



Rewarding Learning

General Certificate of Secondary Education

Physics

Practical Skills Assessment

Unit 3

Booklet A

Foundation Tier

[GPY31]

Assessment

**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. Candidates can be awarded full marks for an answer if they have not shown a method. The advice to show clearly is to allow partial credit to be awarded.

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. If the starting point for a response is clearly incorrect Physics then award 0.

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.

Experiment 1 Stretching a Spring

Procedure: Completion of Table 1

Step 1

5 extensions recorded to 1 decimal place ($[\frac{1}{2}]$ each, round down) [2]
 Extensions increasing as Force increases [1]

Step 2

5 extensions recorded to 1 decimal place ($[\frac{1}{2}]$ each, round down) [2]
 Extensions increasing as Force increases [1]

In Steps 1 and 2: If not recorded to 1 decimal place deduct [1] once only

Typical values obtained at Steps 1 and 2

Table 1

Force/N	Extension 1/cm	Extension 2/cm
0	0.0	0.0
1	3.9	3.7
2	7.6	7.6
3	11.4	11.5
4	15.2	15.3
5	19.0	19.0

The extension values will depend on your spring. The values in the two columns should be similar.

Analysis of data: Completion of Table 2

Step 3

5 average extensions calculated correctly ($[\frac{1}{2}]$ each round up) [3]
 If 3 average extensions calculated correctly give [2]
 If 2 average extensions calculated correctly give [1]

At Step 3: If not recorded to 1 decimal place deduct [1]

Typical values obtained at Step 3

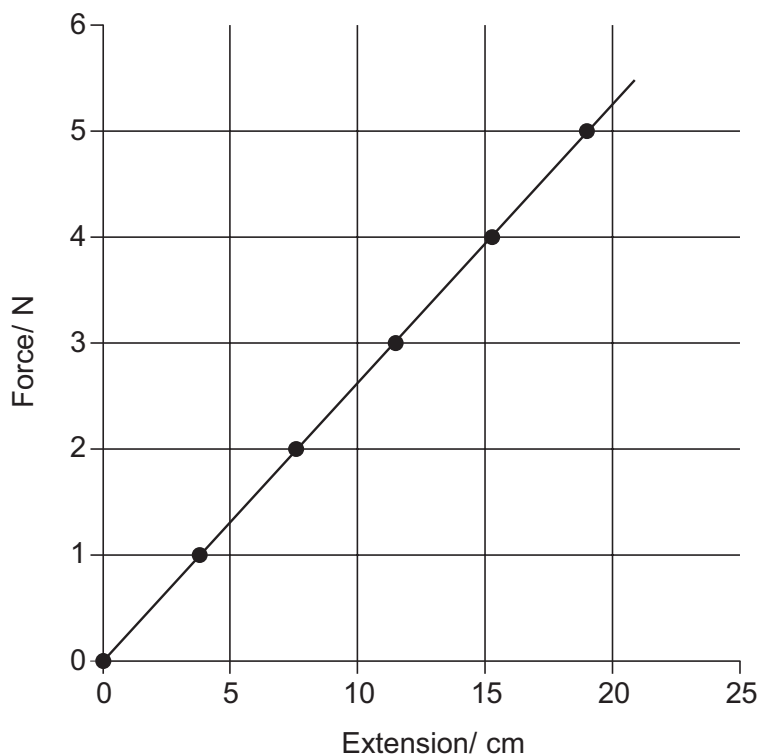
Table 2

Force/N	Average extension/cm
1	3.8
2	7.6
3	11.5
4	15.3
5	19.0

Interpretation of data

- | | | |
|---|--|------------------------------|
| 1 | Axes labelled Y axis – Force/N
X axis – extension/cm
Accept mm for the unit of extension if appropriate
Suitable scale (more than half of the grid used)
Four or more points correctly plotted (± 1 div)
Best fit line (using a ruler) | [1]
[1]
[1]
[1] [4] |
|---|--|------------------------------|

Typical graph



- | | | |
|---|---|----------------|
| 2 | Extension proportional to the force
Graph is a straight line passing through (0,0) | [1]
[1] [2] |
|---|---|----------------|

Award marks if the explanation is consistent with the shape of their graph

For example not proportional since it is a curve

15

Experiment 2 Refraction of Light

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Step 1

No marks are awarded for this step

Step 2

Angle of refraction for angle of incidence of 10°
recorded in the table between 5° to 8°

Outside this range [1] e.g. by 2°

If 0° [0]

[2]

Step 3

Four sets of values of angle of incidence and angle of refraction recorded
within the range of typical values in the table below.

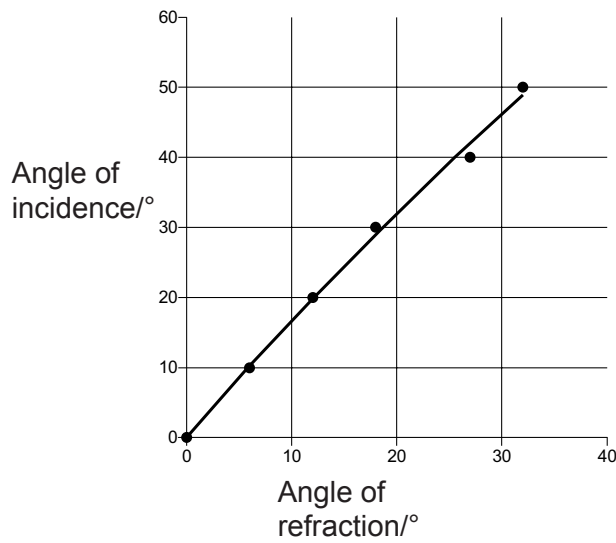
Table 3

Angle of incidence	Angle of refraction
10°	5° to 8°
20°	10° to 14°
30°	16° to 20°
40°	25° to 29°
50°	30° to 34°

[4]

Analysis of data

1 Typical graph



Labels with units on both axes. The unit can be in words or symbol [2]
 6/5 points with ± 1 div [2]
 4/3 points give [1]

[4]

2 Best line

Consistent with their points
 Joining with short lines give [0]

[1]

Interpretation of data

3 Values in the table (typical values below)

24° gives 13° to 17°
 48° gives 29° to 33°
 If values stated are outside the above range
 check the candidate's graph

[2]

4 The angle of refraction increases as the angle of incidence increases

Consistent with their graph or table of results

[2]

15

Total

30

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