4. Black Box (12 points) — *Eero Uustalu.*

Tools: a black box with a yellow and a blue lead, two multimeters, a voltage source (that is connected in series with a resistor to limit the maximal current), wires, sheets of graph paper. In the black box, there are three diodes and a resistor.

You are allowed to connect your circuit to the power source only through the yellow lead with a built-in resistor (that is already connected to the power source)**!**

For each series of measurements, also draw the circuit used!

i) *(4 points)* Determine the electrical circuit inside the black box.

ii) *(2 points)* Determine the resistance of the resistor.

iii) *(6 points)* Determine the opening voltages of all the diodes (at which the current reaches 1 mA).