EXERCISE NO. 3
POWER IN DC CIRCUITS

Objectives: The objectives of this exercise are to show how resistor power dissipation is related to voltage, current and resistance in a DC circuit.

Procedure:

1. Connect the circuit shown in Figure 1 using two 1 kΩ resistors in series. The portable multimeter can be used for the voltmeter. The DMM, used as an ammeter, **must be connected in series** between the power supply and the resistors.

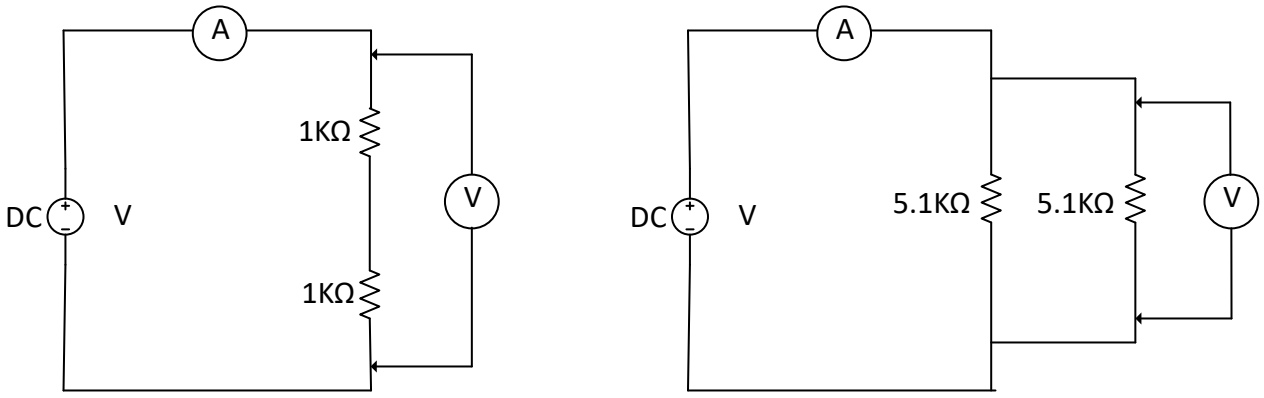


Fig. 1

Beginning at 0.0 volts, increase the voltage across the resistors in 2.0-volt steps to a maximum of 10.0 volts. Record the voltage and current in a table in your lab notebook for each step.

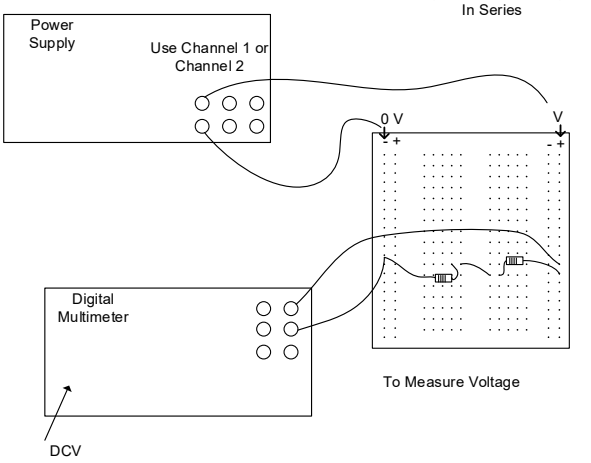
2. Replace the 1 kΩ resistors with two 5.1KΩ resistors in parallel as shown and repeat the voltage and current measurements from zero to ten volts. Record this data in a table in your lab notebook.

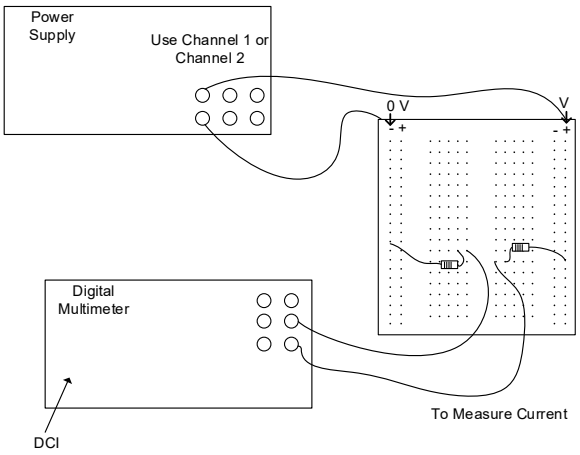
3. Turn off all power to the circuit and remove the resistors from the circuit board. Using the DMM as an ohmmeter, measure and record the actual resistance of each of the two connections of resistors (R_T).

Data Analysis:

1. Use your data to calculate the resistor power dissipation (in mW) for each voltage for each R_T. Remembering that Power = Voltage of the resistor X Current through the resistor (see power circle)
2. Create a graph of power versus voltage for each of the two R_T. Note that voltage is the independent variable and it must be plotted on the horizontal axis. Use linear scales and label them properly.
3. Create a graph of power versus current for each of the two R_T. Note that current is the independent variable and it must be plotted on the horizontal axis. Use linear scales and label them properly.
4. Record all tables and graphs on the lab report form template.

Set-up for Volts and Amps –
In Series





Set-up for Volts and Amps –
In Parallel