



Rewarding Learning

General Certificate of Secondary Education
2024

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit 7 Practical Skills
Booklet B
Higher Tier



[GDW78]

GDW78

TUESDAY 18 JUNE, MORNING

TIME

30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 35.

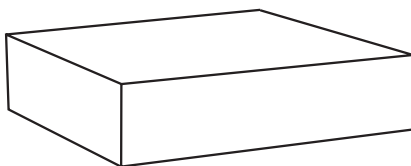
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **1(i)**.



- 1 (i) A student is given a rectangular box.

She wants to find the pressure exerted by the box on the floor.
She has measured the length of the box.



Source: Principal Examiner

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

State the names of two other measurements that are needed to calculate the pressure.

1. _____

2. _____

State the names of the two measuring instruments that are needed.

1. _____

2. _____

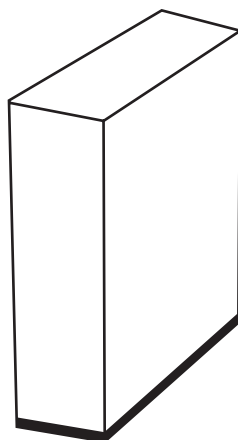
State fully, in words, the equation used to calculate pressure.

State a unit for pressure.

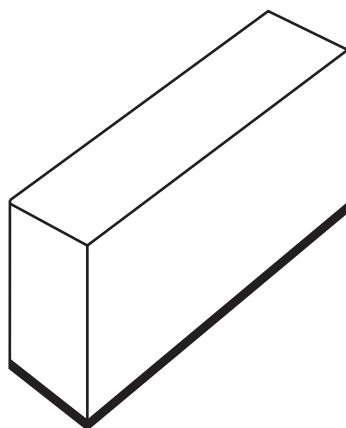
_____ [6]



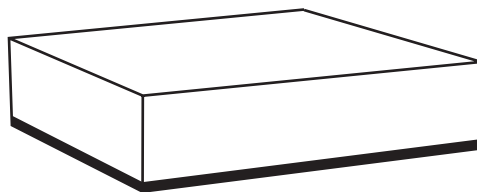
(ii) The student calculates the pressure exerted by the box in each of the positions shown below.



on floor
A



on floor
B



on floor
C

Source: Principal Examiner

In which position, **A**, **B** or **C**, will the box exert the **greatest** pressure on the floor?

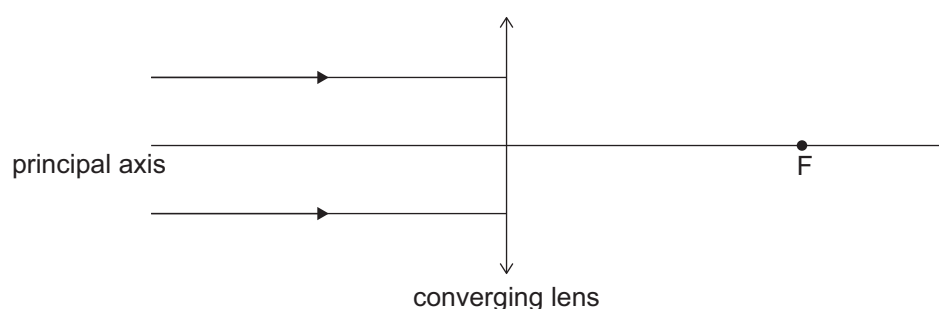
Explain your answer.

[2]



2 This question is about converging lenses.

- (a) Complete the diagram below to show the paths of the 2 rays of light after they pass through the lens.



Complete the sentence below to define the focal length of a converging lens.

The focal length is the _____ between the principal
_____ and the optical _____ of the lens.

[5]

- (b) A student wants to measure the focal length of a converging lens using a distant object.

The student is provided with a distant object, a converging lens, a lens holder and a metre rule.

State the name of the additional piece of apparatus needed.

During the experiment to find the focal length of the lens, the student observes the focused image to be real and smaller than the object.

State one other property of the image.

_____ [2]



(c) The student takes several measurements of the focal length as shown.

Focal length / mm	297	40	302	301
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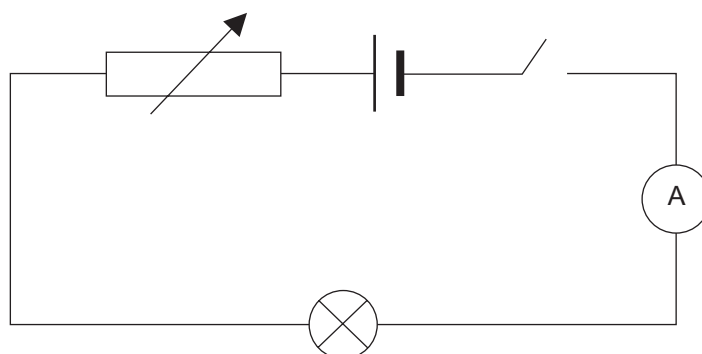
Examine the results carefully and calculate the most reliable value for the focal length.

You are advised to show your working out.

Most reliable value for the focal length = _____ mm [2]



- 3 A student carries out an experiment to find the resistance of a filament lamp. The circuit diagram is shown below.



- (a) On the diagram, add the symbol for the voltmeter so that the resistance of the filament lamp can be found. [1]

- (b) The results of the experiment are shown in the table below.

Voltage / V	Current / A
0.00	0.00
0.07	0.15
0.15	0.25
0.24	0.35
0.32	0.40
0.44	0.45

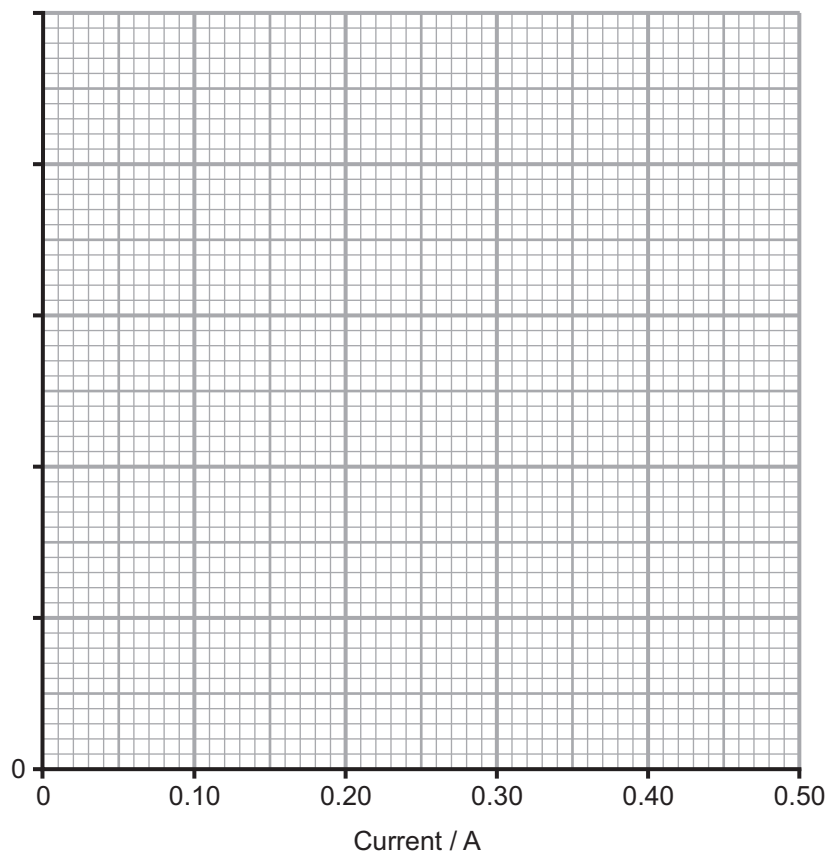
- (i) You are asked to plot a graph of voltage against current on the grid opposite.

Choose a scale for the vertical axis and label it.

Plot the points.

Draw a smooth curve of best fit. [5]





- (ii) Use your graph to calculate the resistance of the filament lamp when the current is 0.30 A.

You are advised to show your working out.

Resistance at 0.30 A = _____ Ω [2]

- (iii) State what happens to the resistance of the filament lamp as the current increases.

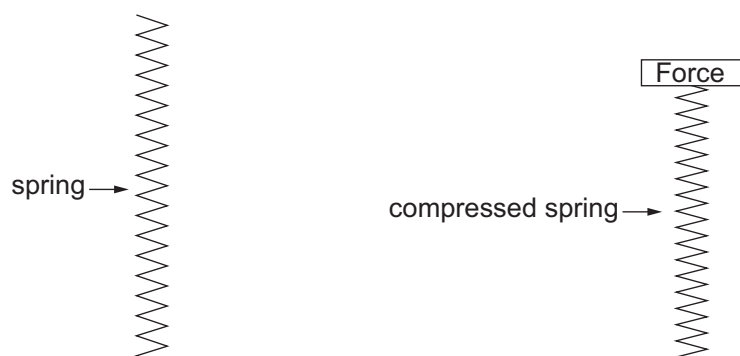
_____ [1]

[Turn over



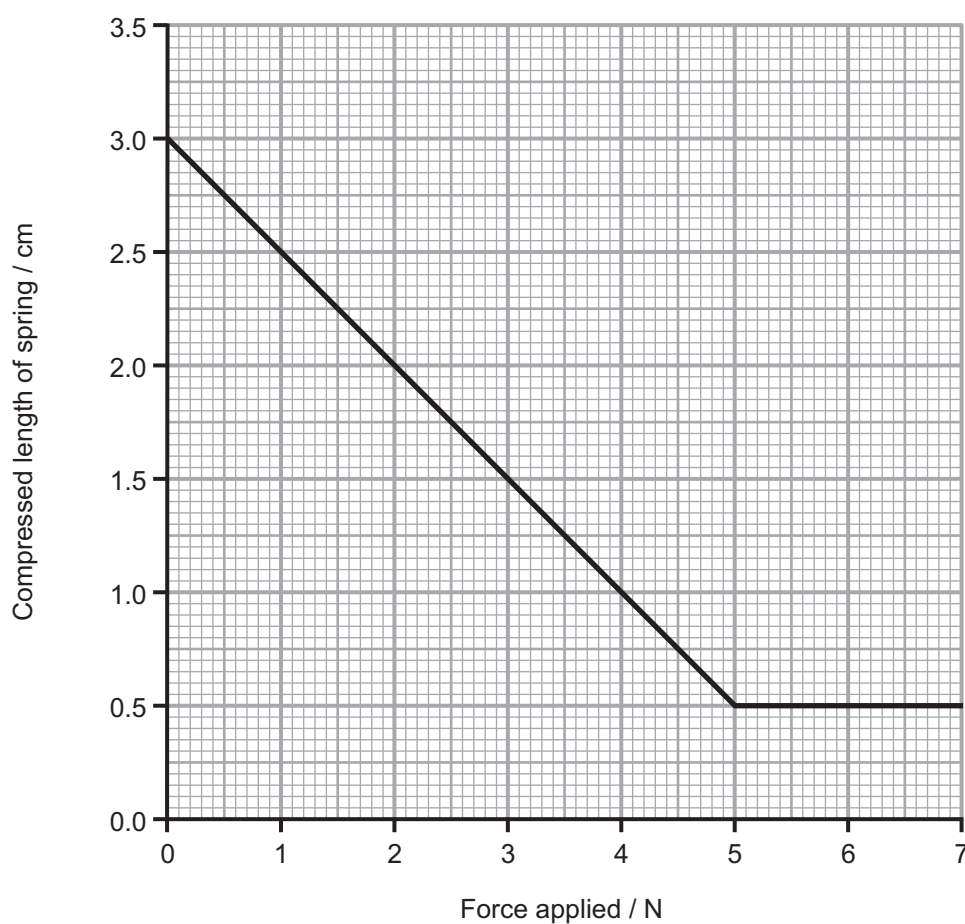
- 4 A student carries out an experiment to investigate whether Hooke's law is obeyed when a spring is compressed.

When a force is applied to the top of the spring, it is compressed, as shown in the diagram.



The length of the spring is measured as the force applied is increased.

A graph showing the compressed length of the spring and the force applied is shown below.



- (a) State the names of the independent and dependent variables.

Independent: _____

Dependent: _____ [2]

- (b) When the force applied increases to a certain value, it is not possible to compress the spring any further.

Use the graph to determine the **minimum** value of this force.

Force = _____ N [1]

- (c) The compression of the spring is found by subtracting the compressed length from the original length.

Use the graph to find the compression of the spring when a 4.0 N force is applied.

You are advised to show your working out.

Compression = _____ cm [2]

[Turn over



- (d) On a different occasion, a force of 6 N extends a spring of length 12 cm to a new length of 15 cm.

Calculate the value of the spring constant, k .

Include the unit in your answer.

Do not change any units.

You are advised to show your working out.

Spring constant, $k =$ _____

Unit = _____ [4]

THIS IS THE END OF THE QUESTION PAPER





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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	

Total Marks	
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Examiner Number

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