

Surname	Centre Number	Candidate Number
Other Names		2



GCE A LEVEL

1420U50-1A



S19-1420U50-1A

PHYSICS – A2 unit 5 Practical Examination

Experimental Task TEST 1

TUESDAY, 26 MARCH 2019

1 hour 30 minutes

For Teacher's use only	
Award a mark of 0 or 1 for each of the following	
Extension and vertical oscillation measured – (b)(i)	
Risk assessment – (b)(ii)	
For Examiner's use only	
Mark awarded	
Total	

ADDITIONAL MATERIALS

In addition to this examination paper you will require a calculator and a **Data Booklet**.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Pencil may be used to draw tables and graphs.
Write your name, centre number and candidate number in the spaces at the top of this page.
Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The total number of marks available for this task is 25.
Your teacher will directly assess your practical skills in part (b).
The number of marks is given in brackets at the end of each question or part question.
You are reminded of the necessity for orderly presentation in your answers.

Answer all questions.

You are going to investigate how the static extension, z , of a spring affects its period, T . The static extension is the distance a spring extends without oscillating when a weight has been added.

- (a) The relationship between the period of oscillation, T , and the static extension, z , can be expressed as:

$$T = kz^n$$

where k and n are unknown constants.

By taking logs, rearrange the above equation into the form $y = mx + c$ and state which graph should be plotted to determine n and k . [2]

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- (b) (i) You are provided with the following equipment.

100 g hanger and 4×100 g masses
 2 linked springs
 split cork
 2 retort stands with clamps and bosses
 G-clamp
 metre ruler
 stopwatch

Write out a plan of how you will carry out an investigation into the relationship $T = kz^n$. Include a labelled diagram in the space below. [5]

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(ii) Provide a risk assessment for your investigation. [1]

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- (c) Using the apparatus, take sufficient readings to obtain values for n and k . Draw a table to show your results. State the resolutions of all instruments used. **Ensure that all measurements of length are taken in centimetres.** [5]

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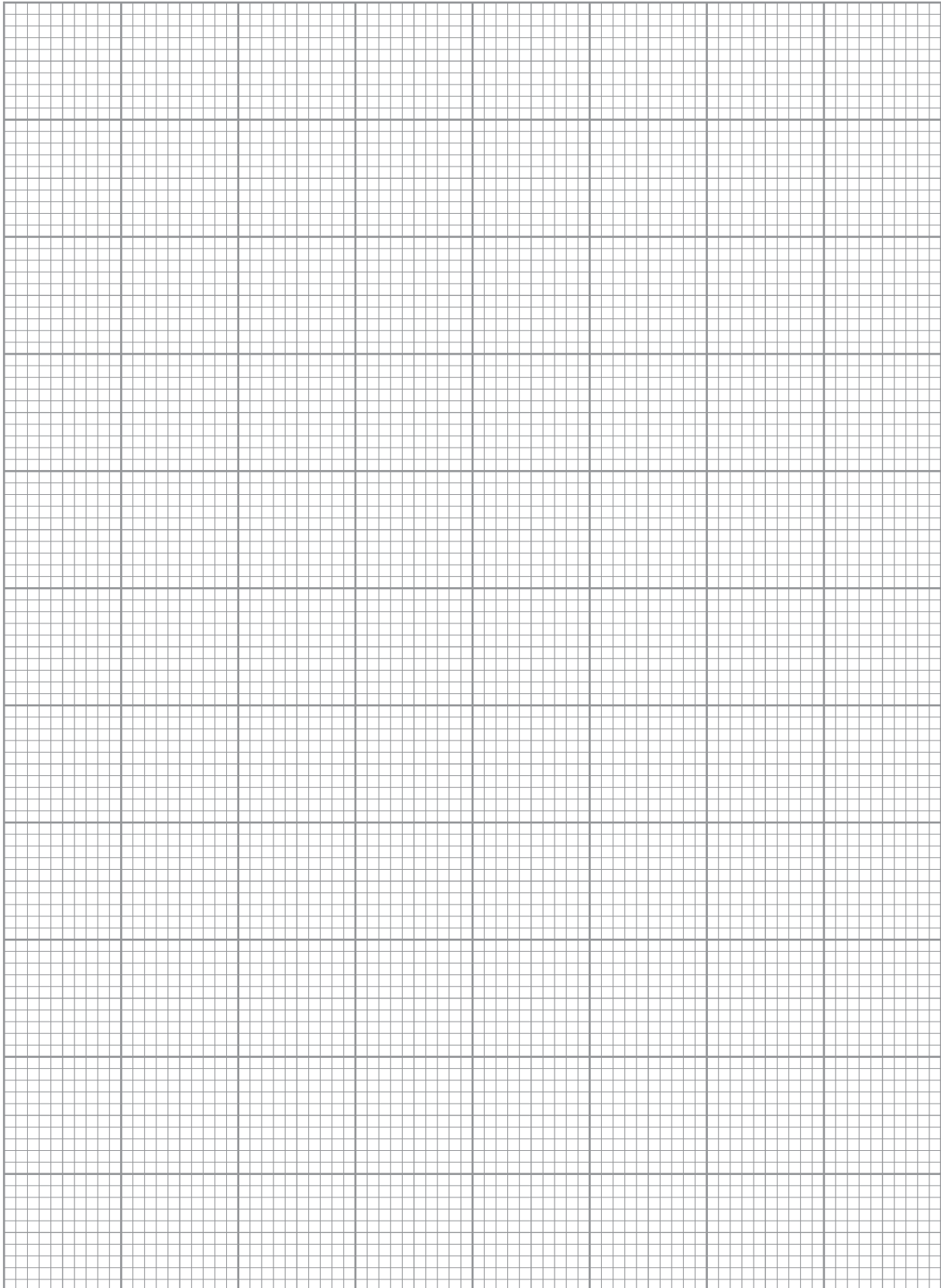
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(d) Plot your data on a suitable graph to determine values for n and k . **Error bars are not required on the graph.** [4]

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- (e) Use your graph to determine values for n and k . You are not required to calculate any uncertainties. [4]

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- (f) (i) Theory states that the period, T , of the spring system is related to its static extension, z , by the equation:

$$T = 2\pi\sqrt{\frac{z}{g}}$$

where g = the acceleration due to gravity

Explain whether your values for n and k in part (e) are consistent with the above equation. [3]

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- (ii) State **one** way in which you could improve the investigation in order to reduce the uncertainty in your results. [1]

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