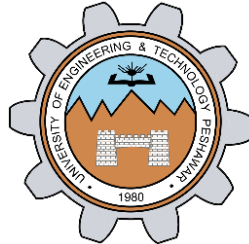


TO FIND THE RESISTANCE OF RESISTOR BY COLOR CODING METHOD

LAB # 02



Spring 2023

CSE103L Circuits & Systems-I Lab

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Class Section: **B**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”

Student Signature: _____

Submitted to:

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(March 11, 2023)

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RESISTANCE:

Electrical resistance is a measure of how much a material opposes the flow of electrical current. In other words, it is the property of a material that determines the degree to which it resists the passage of electric current through it. The standard unit of electrical resistance is the ohm (Ω), named after the German physicist Georg Simon Ohm.

Every material has a certain amount of electrical resistance, but some materials, such as metals like copper and silver, have very low resistance and are good conductors of electricity. Other materials, such as rubber and plastic, have high resistance and are poor conductors of electricity.

The amount of electrical resistance in a material is determined by several factors, including its composition, temperature, and physical dimensions. The resistance of a material can also be affected by the presence of impurities, the strength of its magnetic field, and other factors.

MATHEMATICALLY:

$$V=IR$$

$$R=V/I$$

UNIT:

The unit of electrical resistance is ohm (Ω),

1 OHM:

One ohm is defined as that resistance of an object when a current of 1 ampere flows through an object having a potential difference of 1 Volt. $R=V/I$. $\Rightarrow 1\text{ohm}= 1\text{volt}/1\text{ampere}$.

OBJECTIVE OF THIS LAB:

In this lab we learnt about electrical resistance and how it depends upon other factors like temperature, materials, how to find resistance by color coding and its verification through multimeter. Moreover, unit of resistance.

FINDING RESISTANCE BY COLOR CODING METHOD:

- ✓ In electronic components, such as resistors, the resistance value is often indicated by a series of colored bands on the component. To read the resistance value using color coding, we can follow these steps:
1. Identify the color bands on the resistor. Resistors typically have four or five color bands, although some have more.
 2. Determine the first two bands. These represent the first two digits of the resistance value. Use a color code chart to find the corresponding values for each color. The first band represents the first digit, and the second band represents the second digit. For example, a brown band followed by a black band would represent the number 1 and 0, respectively, so the first two digits of the resistance value would be 10.
 3. Determine the third band. This represents the multiplier, or number of zeros, to apply to the first two digits. Again, use the color code chart to find the corresponding value. For example, a red band would represent a multiplier of 100, so the resistance value would be $10 \times 100 = 1000$ ohms, or 1 kilo ohm.
 4. Determine the fourth band, if present. This represents the tolerance of the resistor, or how closely the resistance value matches the specified value. Use the color code chart to find the corresponding tolerance value.

NOTE

Note that some resistors may have additional color bands to indicate other properties, such as the temperature coefficient or the voltage rating. A color code chart can help you interpret the meaning of each band.

Colors	1 st bend	2 nd bend	3 rd bend	Multiplier	Tolerance
Black	0	0	0	1	
Brown	1	1	1	10	± 1%
Red	2	2	2	100	± 2%
Orang	3	3	3	1000	
Yellow	4	4	4	10,000	
Green	5	5	5	100,000	± 0.5%
Blue	6	6	6	1,00,000	± 0.25%
Violet	7	7	7	10,000,000	± 0.1%
Grey	8	8	8		± 0.05%
White	9	9	9		
Gold	0.1	0.1	0.1	0.1	± 5%
Silver	0.01	0.01	0.01	0.01	± 10%

CONSIDER A RESISTER MARKED AS RED, RED, ORANGE AND OF GOLD COLOR

First band represents the first significant figure of resistor value.

Second band represents the second significant figure of resistor value.

Third band represents the decimal multiplier after the first-two significant figures of resistor value.

Fourth band represents the tolerance of resistor.

According to color code: red (2) orange (3) gold (5 %).

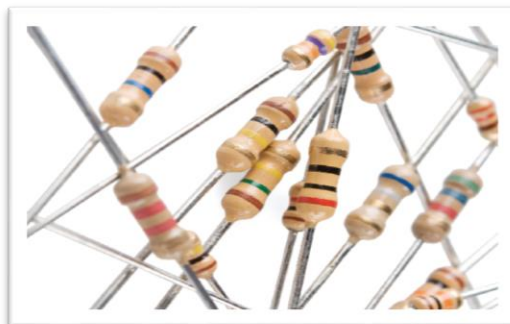
Thus resistance value is $22 \times 10^3 \pm 5\% \Omega$.

CALCULATION AND OBSERVATION:

S no	1 st band	2 nd band	Multiplier	Tolerance	Resistance rang (Ω)	Verification DDM
1	Red(2)	red(2)	Orange(1000)	Gold($\pm 5\%$)	20995-- 23205	20132 Ω
2	red(2)	Orange (3)	black(1)	Gold($\pm 5\%$)	21.85-- 24.15	22 Ω
3	Brown (1)	black(0)	Red(100)	Silver($\pm 10\%$)	9090-- 11110	10k Ω

CONCLUSION:

So from all discussion I concluded that “we can find the resistance of resistor by color coding method which Is very convenient and simple



LAB RUBRICS: (Circuits & Systems-I Lab)

Criteria & Point Assigned	Outstanding 4	Acceptable 3	Considerable 2	Below Expectations 1
Attendance and Attentiveness in Lab PLO10	Attended in proper Time and attentive in Lab	Attended in proper Time but not attentive in Lab	Attended late but attentive in Lab	Attended late not attentive in Lab
Equipment / Instruments Selection and Operation PLO1, PLO2, PLO3, PLO5,	Right selection and operation of appropriate equipment and instruments to perform experiment.	Right selection of appropriate equipment and instruments to perform experiment but with minor issues in operation	Needs guidance for right selection of appropriate equipment and instruments to perform experiment and to overcome errors in operation	Cannot appropriately select and operate equipment and instruments to perform experiment.
Result or Output/ Completion of target in Lab PLO9,	100% target has been completed and well formatted.	75% target has been completed and well formatted.	50% target has been completed but not well formatted.	None of the outputs are correct
Overall, Knowledge PLO10,	Demonstrates excellent knowledge of lab	Demonstrates good knowledge of lab	Has partial idea about the Lab and procedure followed	Has poor idea about the Lab and procedure followed
Attention to Lab Report PLO4,	Submission of Lab Report in Proper Time i.e. in next day of lab., with proper documentation.	Submission of Lab Report in proper time but not with proper documentation.	Late Submission with proper documentation.	Late Submission Very poor documentation