Lab Equipment

Name:

PES 2160 Prelab Questions

Lab Station: 005

- What is the resistance value of the follow resistor "color codes"?

Determining the resistance of a resistor from its bands is a fairly trivial process. Bands 1 and 2 are the first two digits in the resistance value. The third band is the power of 10 multiplier. And finally, the last band is the uncertainty of the resistance. We can use the following table to understand the color to number correspondence for resistors.

All these will have the form of:

(First Band #) (Second Band #) x $10^{(\text{Third Band \#})}$ ± (Fourth Band Uncertainty) Ω

Color	Number	Multiplier	Uncertainty (%)
black	0	$10^0 = 1$	
brown	1	$10^1 = 10$	
red	2	$10^2 = 100$	
orange	3	$10^3 = 1000$	
yellow	4	$10^4 = 10{,}000$	
green	5	$10^5 = 100{,}000$	
blue	6	$10^6 = 1{,}000{,}000$	
violet	7	$10^7 = 10{,}000{,}000$	
gray	8	$10^8 = 100{,}000{,}000$	
white	9	$10^9 = 1{,}000{,}000{,}000$	
gold		$10^{-1} = 0.1$	± 5 %
silver		$10^{-2} = 0.01$	± 10 %

Brown – Black – Brown _100 ± 10___ Ω

(1) (0) x $10^{(1)}$ ± (10%) Ω

10 x 10 ± 10% Ω

100 ± 10 Ω

Brown – Black – Orange __10,000 ± 1,000__ Ω

(1) (0) x $10^{(3)}$ ± (10%) Ω

10 x 10^{3} ± 10% Ω

10,000 ± 1,000 Ω

(Sometimes you'll see this called a 10kΩ resistor. This is probably the most commonly used resistor in circuits, next to 1kΩ and 100kΩ.)

Yellow – Violet – Green __4,700,000 ± 235,000_ Ω

(4) (7) x $10^{(5)}$ ± (5%) Ω

47 x 10^{5} ± 5% Ω

4,700,000 ± 235,000 Ω

(Typically you'll see this labeled as a 4.7MΩ resistor. This is not a very common resistor.)

Blue – Grey – Black __68 ± 3.4__ Ω

(6) (8) x $10^{(0)}$ ± (5%) Ω

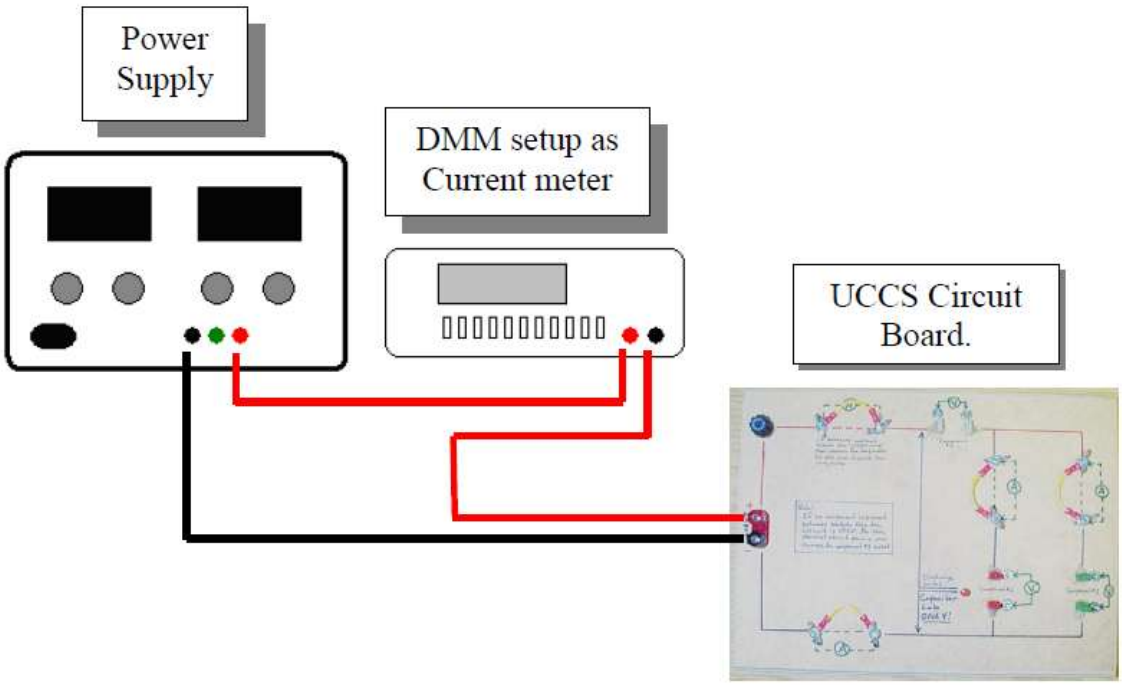
68 x 10^{1} ± 5% Ω

68 ± 3.4 Ω

It's always a good idea to use a voltmeter and check the resistance of a resistor before using it. Sometimes it is hard to distinguish the colors of the bands.

** One final note: When you run a current through a resistor, the resistor will get VERY HOT! If you do not want to burn yourself – be especially careful not to touch the resistors for at least a few seconds AFTER you turn off the current. **

- Draw in the wires needed to measure the current passing into the circuit board.



1. Lead (wire) 1 goes from the red port on the Power supply to the red port on the Digital Multimeter (Ampmeter).
2. Lead 2 goes from the black port on the Digital Multimeter to the red port on the UCCS Circuit Board
3. Lead 3 goes from the back port on the UCCS Circuit Board to the black port on the Power Supply

** NOTE: In order to measure the current through the circuit, the ampmeter needs to be contained within the circuit, not measured across a component. **

- Use Ohm's Law to calculate the resistance of a component that passes 0.08 Amps and a voltage drop of 6 Volts.

Ohm's law is given as:

$$\Delta V = IR$$

If we solve Ohm's Law for the resistance, we get:

$$R = \frac{\Delta V}{I} = \frac{(Potential\ \ Drop)}{(Current)}$$

$$R = \frac{6\ V}{0.08\ A} = 75\ \Omega$$

If we convert this back into the color bands, we could more easily find the resistor:

7 5 x 10^0 = (violet) (green) (black) (silver/gold)