



**General Certificate of Secondary Education
2023**

Biology

Unit 1

Higher Tier

[GBL12]

TUESDAY 16 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)	A – bronchiole; B – alveolus;	[2]	7
	(b)	Arrow going from alveolar air space into blood (plasma or rbc);	[1]	
	(c)	Any two pairs from: many alveoli/large surface area; faster diffusion/described; membrane thin/one cell thick; short <u>diffusion</u> distance; good blood supply; maintain <u>diffusion</u> gradient/described; layer of moisture; gases <u>dissolve</u> ;	[4]	
2	(a)	(i) number of organisms of the <u>same species</u> living in the <u>same area</u> / number of Sumatran tigers living on the island of Sumatra;	[1]	8
		(ii) subtraction 850 – 625 = 225; division (225 ÷ 850); x 100 = answer x 100 = 26.47/26.5;	[3]	
	(b)	(i) Any 2: decrease in area of forest; loss of habitat; (more) competition (for resources)	[2]	
		(ii) hunting/disease/migration;	[1]	
		(iii) conservation of tigers/ban hunting/reforestation/reduce deforestation;	[1]	
3	(a)	glycerol; fatty acid(s);	[2]	6
	(b)	Food C; highest/most carbohydrate content;	[2]	
	(c)	glycogen; starch;	[2]	
4	(a)	villi	[1]	5
	(b)	ileum	[1]	
	(c)	(i) (blood) capillary;	[1]	
		(ii) products of digestion continually transported away;	[1]	
	(d)	amino acids/glucose	[1]	
5	(a)	motor neurone	[1]	5
	(b)	(i) arrow drawn going down OR left to right;	[1]	
		(ii) circle drawn around synapse;	[1]	
		(iii) line to muscle (labelled E);	[1]	
	(c)	electrical	[1]	

			AVAILABLE MARKS	
6	(a)	$6\text{H}_2\text{O}; \text{C}_6\text{H}_{12}\text{O}_6; 6\text{O}_2$	[3]	8
	(b) (i)	5.4 - 5.6 arbitrary units; no further increase in rate of photosynthesis (with further increase in light intensity);	[2]	
	(ii)	Line drawn along existing line to 5 arbitrary units light intensity; curves and levels off higher than 35 rate of photosynthesis;	[2]	
	(iii)	Carbon dioxide concentration	[1]	
7	(a)	process X – nitrogen fixing; converts nitrogen gas in air into nitrates ; process Y – nitrification; convert ammonium (compounds) into nitrates/nitrogen compounds;	[4]	11
	(b)	Any three from: root hair cells; active transport/uptake; low concentration to high concentration/against concentration gradient; requires energy/energy from respiration	[3]	
	(c)	allow mix and match between waterlogged and well-drained soils only Waterlogged: Denitrification/denitrifying bacteria; less oxygen present/anaerobic; nitrates converted to nitrogen gas; less nitrates available for growth (of wheat); OR waterlogged: less N fixation/nitrification; anaerobic; less N_2 gas to nitrates/ NH_4 to nitrates; less nitrates for growth; Or waterlogged: anaerobic; less respiration/energy; less active uptake; less nitrates for growth; (Accept converse for well-drained soil)	[4]	
8	(a)	osmoregulation/homeostasis described; excretion;	[2]	12
	(b) (i)	400 + 450 + 250 + 50; 1150 cm^3 ; 1150 \div 2 = 575 correct data ([-1] for each error); [2] correct addition; [1] dividing by 2 to get the correct answer; [1]	[4]	
	(ii)	Anti-diuretic hormone/ADH;	[1]	
	(iii)	less water reabsorbed from urine; more urine produced; dilute/less concentrated urine;	[3]	
	(iv)	Any two from: lost as sweat; breathing; faeces;	[2]	

- 9 (a) emphasis on trends
 similarity:
 number of new cases decreases with age in both males and females;
- difference:
 more male cases than female cases/
 number of male cases decreases and then increases; [2]

- (b) (i) perfect match/don't have to find donor/less chance of rejection/infection; [1]

- (ii) Umbilical cord/embryonic; [1]

- (iii) Indicative content
 essential point 1: chemotherapy/described;
 essential point 2: radiotherapy/described;
 3 kills cancer cells;
 4 also kills healthy/normal white blood cells/kills other healthy cells;
 5 reduces immunity/more susceptible to infection;
 6 side effects, e.g. can divide to form tumours;

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]

- (iv) Divide;
 differentiate;
 into new white blood cells; [3]

Total

**AVAILABLE
 MARKS**

13

75