



**General Certificate of Secondary Education
2019**

Single Award Science

Unit 4

Booklet B

Foundation Tier

[GSA42]

TUESDAY 28 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 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

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 levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is good.

Level 3: Quality of written communication is excellent.

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

Level 1 (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.

Level 2 (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.

Level 3 (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.

Section A

			AVAILABLE MARKS	
1	(a)	(i) Stage	[1]	7
		(ii) Appear ten times bigger	[1]	
		(iii) Close to [1] coarse and fine [1]	[2]	
	(b)	(i) To allow light to pass through/produce one layer of cells	[1]	
		(ii) X nucleus [1] Y cytoplasm [1]	[2]	
	2	(a)	(i) Lilac/purple [1] Benedict's (solution) [1]	
(ii) Benedict's reagent stays blue/does not turn brick red			[1]	
(b)		(i) Thermometer	[1]	
		(ii) 21 – 13 [1] 8 °C [1]	[2]	
(iii) The temperature increase for food B was less than food A		[1]		

- 3 (a) (i) Indicative content
- place the leaf in boiling water
 - to prevent further reactions
 - boil the leaf in ethanol
 - to remove the chlorophyll
 - dip the leaf in (boiling) water
 - to soften it/make less brittle
 - (spread the leaf on a white tile and) add iodine
 - colour changes to blue/black
 - safety precaution: use water bath/do not use a Bunsen burner

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe testing a leaf for starch using more than six of the points above, 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 to describe testing a leaf for starch using four to six of the points above, 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 describe testing a leaf for starch using one to three of the above points. However, these are not presented 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]

(ii) Correct shading [1]

(b) The more light a plant gets the more it will photosynthesise [1]

(c) (i) The maximum point of the graph is between 20 °C and 30 °C [1]

(ii) 22 °C, 24 °C, 26 °C and 28 °C [1]

10

Section A Total**24**

Section B

			AVAILABLE MARKS	
4	(a) (i)	Any two from:		
		<ul style="list-style-type: none"> • safety screen • small piece of metal • large amount of water • tongs • goggles 	[2]	
	(ii)	Same size of metal	[1]	
	(b) (i)	(As you go down Group 1) the metal took less time to disappear	[1]	
		Bigger atoms take less time	[1]	
	(c)	Hydrogen	[1]	6
5	(a) Z		[1]	
	(b) (i)	15 – 35 cm ³ /20 cm ³	[1]	
		C and D are the same	[1]	
	(iii)	End point/neutralisation is identified more accurately	[1]	
	(iv)	It is difficult to distinguish between different shades of green	[1]	
	(v)	pH probe/sensor/meter	[1]	
	(vi)	B A D C (any two in the correct order [1])	[2]	
	(c)	Limewater [1]		
		colourless to milky [1]	[2]	
	(d) (i)	All points plotted [2] (4 points plotted [1])		
		correct line [1]	[3]	
		(ii)	As the mass of sodium hydrogencarbonate increases so does the volume of acid needed to neutralise it	[1]
		(iii)	0 cm ³	[1]
(iv)		80 – 84 cm ³	[1]	
(v)	No, the points all follow the trend	[1]	17	
Section B Total			23	

Section C

			AVAILABLE MARKS	
6	(a) (i)	Stopwatch/stop clock	[1]	13
	(iii)	Same amount of heat/same length of rod/same thickness of rod/ same amount of wax	[1]	
	(ii)	Dependent	[1]	
	(b) (i)	To improve reliability	[1]	
	(ii)	14.9 + 14.1 + 14.5 = 43.5 [1] 43.5 ÷ 3 = 14.5 [1]	[2]	
	(iii)	20.1 s circled in table	[1]	
	(iv)	Anomalous result ignored/not used to calculate the average	[1]	
	(v)	A	[1]	
	(vi)	Bar graph	[1]	
	(c)	6.2 s	[1]	
	(d)	600 s	[1]	6
	(e)	The student could burn his hand	[1]	
7	(a) (i)	When student A makes the sound	[1]	
	(ii)	When student B hears the echo	[1]	
	(b)	1 s	[1]	
	(c)	They could not measure the time accurately	[1]	
	(d)	Shorter time	[1]	
	(e)	Speed = distance ÷ time	[1]	
8	(a)	Student Y because they are catching the ruler	[1]	4
	(b) (i)	X has faster reactions than Y [1] There is a difference of 0.05 s in reaction times [1]	[2]	
	(ii)	The test was only done for one boy and one girl	[1]	
Section C Total				23
Total				70