are anaerobic	[1]		
	(b) (i)	Less oxygen present in A/more oxygen present in B; Less respiration in roots of A/more respiration in roots of B; Less active uptake in roots of A/more active uptake in roots of B	[3]		
	(ii)	no difference/the same; respiration/active uptake at its max./other factor is limiting/ oxygen no longer limiting/no nitrate left in solution	[2]	10	
9	<b>At 10 cm:</b>	Photosynthesis faster than respiration; More carbon dioxide used up (than produced)			
	<b>At 20 cm:</b>	Photosynthesis equal to respiration/compensation point; Carbon dioxide used up at same rate as produced			
	<b>At 40 cm:</b>	Photosynthesis slower than respiration; Less carbon dioxide used up than produced	[6]		
			<b>Total</b>	<b>70</b>	