

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
TOTAL	



General Certificate of Education  
Advanced Level Examination  
June 2014

## Physics (Specifications A and B)

## PHA6/B6/XPM2

Unit 6 Investigative and Practical Skills in A2 Physics  
Route X Externally Marked Practical Assignment (EMPA)

### Section A Task 2

**For this paper you must have:**

- a calculator
- a pencil
- a ruler.

### Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Show all your working.
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for Section A Task 2 is 16.

**Section A Task 2**

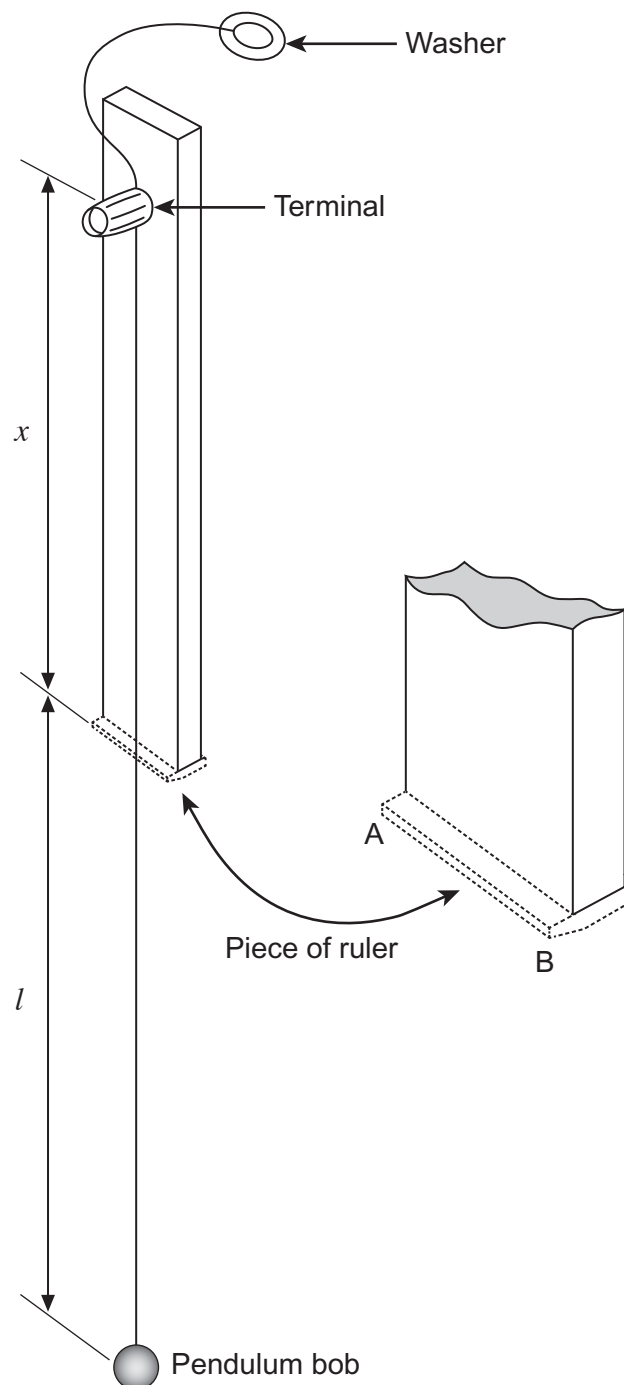
Follow the instructions given below.

Give the information required in the spaces provided.

No description of the experiment is required.

- 1 In this experiment you are required to measure the time period of a pendulum with an interrupted swing.  
You are provided with the apparatus shown in **Figure 5**, including a fiducial mark.

**Figure 5**



- 1 (a)** Measure and record  $x$ , the length of thread between the terminal and the piece of ruler. **[1 mark]**

$x = \dots\dots\dots$

- 1 (b)** Holding the washer in one hand, unscrew the terminal. Adjust  $l$ , the length of the thread between the piece of the ruler and the centre of the pendulum bob, until  $l$  is about 0.55 m.

Secure the thread in this position by tightening the terminal.

Make further adjustments to ensure that when the pendulum is at rest the string is vertical along its entire length and just touches the edge AB of the ruler.

Measure and record  $l$ .

Displace and release the pendulum so that it performs small-amplitude oscillations in a plane perpendicular to AB.

Make suitable measurements to determine the period,  $T$ , of these oscillations.

Repeat this procedure to find  $T$  for **four smaller** values of  $l$ .

Record all your observations on page 4.

Note that the independent variable should be recorded in the **left-hand** column of your table.

**Question 1 continues on the next page**

## Measurements

**[4 marks]**

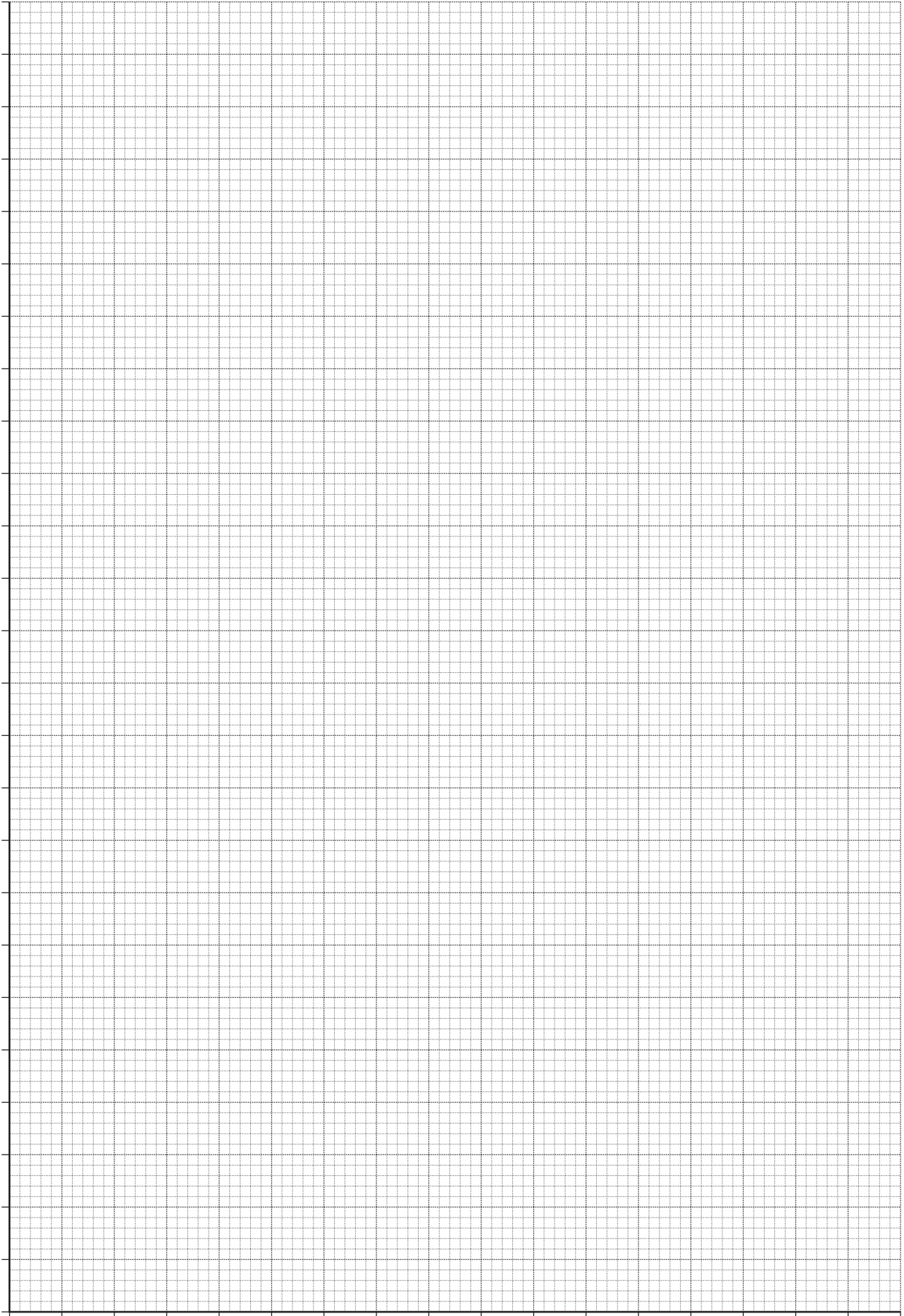
- 1 (c)** Plot, on the grid opposite, a graph with  $(\sqrt{l+x} - \sqrt{l})$  on the vertical axis and  $\frac{1}{T}$  on the horizontal axis.  
Tabulate below, the data you will plot on your graph (**Figure 6**).

**[11 marks]**

16
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**END OF QUESTIONS**

**Figure 6**



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