

Physics

PHY3T/P13/task

Unit 3 Investigative and Practical Skills in AS Physics
ISA (P) Investigation of three forces in equilibrium

Stage 1: Task Sheet

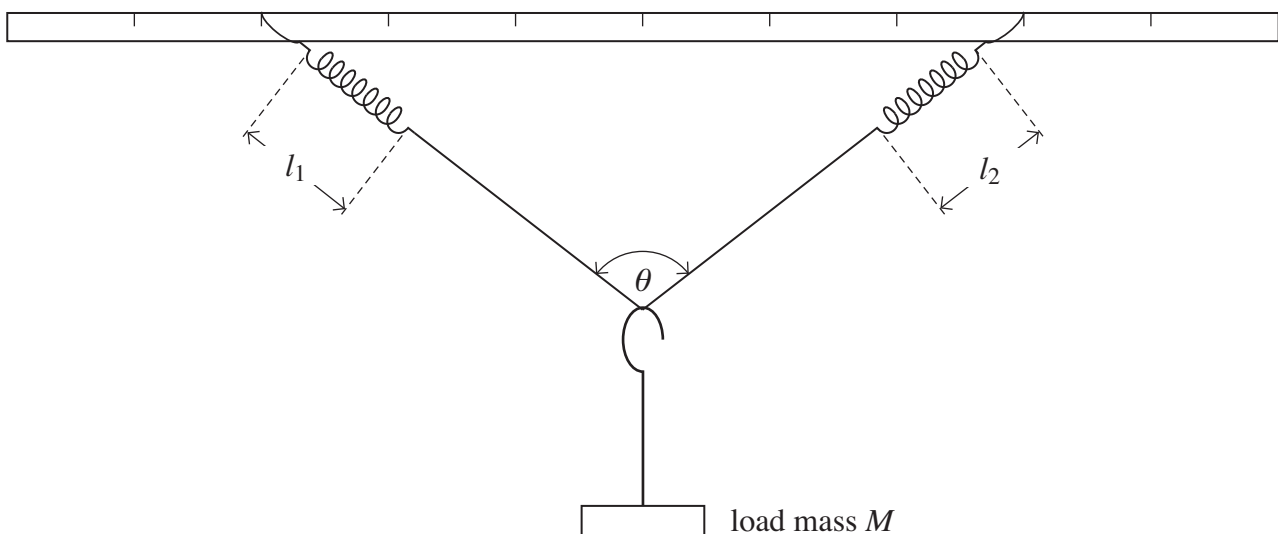
This task is worth 8 marks

You are advised to read through these instructions before beginning your work.

You are going to investigate how the angle between two strings varies as the load they are supporting is increased.

The apparatus has been assembled for you as shown in **Figure 1**, with $M = 100\text{ g}$.

Figure 1



- For each load of mass M you will be making two measurements of l_1 and l_2 , the lengths of the springs including the end loops, and two measurements of angle θ as shown in **Figure 1**. You will need a table with ten data columns to record your measurements, including three columns for derived data.

Ensure that the mass hanger is positioned at the mark on the string before making each measurement.

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- Measure l_1 , l_2 and angle θ and record these data in your table for $M = 100$ g.
 - Add 100 g to the mass hanger ($M = 200$ g) and then measure and record l_1 , l_2 and θ .
 - Repeat the previous step up to and including $M = 600$ g.
 - Remove the load from the string and remove the slotted masses. Place the mass hanger on the string at its original position.
 - Repeat the whole experiment increasing M from 100 g to 600 g as before.
 - For each value of M calculate L , the mean of your l_1 and l_2 values and θ_m , the mean value of θ . Record these data in your table.
 - For each value of M , calculate $\frac{M}{\cos(\frac{\theta_m}{2})}$. Record these data in your table.
 - Plot a graph of L on the y-axis against $\frac{M}{\cos(\frac{\theta_m}{2})}$, **starting the scale on both axes at zero.**
 - Draw the best fit straight line.
 - Extrapolate the best fit line back to the L axis.

After the Investigation

At the end of the investigation, hand in all your written work, including the graph of L against $\frac{M}{\cos(\frac{\theta_m}{2})}$, to the supervisor.

This documentation will be required for Stage 2 of the ISA.

Ensure that you have entered your centre details, candidate number and name on all the sheets you have completed.