T.C.

GEBZE TECHNICAL UNIVERSITY

PHYSICS DEPARTMENT

PHYSICS LABORATORY II

EXPERIMENT REPORT

THE NAME OF THE EXPERIMENT

Electric Circuits

GEBZE TEKNİK ÜNİVERSİTESİ

PREPARED BY

NAME AND SURNAME :

STUDENT NUMBER :

DEPARTMENT :

GROUP NO :

TEACHING ASSISTANT :

DATE OF THE EXPERIMENT : ….. / ….. / …….

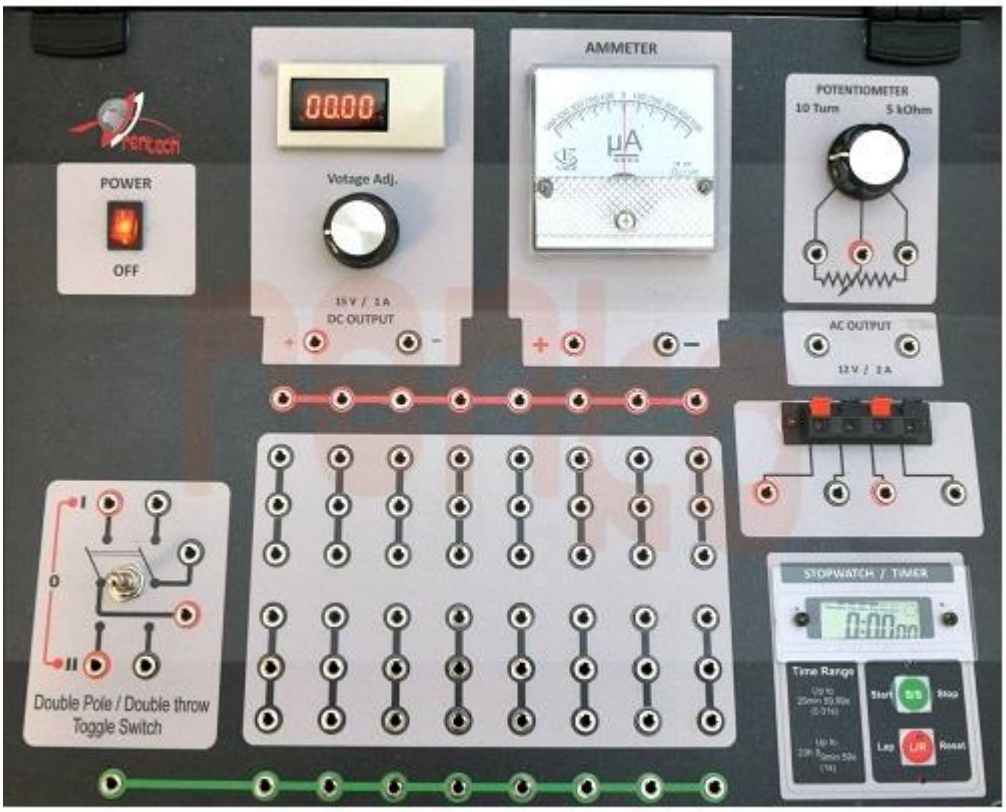
DATE : ….. / ….. / …….

Signature:

Equipments :

- Basic Electrical Experiment Unit
- Multimeter
- Resistors
- Connection Cables (Red and Black, Different Lengths)

Experiment Set:



- **Figure 1.** *Basic Electrical Experiment Unit*

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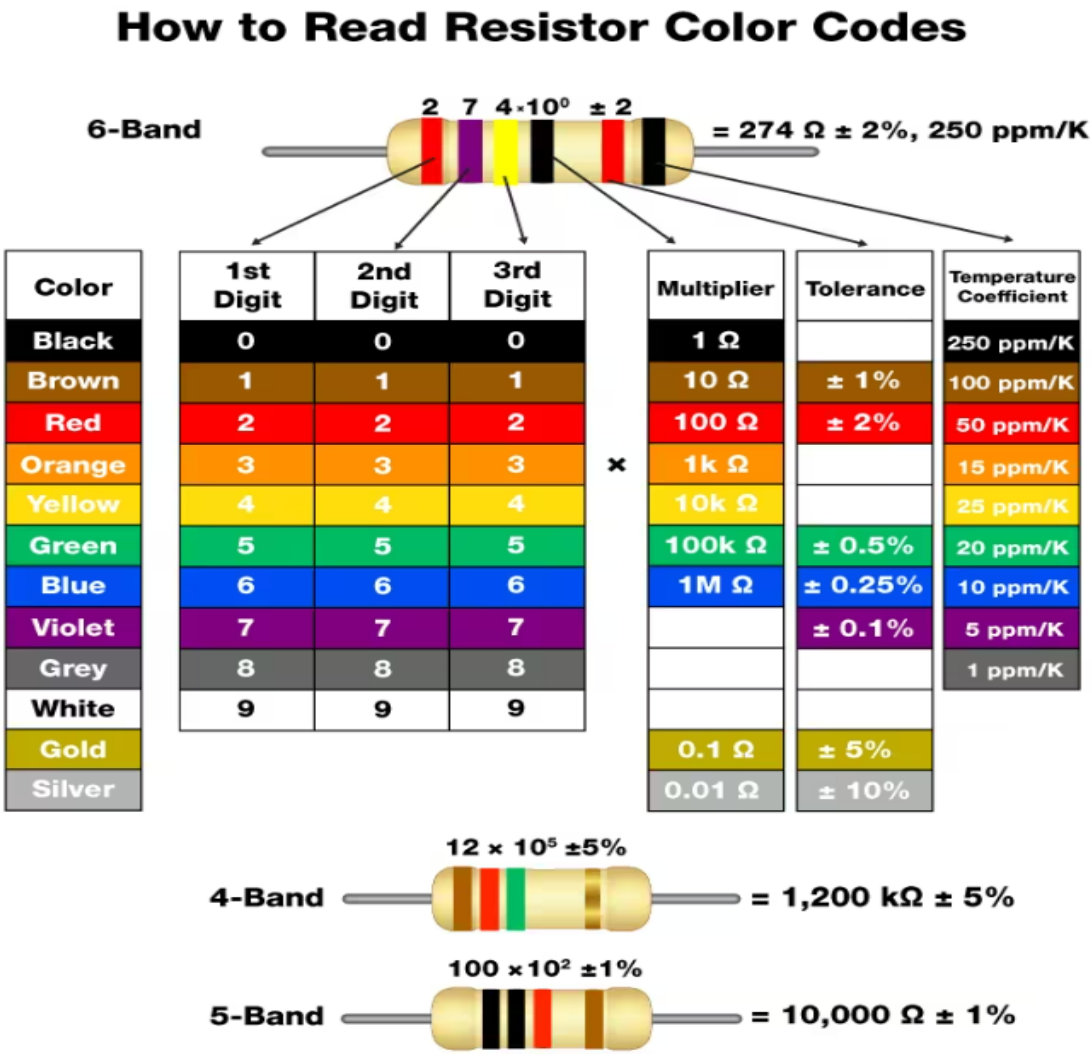
Experimental Procedure:

A- Reading and measuring the values of the resistors.

The resistor color code chart is used to determine the resistance value of a resistor based on the colors of its bands. Each color band on the resistor corresponds to a numeric value. By reading the color bands from left to right and referring to the chart, you can calculate the resistance value. The first (a), second (b) and third (c) (if present) bands represent significant digits, the fourth (d) band represents a multiplier, and the fifth band (if present) indicates the tolerance level. The final calculated value provides you with the resistance value in ohms (Ω) for the resistor.

1- Using the table below, read the values of the resistors (R_1, R_2, R_3, R_4) you will use in the experiment.



Tablo 1. *Resistor Color Code*

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2- Set the multimeter to the ohm symbol (Ω) to measure the resistors.

3- Measure the values of the resistors (R_1, R_2, R_3, R_4) you will use in the experiment using a multimeter.

4- Write down the resistors (R_1, R_2, R_3, R_4) you have read and measured in Table 2.

-Calculate the value of each resistor read using Table 1. Write down the intermediate steps.

$$\boldsymbol{R = abc\ x\ 10^{d} \pm \%e\ \Omega}$$

R_1 =

R_2 =

R_3 =

R_4 =

Resistors	Read	Measured
$\mathbf{R_1}$		
$\mathbf{R_2}$		
$\mathbf{R_3}$		
$\mathbf{R_4}$		

Table 2. *Value of read and measured the resistors*

To calculate the percentage error for each resistor's measured and read resistance value. Write down the intermediate steps.

For $\mathbf{R_1}$, $\%\boldsymbol{eror} = \frac{|\mathbf{R_1}\,\text{measured} - \mathbf{R_1}\,\text{read}|}{\mathbf{R_1}\,\text{measured}} =$

For $\mathbf{R_2}$, $\%\boldsymbol{eror} = \frac{|\mathbf{R_2}\,\text{measured} - \mathbf{R_2}\,\text{read}|}{\mathbf{R_2}\,\text{measured}} =$

For $\mathbf{R_3}$, $\%\boldsymbol{eror} = \frac{|\mathbf{R_3}\,\text{measured} - \mathbf{R_3}\,\text{read}|}{\mathbf{R_3}\,\text{measured}} =$

For $\mathbf{R_4}$, $\%\boldsymbol{eror} = \frac{|\mathbf{R_4}\,\text{measured} - \mathbf{R_4}\,\text{read}|}{\mathbf{R_4}\,\text{measured}} =$

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B- Measuring Equivalent Resistance R_{Eq}

1- Set up the circuit shown in Figure 2 by using resistors (R_1, R_2, R_3, R_4). When this circuit is set up, the resistors cannot be measured individually.

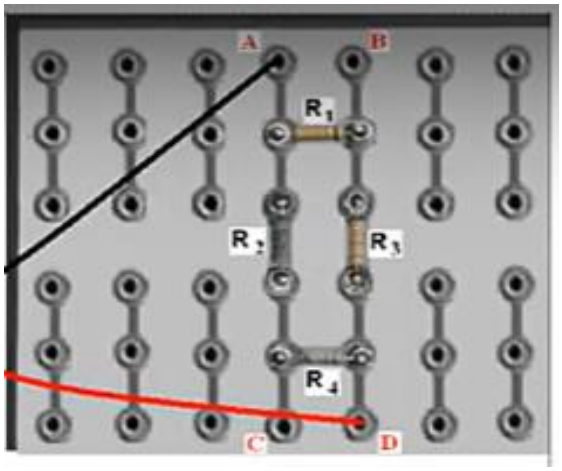

Figure 2. *Set up the Circuit*

When you touch the ends of the multimeter's test leads to both ends of a single resistor, you measure the equivalent resistance. For example, when measuring R_1 individually, you are measuring the equivalent resistance R_{AB}. Therefore, even if you have assembled the circuit, you can remove a single resistor from the circuit to measure its value individually. In the diagram, R_{AD} equivalent resistance is being measured.

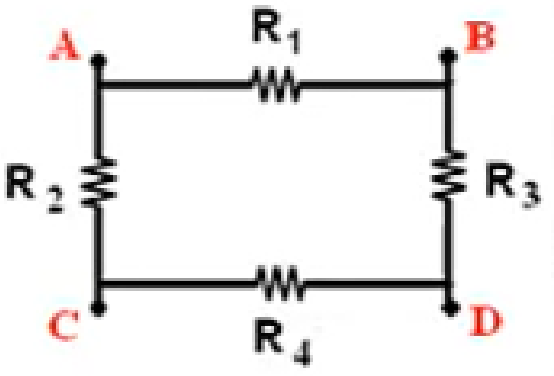

Figure 3. *Circuit diagram*

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i. For the power supply is connected to points **A** and **B,**

measure $\mathbf{R_{AB}}$ =

ii. For the power supply is connected to points **A** and **C,**

measure $\mathbf{R_{AC}}$ =

iii. For the power supply is connected to points **B** and **D,**

measure $\mathbf{R_{BD}}$ =

iv. For the power supply is connected to points **C** and **D,**

measure $\mathbf{R_{CD}}$ =

v. For the power supply is connected to points **A** and **D,**

measure $\mathbf{R_{AD}}$ =

vi. For the power supply is connected to points **B** and **C,**

measure $\mathbf{R_{AD}}$ =

For all the calculations you will make below, Write down the <u>intermediate steps</u>.

If the power supply is connected to points **A** and **B**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{AB}}$ =

If the power supply is connected to points **A** and **C**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{AC}}$ =

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If the power supply is connected to points **B** and **D**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{BD}}$ =

If the power supply is connected to points **C** and **D**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{CD}}$ =

If the power supply is connected to points **A** and **D**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{AD}}$ =

If the power supply is connected to points **B** and **C**, calculate and draw circuit diagram the equivalent resistance

$\mathbf{R_{BC}}$ =

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Conclusion, Comment and Discussion:

(**Tips**: Give detail explanation about what you've learned in the experiment and also explain the possible errors and their reasons.)

-Give detail explanation about what you've learned in the experiment

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-Explain the possible errors and their reasons in the experiment

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Questions:

Q1) Write three examples explaining the purpose and function of resistors.

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Q2) Define Internal resistor and External resistors.

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Q3) Calculate the values of three resistors with the color codes:

R_{YR} , yellow (a), red (b), green (d), and gold (tolerance);

R_{BW} , black (a), white (b), green (d), and gold (tolerance);

R_{YB} ,yellow (a), blue (b), green (d), and gold (tolerance);

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