General Certificate of Education
Advanced Subsidiary Examination
June 2015

Physics PHY3T/P15/task

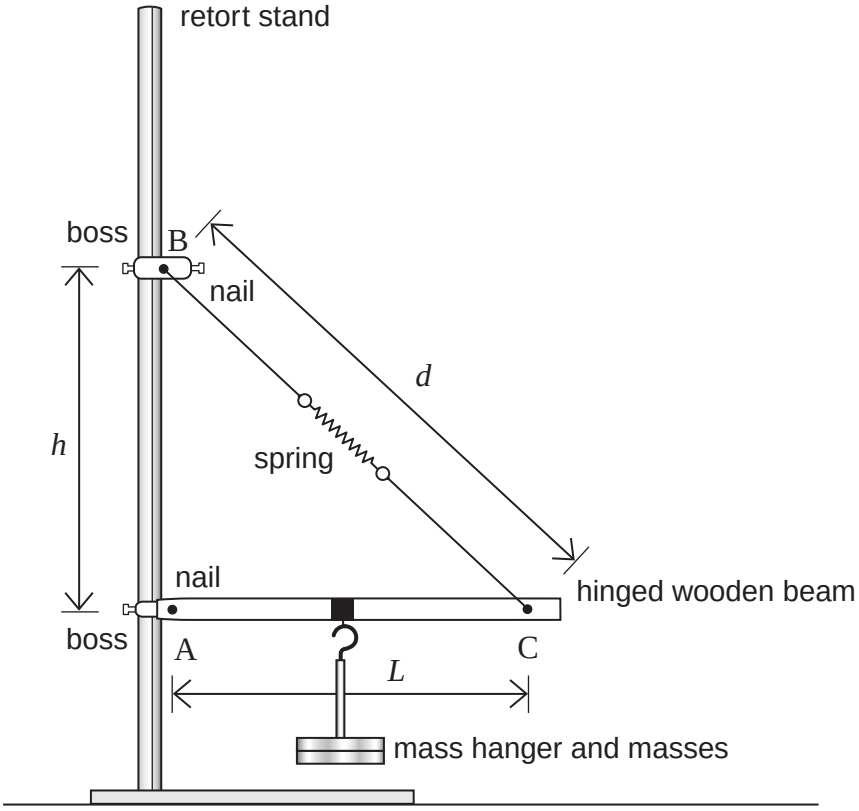
Unit 3 Investigative and Practical Skills in AS Physics
ISA (P) Investigation of forces in equilibrium
Task Sheet

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



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.