



## Physics

## PHY6T/P12/task

### Unit 6 Investigative and Practical Skills in A2 Physics ISA (P) Cooling Experiments

#### 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 heat exchange between cold metal and hot water and to plot a cooling curve for hot water.**

- Record the precision of your thermometer and that of the measuring cylinder.
- Measure and record room temperature,  $\theta_s$ .
- Pour  $60 \text{ cm}^3$  of cold water into each cup and mark the water level on the inside of both.
- Empty both cups.
- Use the ruler to measure the diameter,  $d$ , of a 2p coin.
- Use the ruler to measure the height,  $h$ , of a pile of ten 2p coins.
- Place the ten coins into one of the cups. This is cup B: the other cup is cup A.
- Collect a beaker of freshly boiled water and pour the water into both cups just up to the water levels you marked earlier.
- Place a thermometer into each cup, stir both gently and record  $\theta_A$  and  $\theta_B$ .  $\theta_A$  is the maximum temperature reading for the water in cup A and  $\theta_B$  is the temperature of the water in cup B measured **at the same time** as  $\theta_A$ .
- Empty both cups.
- *You are now going to plot a cooling curve for the water in cup A.*
- Collect another beaker of freshly boiled water and pour it into cup A up to the water level you marked earlier.

- Stir gently with the thermometer and as soon as the maximum temperature reading is reached, start the stopclock or stopwatch and record this temperature.
- Keep stirring the water gently while it cools and record the water temperature,  $\theta$ , at suitable time intervals for a total of 600 seconds.
- Present all your readings in a suitable format.
- Plot a graph of  $\theta$  against time,  $t$ , in seconds ( $\theta$  on the  $y$ -axis) and draw a best fit line.

### **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.