

Physics Practical 10

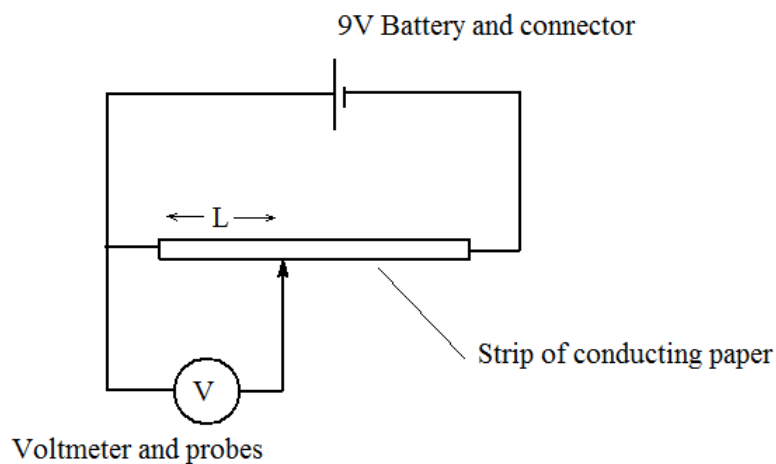
Resistivity of conducting paper

Introduction

Conducting paper is a special type of paper that conducts electricity; it has a fairly high resistance so the current through it is small. In this practical the pd along a piece of current carrying conducting paper will be measured using a voltmeter. Given the resistivity it is then possible to find the current flowing through it.

Method

Set up the circuit as in the diagram



When not taking measurements disconnect the battery so that it doesn't run down.

Using the multimeter adjusted to a suitable range measure the pd across different lengths of the conductor (L). Enter your results into an appropriate table with all the usual additions.

Theory

Making the following assumptions:

- The voltmeter has an infinite resistance so takes no current
- The current is small so the pd across the internal resistance is negligible
- The paper strip is uniform

The pd across a length L of paper, $V = IR$ Where R is the resistance of the length of paper L.

But $R = \rho L/A$ where ρ = resistivity of the paper and A = Cross sectional area

$$\text{So } V = I\rho L/A$$

Given that $\rho/A = 200\text{k}\Omega/\text{cm}$ use a graphical method find the current flowing through the paper.