



**General Certificate of Secondary Education
2019**

Biology

Unit 1

Higher Tier

[GBL12]

FRIDAY 24 MAY, AFTERNOON

**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
<p>1 (a) (i) $5 + 12 + 18 + 20$; = 55; [2]</p> <p>(ii) $20 \div 55 = 0.3636$; $0.3636 \times 100 = 36.4\%$; [2]</p> <p>(b) More/increased photosynthesis; photosynthesis requires/takes in carbon dioxide; (<i>'more' required only once</i>) [2]</p> <p>(c) Increased biodiversity/better biodiversity/positively affects biodiversity; increased habitat (example described)/more food for other organisms; [2]</p>	8
<p>2 (a) $29 \div 100$; = 0.29; [2]</p> <p>(b) Accurate plots [2]; single line drawn through the plotted points [1]; [3]</p> <p>(c) (Mass of) wheat crop increases as the mass of weeds decreases/inverse relationship; (<i>Wheat must be dependent variable</i>) [1]</p> <p>(d) Any two from: light; space/soil; water; minerals/named example/nitrates/N/P/K/Mg/Ca; carbon dioxide; (Reject: <i>temperature/nutrients/humus/manure/fertiliser</i>) [2]</p> <p>(e) Plot C/(clear of weeds for 10 weeks); mass of wheat is lower than the expected trend; [2]</p>	10
<p>3 (a) Bars accurately plotted; (if 3 plots wrong - Max [1]); bars same depth and symmetrical; bars labelled/correct use of key and correct sequence; [3]</p> <p>(b) Advantage Pyramid of biomass takes account of the size of organisms/the oak tree;</p> <p>Disadvantage Biomass measurements requires some of the organisms to be killed/difficult to measure/damages habitat; [2]</p>	5

4 (a) Cornea;	[1]	AVAILABLE MARKS
(b) Ciliary muscles contract; suspensory ligaments slack; lens becomes fatter/thicker/bulges;	[3]	
(c) (i) Retina;	[1]	
(ii) Impulses; along optic nerve;	[2]	7
5 (a) (i) Exothermic;	[1]	
(ii) Growth/movement;	[1]	
(b) ✓; X; [1] X; ✓; [1] X; ✓; [1]	[3]	5
6 (a) (i) Root hair cells;	[1]	
(ii) Large surface area/extension;	[1]	
(iii) Needed to make chlorophyll; (Reject: <i>chloroplast</i>)	[1]	
(b) (i) More magnesium ions in roots of plant B; 35 vs 128/93 more in plant B;	[2]	
(ii) Any four from: beaker B has more oxygen; for respiration/energy; for active transport; against concentration gradient; beaker A only absorption by diffusion;	[4]	9
7 (a) (i) Pancreas; liver;	[2]	
(ii) (Liver) absorbs more sugar/glucose from blood; glucose converted to glycogen; for storage; liver cells respire more glucose/faster rate of respiration; (<i>'more' required only once</i>)	[4]	
(b) Blood glucose (constantly) monitored; rise in blood glucose level brings about a fall/corrective mechanism returns blood glucose to normal;	[2]	8

- 8 (a) Provides nitrates; [1]
- (b) **More** rainfall Nov–Jan/rainfall in these months is above average; increased **runoff**; [2]
- (c) Nitrates in slurry stimulate aquatic plants and algal growth/bloom; aquatic plants and algae die due to nitrogen depletion/shading; aerobic microorganisms/bacteria decompose dead organisms; consume oxygen so aquatic vertebrates and invertebrates die; [4]

9 **Indicative content:**

Midnight to 05:00 hours

1. No light for photosynthesis, only respiration occurs;

At 07:00 hours

2. Rate of photosynthesis = rate of respiration/volume of CO₂ produced same as volume of CO₂ used;
3. Compensation point;

After 07:00 hours

4. Photosynthesis greater than respiration/CO₂ used greater than CO₂ produced;
5. Photosynthesis levels off explained/respiration increases, levels off explained;

Band	Response	Mark
A	Candidates must use appropriate, specialist terms throughout to describe and explain their conclusions using at least 5 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 at least 3 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 at least 1 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]

AVAILABLE
MARKS

7

6

10	(a) Protein; biological catalyst/Speeds up reaction;	[2]	AVAILABLE MARKS
	(b) As the temperature increases the mass of substrate broken down increases; more kinetic energy; more (molecular) collisions between substrate and enzyme;	[3]	
	(c) $90 \div 15$; = 6;	[2]	
	(d) (i) Inhibitor blocks active site so substrate can't fit;	[1]	
	(ii) Less inhibitor than enzyme; some active sites not blocked/some enzyme (active sites) can still combine with substrate;	[2]	10
	Total		75