



General Certificate of Education
Advanced Level Examination
June 2014

Physics

PHY6T/Q14/task

Unit 6 Investigative and Practical Skills in A2 Physics
ISA (Q) Thermistor Characteristics

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 how the resistance of a thermistor varies over a range of temperatures.

- Draw a diagram of a circuit that will supply a variable potential difference (pd) from a power supply and allow measurements to be taken of the current in the thermistor and the pd across it.
- Connect the circuit you have drawn but do not switch it on yet. Adjust the control dial of your power supply or the potential divider to ensure that when the circuit is switched on the pd across the thermistor will be zero.
- **Ask your supervisor to check your circuit.**
- Switch on the circuit.
- Adjust the pd V across the thermistor to a suitable value.
- Measure and record the room temperature in $^{\circ}\text{C}$, the pd V across and the current I in the thermistor. Take suitable repeat readings for the current, switching off the circuit between readings and if necessary re-adjusting the pd to its initial value.
- Carefully collect about 100 cm^3 of hot water in one beaker.
- Place the thermistor into the hot water. Measure the current and pd, and the temperature of the water θ . Be aware that the current will be significantly greater at this temperature than at room temperature.
- You are to take readings for temperature θ , I and V as the temperature of the water decreases. You need to decide on an appropriate range of temperatures. In this part of the experiment you are not required to take repeat readings.
- Take precautions to minimise the uncertainty in the temperature measurements.
- Allow the water to cool, adding small amounts of cold water if necessary, and record all of your readings of θ , I and V in a suitable table, including space in this table for processed data.
- Calculate the resistance R of the thermistor at each temperature.
- Plot a graph of R (on the y -axis) against θ , drawing a best-fit curve.
- Record the precision of your thermometer, ammeter and voltmeter.

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.