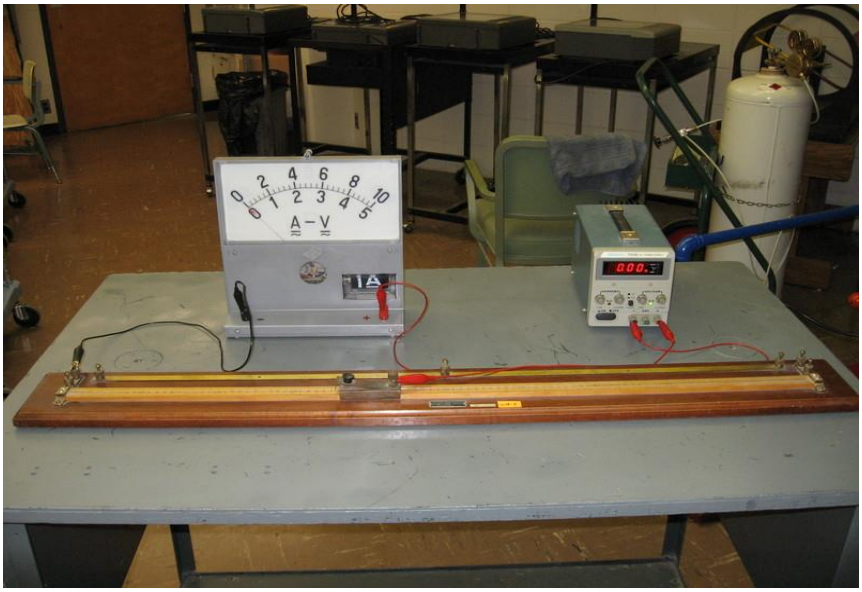
Experiment 5. The relation between resistance and length and type of wire

The used devices:-

1 - connecting wires, one is copper and the other consists of lead, 2 - A measuring ruler for each wire, 3 - A power supply, 4 - An ammeter, 5 - Connecting wires, 6 - A tool for measuring the thickness of the wires.

The theory of experiment:

The resistance of any wire depends on the type of material from which the wire is made, so the conductivity of lead differs from copper and also differs from other materials, and the resistance of the wire depends on its general form in terms of length and diameter, and wires made of one material differ in resistance according to its dimensions. The greater the length of the wire, the greater its resistance. The resistance is also inversely proportional to the thickness of the wire.



The resistance of any wire depends on the following factors:

1 - The length of the wire.

2 - Type of wire

3 - The cross-sectional area of the wire.

Where the cross-sectional area is calculated by multiplying the square of the radius by the constant ratio

$$A = \pi r^2$$

The method of experiment:-

1 - Connect the electrical circuit and turn on the power source

2- Measure the diameter of each wire separately and calculate its cross-sectional area

3 - Use the sharp end of the wire to measure the amount of current passing through at different lengths

4 - Draw a graphic relationship between the length of the wire and the value of the current for each of the copper and lead separately

5 - Discuss the graph relationship as well as the relationship of resistance with the cross-sectional area.

L (cm)	I (amp)