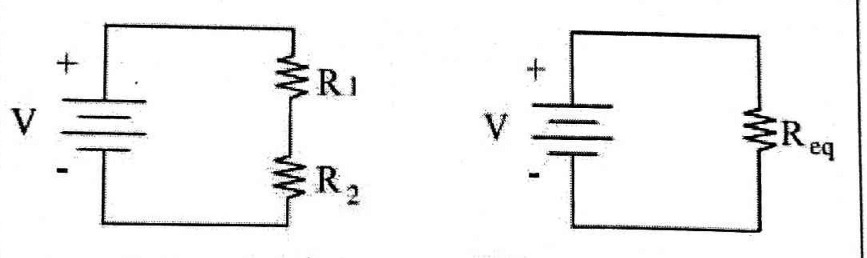
EXPERIMENT

AIM: Connect resistors in series and parallel combination on bread board and measure its value using Digital multimeter.

Objective: In this experiment you will set up three circuits: one with resistors in series, one with resistors in parallel, and one with some of each.

Equipment: Breadboard, Power supply, Resistors, Multi-meter.

Theory: In the first part of this experiment we will study the properties of resistors, which are connected "in series". Figure 1 show two resistors connected in series (a) and the equivalent circuit with the two resistors replaced by an equivalent single resistor (b), when resistors are connected in series, each one "sees" the same current. Recall the water analogy: We showed that the equivalent resistance for resistors in series is Req = R1 + R2.



(a) The actual circuit. *(b) The equivalent circuit*
Figure 1. Resistors connected in series.

Of course, this equation can be extend to any number of resistors in series, so that for N resistors the equivalent resistance is given by

$$Req = \Sigma Ri \text{ (for } i=1,2,3,...,N)$$
or
$$Req = R1 + R2 + R3 + ... + RN.$$

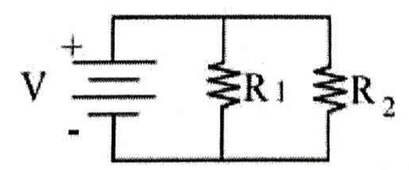


Figure 2: Two resistors in parallel

We say these resistors are connected in parallel. In series they were connected one after the other, but in parallel, as the name suggests, they are 'side by side' in the circuit. When resistors are in parallel, the current flowing from the battery will come to a junction where it has a "choice" as to which branch to take. Therefore, they "see" different amounts of current, we calculate

$$1/R_{eq} = 1/R_1 + 1/R_2$$

It's important to remember that after you do this calculation, you will have gotten $1/R_{eq}$.

CONCLUSION: