



**General Certificate of Secondary Education
2021**

**Single Award Science:
Biology**

Unit 1

Higher Tier

[GSA12]

MONDAY 22 NOVEMBER, 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 Single Award Science

Candidates must:

- AO1** Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;
- AO2** Apply knowledge, skills and understanding of scientific ideas, scientific enquiry, techniques and procedures; and
- AO3** Analyse information and ideas to interpret and evaluate; make judgements and draw conclusions; 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

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.

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.

1 Indicative content

- a condition in which the blood glucose control mechanism fails

Differences – Any two from:

- Type 1 treated using insulin/Type 2 controlled by diet/medication
- Type 1 usually occurs in early life/Type 2 is a progressive disease/ linked to lifestyle factors and obesity
- Type 1 pancreas stops producing insulin/Type 2 pancreas gradually produces less insulin

Symptoms – Any two from:

- High blood glucose/presence of glucose in the urine/lethargy/thirst

Long term effects – Any two from:

- Eye damage/kidney failure/heart disease/stroke

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to explain what diabetes is and how it can be treated using five, six or seven of the above points in a logical sequence. 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 explain what diabetes is and how it can be treated using three or four of the points in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates partially explain what diabetes is and how it can be treated using one or two of the above points and are not present in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

6

2 (a) (i) Asian hornet is bigger [1]

Asian hornet can travel faster [1]

[2]

(ii) Honeybees are a food source of Asian hornets

[1]

(b) Any **two** from:

spread rapidly when introduced into a region

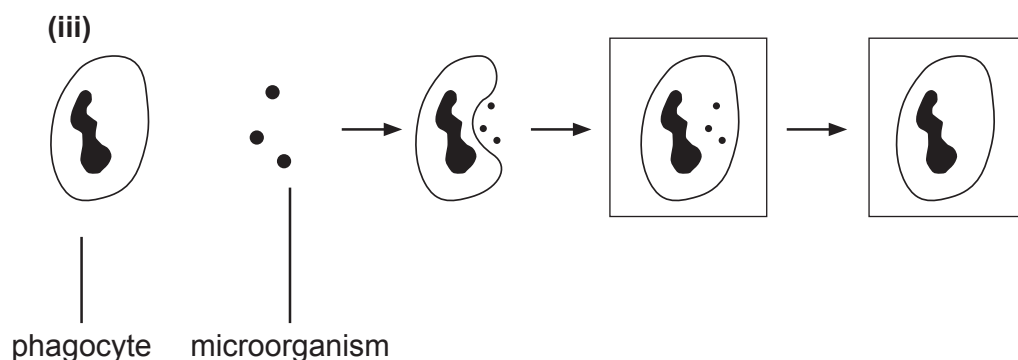
outcompete native species

they are almost always introduced to a country by humans

[2]

5

- 3 (a) (i)** Antibiotic B has a larger clear area around it than antibiotic A [1]
Antibiotic B has killed/destroyed more bacteria [1] [2]
- (ii)** Same volume/concentration of antibiotic used [1]
- (b)** There would be no clear area around either antibiotic/
no fungus would have been killed by either antibiotic [1]
antibiotics only kill bacteria not fungi [1] [2]
- (c) (i)** Antibodies attach on to the antigen on the microorganism [1]
Antibodies clump microorganisms together [1] [2]
- (ii)** Antibodies do not match/don't fit antigens on this microorganism [1]



- 4 (a) (i)** 7 points plotted correctly [2]
6 points plotted correctly [1]
straight line joining points [1] [3]
- (ii)** Difference: the number of males dying from MRSA from 2008–2012
is higher than females [1]
Similarity: numbers of deaths decrease for both/number of deaths
is the same in 2013 and 2014 [1] [2]
- (iii)** More people in a smaller area/more exposure to bacteria [1]
- (b)** Antibiotic resistant bacteria survive to reproduce [1]
to pass on their genes to the next generation [1] [2]

AVAILABLE
MARKS

10

8

			AVAILABLE MARKS
5	(a) (i)	250–200 = 50 [1] 50/250 × 100 = 20% [1]	[2]
	(ii)	Same student used each time	[1]
	(iii)	Needs to be repeated/only used one student	[1]
	(b)	Any two from: • produced by glands • that travel in the blood • to a target organ	[2]
6	(a) (i)	As the distance from the lamp increases the number of gas bubbles per minute decreases [1] and then levels off from 50 cm [1]	[2]
	(ii)	17 cm	[1]
	(iii)	To allow the apparatus to acclimatise to the distance from the lamp	[1]
	(iv)	Too many bubbles/bubbles produced too quickly	[1]
	(b) (i)	6CO ₂ [1] C ₆ H ₁₂ O ₆ [1] 6O ₂ [1]	[3]
	(ii)	Chlorophyll	[1]
7	(a)	A process which modifies [1] the genome of an organism [1]	[2]
	(b)	Any two from: • gene is removed from the human chromosome • the ring of DNA is removed from the bacterial cell and cut open • the gene is placed into the ring of DNA • the ring is placed back into the bacterial cell	[2]
	(c)	Advantage: large quantities/short period of time [1] disadvantage: unforeseen outcomes/moral issues [1]	[2]
			6

8 (a) (i) GG and Gg

[1]

(ii)

	G	g
g	Gg	gg
g	Gg	gg

Gametes [1]

Offspring correct [1]

[2]

(iii) Punnett square

[1]

(iv) Mutation

[1]

(b) (i) Homozygous – both alleles (genes) are the same
heterozygous – alleles (genes) are different

[1]

(ii) Dominant allele (gene) is expressed/characteristic shows
if heterozygous/overpowers recessive allele [1]
recessive allele is masked by dominant allele/characteristic
only shows if homozygous [1]

[2]

(c) (i) Genetic screening

[1]

(ii) Down's syndrome

[1]

Total

**AVAILABLE
MARKS**

10

60