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Experiment 2
Resistance

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Experiment 2

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Objective

To use the Color Code system to determine the marked(nominal) value of a resistor. After getting the marked value, we compare this data to the measured value using the breadboard and the multimeter to determine tolerance.

Materials Required:

- 47 Ω
- 330 Ω
- 820 Ω
- 470 Ω
- 68 $K\Omega$
- 220 Ω
- 620 Ω
- 1 $K\Omega$
- 4.7 $K\Omega$
- 270 $K\Omega$
- Breadboard
- Multimeter

PROCEDURE.

- Using the Color Code System the nominal(marked) values of the 10 resistors were calculated and recorded.
- Afterwards, the multimeter and Breadboard was used to measure the resistance of each resistor was recorded and the data recorded.
- The measured value and nominal value was then compared and used to determine the tolerance of the resistor using the formula: (

$$\frac{\text{measure vaalue} - \text{marked value}}{\text{marked value}} * 100 = |\%|$$
- Lastly, We were given two unmarked resistors to determine the color code and record their values.

Data

1 st Band color	2 nd Band color	3 rd Band color	Marked value(Ω) & Tolerance(%)	Measured value(Ω)	Tolerance (%) calculated
Yellow	Violet	Black	47 Ω 5%	47.4 Ω	0.909
Orange	Orange	Brown	330 Ω 5%	322 Ω	2.424
Grey	Red	Brown	820 Ω 5%	822 Ω	0.244
Yellow	Violet	Brown	470 Ω 5%	468 Ω	0.426
Blue	Grey	Orange	68 KΩ 5%	67.4 KΩ	0.882
Red	Red	Brown	220 Ω 5%	219 Ω	0.455
Blue	Red	Brown	620 Ω 5%	612 Ω	1.29
Brown	Black	Red	1 KΩ 5%	980 Ω	2
Yellow	Violet	Red	4.7 KΩ	4.72 KΩ	0.426
Red	Violet	Yellow	270 KΩ	274 KΩ	1.481

Resistor	Measured Resistance(Ω)		Color Code		
	Resistor 1	38.7 K Ω	39 K Ω	Orange	White
Resistor 2	510 Ω	510 Ω	Green	Brown	Brown

Conclusion.

Questions:

- Determine the four band color code for these resistors if the tolerance is 5%:

395 Ω , 3.39 Ω , 1 Ω , 15 Ω and 11 Ω .

Resistor	1 st Band color	2 nd Band color	3 rd Band color	4 th Band color
395 Ω	Yellow	Black	Red	Gold
3.39 K Ω	Orange	Yellow	Gold	Gold
1 Ω	Black	Brown	Black	Gold
15 Ω	Brown	Green	Black	Gold
11 Ω	Brown	Brown	Black	Gold

- Determine the value range of these resistors if the tolerance is 2%:

Color code provided			Value(Ω)	Upper range	Lower range
Red	Red	Orange	22K Ω	22440 Ω (22.44K Ω)	21560 Ω (21.56K Ω)
Brown	Green	Red	1.5K Ω	1530 Ω (1.53K Ω)	1470 Ω (1.47K Ω)
Red	Red	Red	2.2K Ω	2244 Ω (2.244K Ω)	2160 Ω (2.16K Ω)
Orange	Orange	Orange	33K Ω	33660 Ω (33.7K Ω)	32340 Ω (32.34K Ω)

3. Determine the value range of these resistors if the tolerance is 8%:

Color code provided			Value(Ω)	Upper range	Lower range
Blue	Gray	Black	68 Ω	73.44 Ω	62.56 Ω
Brown	Black	Green	1M Ω	1080000 Ω (1.08M Ω)	920000 Ω (920K Ω)
Green	Blue	Red	5.6K Ω	6048 Ω (6.048K Ω)	5152 Ω (5.152K Ω)
Gray	Red	Red	8.2K Ω	8856 Ω (8.856K Ω)	7544 Ω (7.544K Ω)

In this laboratory experiment, we learned how to determine the nominal value of a provided resistor using the Color code system. In addition, we compared the nominal value to the measured value using the multimeter and breadboard to determine the tolerance. There are two types of resistors but in this experiment we only used the fixed resistors (i.e. a resistor that provides a constant value of resistance and which cannot be changed). Lastly, we learnt how to determine the range of a resistor using the tolerance to find the maximum resistance and minimum resistance.

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2. Tolerance of the resistor is calculated by:

$$\frac{\text{Measured Value} - \text{Marked Value}}{\text{Marked Value}} \times 100 = | \% |$$

3. Obtain two unmarked resistors from the CLT and record their values here:

Resistor # 1 38.7kΩ ≈ 39k

Resistor # 2 510Ω

(b) What is the color code of these unknown resistors?

38.7kΩ = orange, white and orange
 510Ω = Green, Brown and Brown.

Approved Gw

Conclusion

1. Determine the four band color code for these resistors if the tolerance is 5%:
 395Ω, 3.39KΩ, 1Ω, 15Ω and 11Ω.

395Ω = Yellow Black Red Gold
 3.39kΩ = Orange Yellow Red Gold
 1Ω = Black Brown Black Gold
 15Ω = Brown Green Black Gold
 11Ω = Brown Brown Black Gold

2. Determine the value range of these resistors if the tolerance is 2%:

	value	upper range	lower range
a. Red, Red, Orange	22kΩ	22440Ω (2.244k)	21560Ω (2.156k)
b. Brown, Green, Red	1.5kΩ	1530Ω (1.53k)	1470Ω (1.47k)
c. Red, Red, Red	2.2kΩ	2244Ω (2.244k)	2160Ω (2.16k)
d. Orange, Orange, Orange	33kΩ	33660Ω (33.66k)	32340Ω (32.34k)

3. Determine the value range of these resistors if the tolerance is 8%:

	value	upper range	lower range
a. Blue, Gray, Black	68Ω	73.44Ω	62.56Ω
b. Brown, Black, Green	1MΩ	1080000Ω (1.08M)	920000Ω (920k)
c. Green, Blue, Red	5.6kΩ	6048Ω (6.048k)	5152Ω (5.152k)
d. Gray, Red, Red	8.2kΩ	8856Ω (8.856k)	7544Ω (7.544k)

Experiment #2

Title: Resistance

Objective: To determine the Nominal (marked) value of the resistor by using the Color Code system. Use a multi-meter to measure the resistance value within a circuit.

Required Material

1- 47 Ω 1- 220 Ω
 1- 330 Ω 1- 620 Ω
 1- 820 Ω 1- 1K Ω
 1- 470 Ω 1- 4.7K Ω
 1- 68K Ω 1- 270K Ω

Procedure

1. Measure these ten resistors from your kit and record each value in the table below.

1 st Band color	2 nd Band color	3 rd Band Color	Marked Value (Ω) & Tolerance (%)	Measured Value (Ω)	Tolerance (%) (Calculated)
Yellow	Violet	Black	47 Ω 5%	47.4 Ω	0.909
orange	orange	Brown	330 Ω 5%	322 Ω	2.424
Grey	Red	Brown	820 Ω 5%	822 Ω	0.244
Yellow	Violet	Brown	470 Ω 5%	468 Ω	0.426
Blue	grey	orange	68K Ω 5%	67.4K Ω	0.882
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Brown	Black	Red	1K Ω 5%	980 Ω	2
Yellow	violet	Red	4.7K Ω 5%	4.72K Ω	0.426
Red	Violet	Yellow	270K Ω 5%	274K Ω	1.481

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