



Rewarding Learning

**General Certificate of Secondary Education
2023**

Physics

Practical Skills Assessment

Unit 3

Booklet A

Foundation Tier

[GPY31]

**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 Physics

Candidates must:

- AO1** Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;
- AO2** Apply knowledge 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 (QWC) 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 A: Quality of written communication is excellent.

Level B: Quality of written communication is good.

Level C: Quality of written communication is basic.

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

Level 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 and spelling, punctuation and grammar (SPG) are of a sufficiently high standard to make meaning clear.

Level 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 and spelling, punctuation and grammar (SPG) are sufficiently competent to make meaning clear.

Level 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 and spelling, punctuation and grammar (SPG) may be such that intended meaning is not clear.

Experiment 1 Motion down a ramp

AVAILABLE
MARKS

Procedure

- (a) (i) Column headings Time/s T1/s T2/s T3/s [1]
All 3 columns headed with units. Accept any indication of time and seconds, e.g. T/S, t(s), time (seconds)
 Three timings for height ramp of 1cm [1] [2]
- (ii) Three timings for height ramp of 2cm [1]
- (iii) Three timings for height ramps of 3cm, 4cm and 5 cm [1]
 If all timings in all steps are to 1 decimal place [1] [2]
 Check values to 1 d.p. **only once**

Typical values – Table 1

	Column 1	Column 2	Column 3
Ramp height/cm	T1/s	T2/s	T3/s
1	5.6	5.4	5.2
2	3.3	3.3	3.1
3	2.9	2.7	2.7
4	2.3	2.3	2.3
5	2.1	2.1	2.1

Analysis

- (b) (i) 5 average times calculated [1]
 All to 1 decimal place [1] [2]
- (ii) Equation average speed = 80/time or distance/time [1]
 Must be in form of equation, e.g. $s = \frac{d}{t}$
 5 average speeds calculated to 1 decimal place [1] [2]
 Check rounding correct to 1 d.p.

Typical values – Table 2

	Column 4	Column 5
Ramp height/cm	Average time/s	Average speed/ cm/s
1	5.4	14.8
2	3.2	25.0
3	2.7	29.6
4	2.3	34.8
5	2.1	38.1

Interpretation

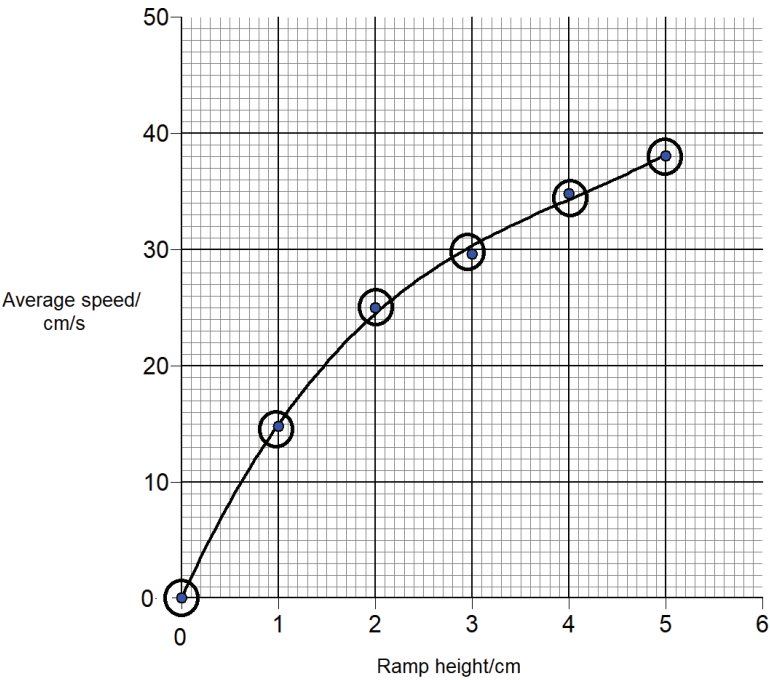
- (c) (i)

Scale to cover more than half the y-axis
Non linear scale = [0]
All 5 points correctly plotted
At least 3 points correctly plotted award 1 mark

[1]
[2] [3]
- (ii)

Best fit smooth curve through their plotted points
Joining points with short lines award [0]

[1]



- (iii) No

The graph is a curve or not a straight line (through the origin or 0,0)

[1]
[1] [2]

AVAILABLE
MARKS

15

Experiment 2 Voltage-Current (V – I) Graph

AVAILABLE
MARKS

Procedure

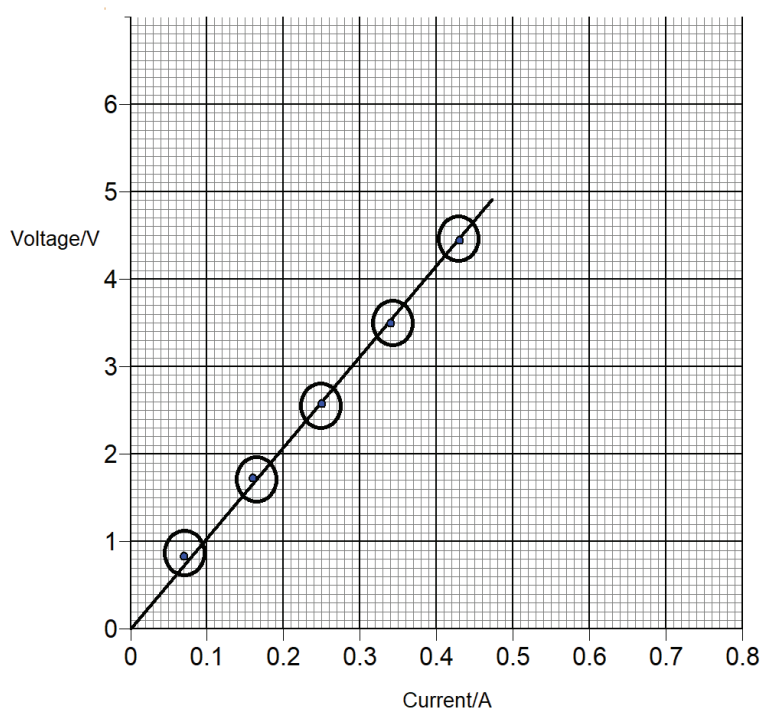
- (a) (i) Ammeter connected in series [1]
Check if candidate had help (see front cover of paper)
If help given award [0] i.e. tick box empty
- (ii) Columns 1 and 2 headed voltage/V or V/V
and current/A or I/A [1]
Not Volts/V. Accept any indication of quantity and unit for V and I
- (iii) 5 sets of voltage and current (1/2 each round up) [2]
All recorded to two decimal places [1] [3]

Typical values

Voltage/V	Current/A
0.84	0.07
1.73	0.16
2.58	0.25
3.50	0.34
4.45	0.43

Analysis

- (b) (i) Label on the y-axis voltage/V [1]
Label on the x-axis current/A **or** I/A [1]
Accept I/A
5 points correctly plotted ($\pm 2\text{mm}$) round down [2] [4]
- (ii) Best fit line through 0,0 [1]



Interpretation

- (c) (i) Yes circled
Graph is a straight line through origin
- (ii) Calculate the gradient/slope
- (iii) $K = \text{gradient} = \frac{4}{0.4} = 10$
Unit is ohm or Ω or V/A or volts per amp
- (iv) The coil/wire was allowed to heat up
or switch not opened between readings

[1]

[1]

[1]

[1] [2]

[1]

AVAILABLE
MARKS

15

Total

30