Rewarding Learning

General Certificate of Secondary Education
2024

Biology

Unit 1

Higher Tier

[GBL12]

FRIDAY 17 MAY, MORNING

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 Biology.

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; 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. 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 'own figure rule' so that candidates are not penalised more than once for a computational error.

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
Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, 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.

Intermediate performance: Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle 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 levels of response. The description for each level 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.

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

Band A (Excellent): 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): 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): 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.

				AVAILABLE MARKS
1	**(a)**	cornea; iris; optic nerve;	[3]	
	(b)	Any **four** from: cornea/lens bends or refracts light; focuses; on to retina/light-sensitive cells; create nerve/electric impulse; (nerve impulse) carried to brain/CNS via optic nerve;	[4]	7
2	**(a)**	as the number of seeds increases the mass (of barley) produced increases/ the mass of barley increases; as the number of seeds increases; up to 250 seeds planted (m^{-2})/mass of seeds produced 4.5 (kgm^{-2}); then falls/decreases **and** levels off/plateaus/remains constant/ remains stable; at 500 seeds planted (m^{-2}) 2.1 (kgm^{-2});	[4]	
	(b) **(i)**	more shading/less light/described; less photosynthesis;	[2]	
	(ii)	Any **two** from; water; space; minerals/nitrates/magnesium/calcium;	[2]	8
3	**(a)**	A – plasmid; B – cell wall;	[2]	
	(b)	Any **two similarities**: cytoplasm/cell membrane/genetic material; **Difference in bacterial cell**: no nucleus v nucleus OR plasmids v no plasmids OR cell wall v no cell wall; OR no mitochondria v mitochondria;	[3]	5
4	**(a)** **(i)**	Cytoplasm;	[1]	
	(ii)	$C_6H_{12}O_6$; $6CO_2$;	[2]	
	(b) **(i)**	1650 ÷ 150; 11;	[2]	
	(ii)	(movement) against concentration gradient/described; energy required;	[2]	
	(iii)	more/most mitochondria;	[1]	8

					AVAILABLE MARKS
5	**(a)**	**(i)**	deforestation;	[1]	
		(ii)	less trees; less photosynthesis; increase in the level of carbon dioxide **in the air (NB correct sequence)**;	[3]	
	(b)	**(i)**	15.2 – 13.3/1.9; **correct subtraction** 1.9 ÷ 40/0.0475; **correct division by 10** 0.05; **correct rounding**	[3]	
		(ii)	rise in sea levels/flooding; loss of habitat/described;	[2]	9
6	**(a)**	**(i)**	arrow pointing away from cell body;	[1]	
		(ii)	transmit nerve impulses from CNS to other parts of the body;	[1]	
		(iii)	branched ends/many nerve endings; make junctions with other neurones; myelin sheath; **speeds up** transmission of nerve impulses;	[4]	
	(b)		chemical/transmitter **diffuses** across synapse; to neurone B **referenced once only**; if it is in a high enough concentration in B; an **electrical impulse** is triggered in neurone B;	[4]	10
7	**(a)**	**(i)**	Rate = 4.6 AU min^{-1};	[1]	
		(ii)	23 AU ÷ 4.6; = 5 (min);	[2]	
	(b)		inhibitor (molecule) complimentary/fits/blocks/remains in active site; inhibitor is not broken down; fewer substrate molecules attach to enzyme/active sites; rate reduced;	[4]	7

8 **(a)** eutrophication; [1]

(b) **Indicative content:**

1. algae shading/blocks light;
2. algae uses up all the nitrates;
3. plants/algae die/cannot photosynthesise;
4. microorganisms/bacteria decompose/decay/break down dead plants;
5. microorganisms use up oxygen/aerobic respiration;
6. invertebrates/fish/aquatic animals die due to lack of oxygen;

Band	Response	Mark
A	Candidates **must use appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 5</u> of the points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high** standard.	[5]–[6]
B	Candidates use **some appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 3</u> of the points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory** standard.	[3]–[4]
C	Candidates make **little use of specialist terms** throughout to describe and explain their conclusions **using <u>at least 1</u> of the points**. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(c) Reduce risk of run off/described;
Fertiliser/mineral/(named) will be used by plants so less minerals enter the river; [2]

AVAILABLE MARKS

9

			AVAILABLE MARKS
9	**(a)**	low blood insulin level; 50×10^{-9} (mmol l^{-1}); had not eaten **therefore** blood glucose level is low; [3]	
	(b) **(i)**	6.0; 4.5; $6.0 - \frac{4.5}{1.5} \div 4.5 \times 100 = 33.3\%$; [3]	
	(ii)	an increase in blood glucose causes a rise in blood insulin level; brings about a decrease in blood glucose level; [2]	
	(c) **(i)**	in Type 1 not enough insulin produced/genetic cause; in Type 2 insulin stops working/caused by excess sugar in the diet/ obesity/lack of exercise; [2]	
	(ii)	Type 1 – insulin injections/pump; Type 2 – diet/exercise; [2]	12
		Total	**75**