

## Physics

## PHY3T/P15/task

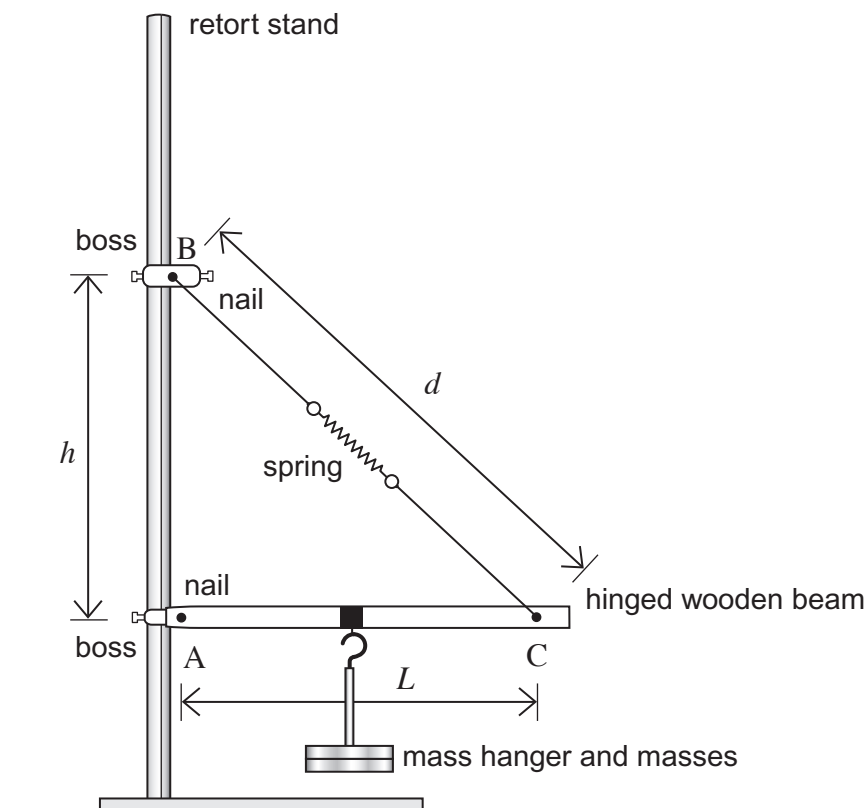
Unit 3 Investigative and Practical Skills in AS Physics  
ISA (P) Investigation of forces in equilibrium  
Task Sheet

This task is worth 7 marks

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

You are going to investigate the equilibrium of forces acting on a wooden beam as shown in Figure 1.

Figure 1



Turn over ►

There should not be any masses or mass hanger on the wooden beam at the start of your experiment.

- Measure  $L$ , the distance between point A where the beam pivots on the nail, and point C.
- Suspend the 100 g mass hanger from the string loop on the wooden beam.
- Carefully move the boss at B up or down the retort stand until the wooden beam is approximately horizontal.
- Devise a suitable method to check whether or not the wooden beam is horizontal. Make minor adjustments to the boss at B until the wooden beam is perfectly horizontal.
- Measure and record height  $h$  from the nail at point A to the nail in the boss at B as shown in **Figure 1**.
- Measure and record  $d$ , the distance BC in **Figure 1**.
- Record  $m$ , the value of the total mass of the hanger and any slotted masses.
- Add a 100 g mass to the mass hanger and repeat the procedure to make the wooden beam horizontal. Measure and record the new values of  $m$ ,  $h$  and  $d$ .
- Repeat for five further values of  $m$ .
- Take repeat readings of  $h$  and  $d$  for all values of  $m$ .
- Evaluate

$$\left(1 - \frac{L}{d}\right)h$$

for each value of  $h$  and record the values in your table.

Your table should also include sufficient columns for all repeat readings and mean values.

- Plot a graph of

$$\left(1 - \frac{L}{d}\right)h$$

on the y axis against  $m$  and draw a best fit straight line.

### After the investigation

At the end of the investigation, hand in all your written work, including the graph, 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.