



**General Certificate of Secondary Education
2022**

Biology

Unit 1

Higher Tier

[GBL12]

TUESDAY 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.

COVID-19 Context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

| | | | AVAILABLE MARKS | |
|---|--|---|-----------------|----|
| 1 | (a) | (i) Root hair cells; | [1] | 11 |
| | | (ii) Active transport/absorption; | [1] | |
| | | (iii) Extension/large surface area; | [1] | |
| | (b) | (i) 180 – 120; (60 ÷ 120) × 100; 50%; | [3] | |
| | | (ii) As amount of fertiliser added is increased, the yield increases; then levels off; | [2] | |
| | | (iii) Some minerals already in the soil; named mineral, e.g. nitrate; | [1] | |
| | | (iv) maximum yield of crop obtained with 80 kg; less cost; lead to eutrophication/leaching/algal bloom/run-off/wash away; | [2] | |
| 2 | (a) | (i) Saprophyte; | [1] | 7 |
| | | (ii) Secrete enzymes/release/extracellular enzymes; digestion/described; products absorbed; | [3] | |
| | (b) | (i) 30 °C and high water content; least mass of leaf remains/most decomposed; | [2] | |
| | | (ii) Enzymes denatured; | [1] | |
| | | (a) (Aerobic) respiration; reactions take place; controls activities of cell; controls what enters and leaves cell; | [4] | |
| (b) Only small molecules/substances can enter/selectively permeable; | [1] | 5 | | |
| 4 | (a) | (i) A – pupil; B – cornea; C – retina; | [3] | 9 |
| | | (ii) D – vitreous humour; maintains shape of eyeball; | [2] | |
| | | (b) (i) Accommodation; | [1] | |
| | (ii) Lens thinner; ciliary muscles relax; suspensory ligaments stretched/taut; | [3] | | |

| | | | AVAILABLE MARKS | |
|---|-----|--|-----------------|----|
| 5 | (a) | (i) Any two from: chemical <u>messenger</u> ; produced by a gland; carried in blood; affects a target organ; | [2] | 7 |
| | | (ii) Insulin; | [1] | |
| | (b) | (i) 4–7/3.5; | [1] | |
| | | (ii) Any two from: blood glucose concentration always higher; greater fluctuation/described; rises for longer/no return to normal; | [2] | |
| | | (iii) Eye damage/kidney failure/heart disease/stroke; | [1] | |
| 6 | (a) | (i) The temp which gives highest rate of reaction/temp at which enzyme works best; | [1] | 12 |
| | | (ii) 32–33 °C; (accept answers in this range) | [1] | |
| | (b) | (i) Rate = 25 mg per minute; 420 ÷ 25; 16.8 minutes; | [3] | |
| | | (ii) Any two from: B has higher optimum temperature; B works over a wider range of temperatures; B has a lower maximum rate; | [2] | |
| | (c) | Fatty acids; glycerol; amino acids; | [3] | |
| | (d) | 40 °C; both enzymes work well/22 arbitrary units; | [2] | |

7 Indicative content:

- 1 long/folded/villi/microvilli;
- 2 large surface area;
- 3 good blood supply;
- 4 maintain diffusion gradient;
- 5 thin/permeable membranes;
- 6 short diffusion pathway;
- 7 lacteal;
- 8 absorbs fats/fatty acids and glycerol;

**AVAILABLE
MARKS**

| 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]

6

- 8 (a)** More CO₂ given out/8 vs 0 arbitrary units;
no light/no photosynthesis;
only respiration occurring (producing carbon dioxide); [3]
- (b)** Midday;
the biggest difference between volume taken in and given out/most photosynthesis;
appropriate data: Volume dioxide taken in = 30.5 and given out = 11; [3]
- (c)** The rate of photosynthesis = the rate of respiration;
the volume of carbon dioxide taken in is equal to that given out;
this is known as the compensation point;
appropriate data, e.g. volumes of CO₂ 9/9.5 arbitrary units; [4]

10

| | | |
|--|-----|------------------------|
| 9 (a) Auxin; | [1] | AVAILABLE MARKS |
| (b) More hormone on left hand side of agar; diffuses from agar down left hand side of seedling; causes cell elongation; shaded side grows more; to get both marks for points 1 and 2, reference to agar block needs to be mentioned once and must interpret the evidence given | [4] | |
| (c) (i) Block 1 closer to tip; where hormone is produced; | [2] | |
| (ii) Seedling with agar block 2 did not bend as much as block 1; | [1] | |
| Total | | 8 |
| | | 75 |