Name of the Student:_____

Max. **Marks : 20 Marks**   **Time : 20 Minutes**

Q1.

The student then found a value of μ for a brass wire, using a different method.

(i) He measured the diameter d of the wire using a micrometer.

Explain one technique the student should use when measuring d.

(2)

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(ii) The student obtained the following data.

d/mm			
0.55	0.59	0.57	0.58

The stated value of μ for the brass wire used by the student was 2.14×10^{-3} kg m^{-1}.

Deduce whether the student's data supports this value for μ.

density of brass = 8700 kg m^{-3} ± 200 kg m^{-3}

(6)

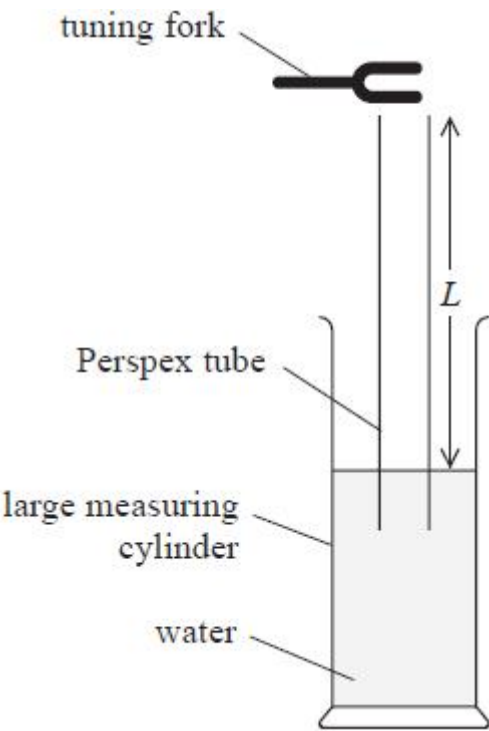...
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(Total for question = 8 marks)

Q2.

The speed of sound in air can be determined by creating a standing wave in a column of air. The diagram shows a tuning fork just above the open end of a tube.

The tuning fork produces a sound wave of known frequency f. Several tuning forks are available, each with a different frequency.

A student adjusted the length L of the air column. A loud sound was heard when a standing wave was produced. A node was formed at the water surface, and an antinode was formed at the open end of the tube.

The student used values of L and f to determine a value for the speed of sound.

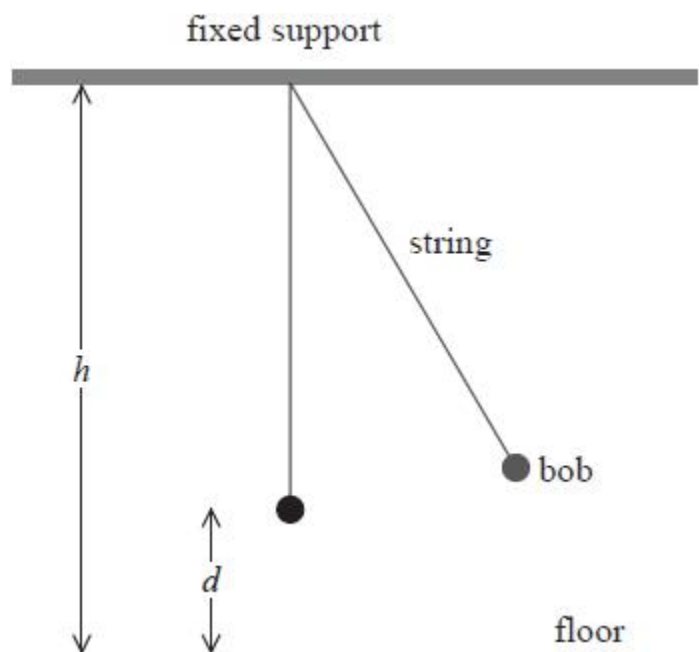Describe a graphical method that the student could have used to determine a value for the speed of sound.

(3)

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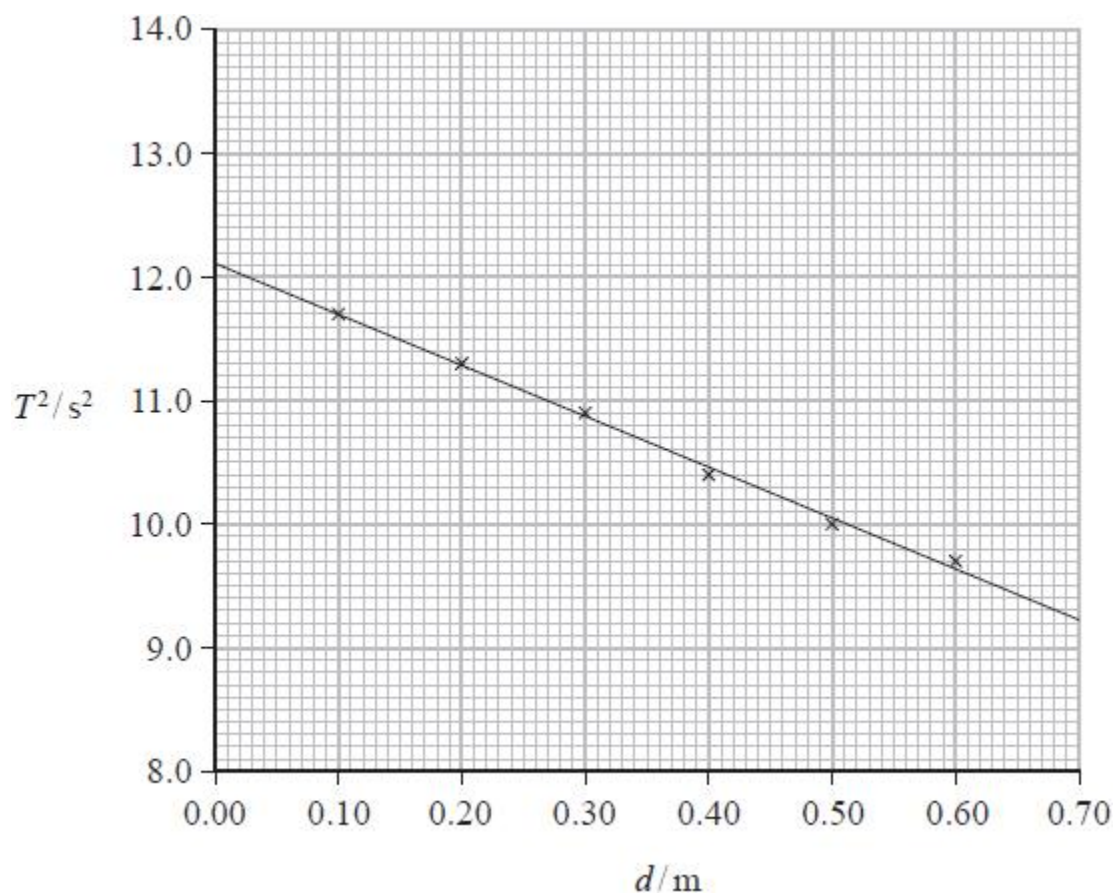
(Total for question = 3 marks)

Q3.

A student carried out an experiment with a pendulum hung from a fixed support. The fixed support was a distance h above floor level as shown.

As the student was unable to measure the length of the pendulum directly, she measured the distance d from the bob to the floor.

The student used her data to plot a graph of T^2 against d as shown below.

Determine a value for the acceleration due to gravity g.
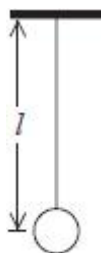
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g = ...

(Total for question = 5 marks)

Q4.

A student is using a simple pendulum to determine a value for the acceleration of free fall *g*.

She measures the length *l* of the pendulum four times with a metre rule and records the following values.

		l / cm		
l_1	l_2	l_3	l_4
85.5	86.0	87.5	85.5

She calculates the mean length l_m of the pendulum using the following method:

$$l_m = \frac{85.5 + 86.0 + 87.5 + 85.5}{4} = 86.1 \text{ cm}$$

(i) Calculate a more accurate value for l_m.

(2)

....

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....

l_m = ...

(ii) Determine the time period of the oscillations of this pendulum, using your calculated value for l_m.

....

....

....

Time period of oscillations = ...

(Total for question = 4 marks)