



## Physics

## PHY6T/Q12/task

### Unit 6 Investigative and Practical Skills in A2 Physics ISA (Q) Oscillations of water in a U-tube

#### Stage 1: Task Sheet

This task is worth 7 marks

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

**You are going to investigate the damped oscillation of water in a U-tube.**

- Measure the internal diameter of the open ends of the U-tube, using the vernier callipers, and record your results.
- Measure 50 cm<sup>3</sup> of water using the measuring cylinder, and transfer it to the U-tube using the funnel.
- Connect the syringe to one side of the U-tube. Press the syringe plunger **gently** to displace the water and then seal the other end of the U-tube with your finger. Disconnect the syringe. When you remove your finger the water will oscillate.
- Measure as accurately as possible the time period,  $T$ , of the water oscillations in the tube.
- Repeat the experiment with increasing volumes of water to give readings for at least five different values of volume. *Remember each time to leave sufficient length of tube empty to allow space for the oscillations.*
- The formula for the volume of a cylinder is  $V = \pi r^2 l$ . Calculate the total length,  $l$ , of the water in the tube for each volume. You may assume that the internal diameter of the flexible tubing in the middle of the U-tube is the same as that for the glass tubing sides.
- Record all your results appropriately.
- Plot a graph of  $T^2$  against  $l$  (length on the horizontal axis).
- Draw the best fit straight line through your points.

#### After the Investigation

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