

**UNIT 1: CELLS, ORGAN SYSTEMS AND ECOSYSTEMS
HIGHER TIER**

MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statements.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			5		1		1	1	
	(b)			Increases (1) because fewer microbes use it for respiration (1)			2	2		
	(c)			Point 2 (1) Least oxygen present (1)			2	2		
	(d)			Indicator (1)	1			1		
				Question 1 total	1	1	4	6	1	0

GCSE BIOLOGY Sample Assessment Materials 64

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		osmosis	1			1		
		(ii)	I	For 1.0M water passed into sugar solution (1) from high water conc to lower water conc/down gradient (1).		2		2		2
			II	For 0.2M water passed in and out of potato at same rate (1) because inside and out is same (1)		2		2		2
	(b)			Boiling destroys SPM (1) so osmosis does not take place/solution can pass through (1)	2			2		2
				Question 2 total	3	4	0	7	0	6

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		6		1		1	1	1
		(ii)		B at pH8		1		1	1	1
	(b)			Stomach (1) Pancreas (1) Small intestine (1)	3			3		
	(c)			Stomach (1) Digests most protein in acid pH (1)			2	2		
				Question 3 total	3	2	2	7	2	2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			<p>The diagram illustrates the lock-and-key model of enzyme action. It shows three stages: 1. An enzyme with a specific 'Active site (1)' and a 'Substrate (1)'. 2. The 'Enzyme substrate complex (1)' where the substrate is bound to the active site. 3. The 'Product (1)' being released from the enzyme.</p>	4			4		
	(b)			Build-up of protein from amino acids	1			1		
					Question 4 total	5	0	0	5	0

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)	2187/193 (1) 11: 1 (1)		2		2	2	
		(ii)	Triangle or blocks showing correct sequence of masses (1) correct labels (1) correct unit (1)	3			3		
	(b)		Any two (x 2) from: Increase in plants (1) As less 1 st stage consumers (1) Or Decrease in insect larvae (1) Being eaten by crayfish (1) Or Decrease in fish (1) Less food available (1) Or Decrease in otters (1) Less fish available (1)			4	4		
	(c)		Pesticide leached into lake/washed in by rain (1) Bioaccumulation/build up (1)	2			2		
	(d)	(i)	$2500 - 1750 = 600$ kJ (correct units)		1		1	1	
		(ii)	$150 / 2500 \times 100$ (1) 6% (1)		2		2	2	
		(iii)	X Excretion (1) Y Respiration (1)	2			2		
			Question 5 total	7	5	4	16	5	0

GCSE BIOLOGY Sample Assessment Materials 68

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)		Any 2 (x1) from: Electricity is more expensive (1) Hand watering is labour intensive (or description) (1) Recycled water is more economical (1)	2			2		
	(b)		Water is lost by the plants through transpiration	1			1		
	(c)	(i)	Potassium	1			1		
		(ii)	Phosphate	1			1		
	(d)		Fossil fuel produces carbon dioxide (1) used in photosynthesis (1)		2		2		
	(e)		Any 2 (x1) from: Pest control (1) Permanent lighting (1) GM crops (1) Selective breeding (1)	2			2		
			Question 6 total	7	2	0	9	0	0

Question		Marking details		Marks Available						
				AO1	AO2	AO3	Total	Maths	Prac	
7	(a)			Fewer sand eels to feed young (1) Fewer chicks reared (1)		2		2		
	(b)			<i>Near the Shetland Islands:</i> More chicks reared because more sand eels available and <i>Around the nearby islands:</i> Less chicks reared because number of sand eels would decrease			1	1		
	(c)			Limit catch/impose quotas/close season/restrict size of fish taken	1			1		
	(d)			Count numbers of breeding birds now (1) Ban sand eel fishing for a period of time (1- 2 years) (1) Count chicks successfully reared at end of ban (1)			3	3		3
				Question 7 total	1	2	4	7	0	3

GCSE BIOLOGY Sample Assessment Materials 70

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)			Statins	1			1		
	(b)			Cholesterol narrows the arteries by building up in them (1) This raises the blood pressure (1)		2		2		
	(c)			Contractions and relaxation of ventricle (1) Causes wave / pulse of blood passing through arteries/ cause muscles in walls of arteries to contract and relax (1)	2			2		
				Question 8 total	3	2	0	5	0	0

Question				Marking details	Marks Available						
					AO1	AO2	AO3	Total	Maths	Prac	
9	(a)			$\frac{4}{20} \times 100$ (1) 20 (1)		2		2	2		2
	(b)			ATP provides energy (1) for contraction (1)	2			2			
	(c)	(i)		$\frac{18-3}{3} = 5$		1		1			
		(ii)	I	Increase		1		1			
			II	Increase		1		1			
				Question 9 total	2	5	0	7	2		2

GCSE BIOLOGY Sample Assessment Materials 72

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
10	(a)	(i)		Glucose and galactose		1		1		1
		(ii)		Rate is reduced by poison (1) because active transport relies on respiration to release energy (1)			2	2		2
	(b)			Even when poison is added there is some absorption by all sugars (1) Diffusion does not require energy/respiration (1)		2		2		
				Question 10 total	0	3	2	5	0	3

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
11	<p>Indicative content: The concentration of nitrate decreases and the mass of plants increases because the plants absorb the nitrates to make protein and grow from March to June. More light, higher temperature, therefore more photosynthesis and plant growth from March to June. Drop of biomass in July because less nitrate available/most nitrate has been used. After October nitrate increases because plants die and decay. Bacteria convert protein into nitrate.</p> <p>5 – 6 marks Detailed description and explanation for all parts of graph correct. <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p>3 – 4 marks No mention of increase in photosynthesis from March to June no mention of protein being made from nitrates. Most of the other points should be mentioned. <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p>1-2 marks Some idea of changes related to months correct. <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p>0 marks <i>No attempt made or no response worthy of credit.</i></p>		6		6		
	Question 11 total	0	6	0	6	0	0