MARCH 11TH, 2019

"LEY DE OHM"

PRACTICE 2

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1CM10

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PRACTICE DEVELOPMENT

DEPENDENCY OF VOLTAGE

Without turning on the voltage source and set at 2.5 KΩ the value of the potentiometer. Build the circuit of the figure 1 using the protoboard. Once built, turn on the voltage source and now change its value from 0V to 15V as showed on the table 1.

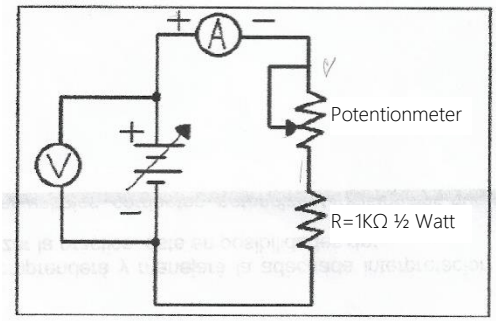
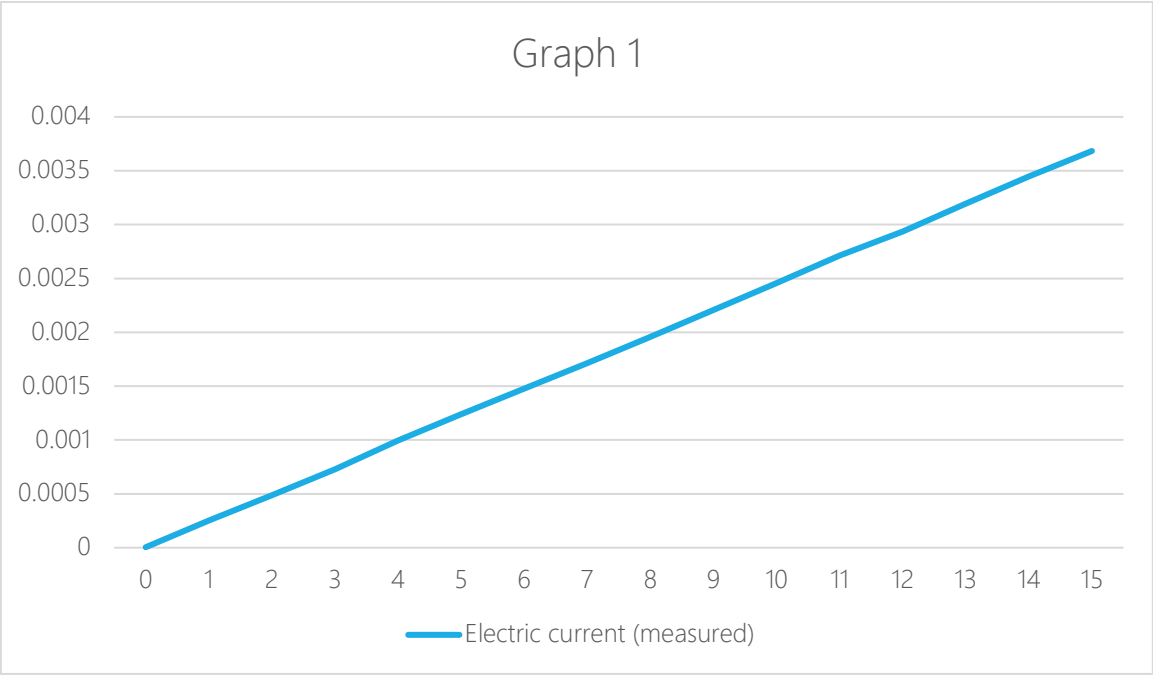


Figure 1. Circuit

Table 1. Values of electric currents

Voltage source (V)	Electric current (measured)	Electric current (Calculated)
0	4.13 µ amps	0 amps
1	253.93 µ amps	0.282 milliamps
2	486.4 µ amps	0.563 milliamps
3	0.7273 milliamps	0.845 milliamps
4	0.9938 milliamps	1.127 milliamps
5	1.238 milliamps	1.409 milliamps
6	1.4761 milliamps	1.69 milliamps
7	1.7152 milliamps	1.972 milliamps
8	1.9585 milliamps	2.253 milliamps
9	2.2080 milliamps	2.535 milliamps
10	2.4572 milliamps	2.817 milliamps
11	2.7110 milliamps	3.098 milliamps
12	2.9357 milliamps	3.38 milliamps
13	3.1950 milliamps	3.661 milliamps
14	3.4458 milliamps	3.944 milliamps
15	3.6832 milliamps	4.224 milliamps

Now we put the data on a graph to look at the differences of the empiric way and the math way.



DEPENDENCY ON RESISTANCE

With the voltage source turned off, set the value of the potentiometer to zero ohms. Build the circuit showed on the figure 2, using a protoboard. Once it is armed turn on the voltage source and set its value to 15V. After that, vary the value of the potentiometer.

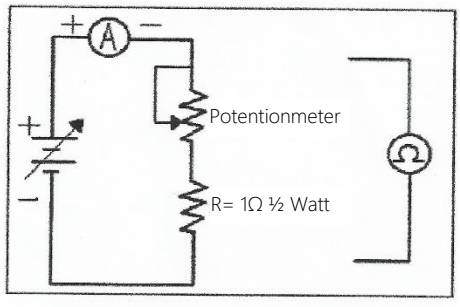
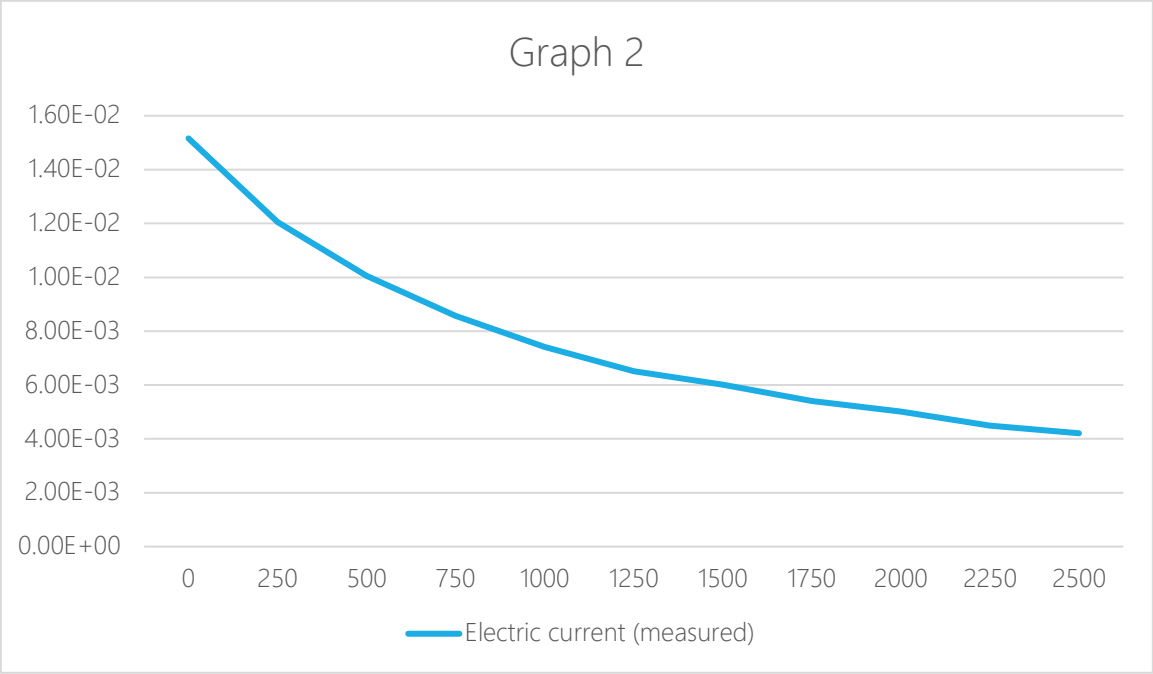


Figure 2. Circuit

Table 2. Value of resistances and electric currents

Value of the potentiometer	Total resistance	Electric current (measured)	Electric current (calculated)
0	1 KΩ	15.16 milliamps	15 milliamps
250	1.25 KΩ	12.05 milliamps	12 milliamps
500	1.5 KΩ	10.053 milliamps	10 milliamps
750	1.75 KΩ	8.569 milliamps	8.57 milliamps
1000	2 KΩ	7.415 milliamps	7.5 milliamps
1250	2.25 KΩ	6.515 milliamps	6.6 milliamps
1500	2.5 KΩ	6.013 milliamps	6 milliamps
1750	2.75 KΩ	5.405 milliamps	5.45 milliamps
2000	3 KΩ	5.019 milliamps	5 milliamps
2250	3.25 KΩ	4.495 milliamps	4.615 milliamps
2500	3.5 KΩ	4.209 milliamps	4.285 milliamps

Now we repeat the method of the graph, for the same reason.



CALCULATION OF THE ELECTRIC POWER IN RESISTANCES

Before you connect the voltage source, set it to 1V, now turn it off and without using your protoboard, build the circuit showed on the figure 3, use a resistance of 1KΩ with ¼ Watt, once it is built, turn on the voltage source.

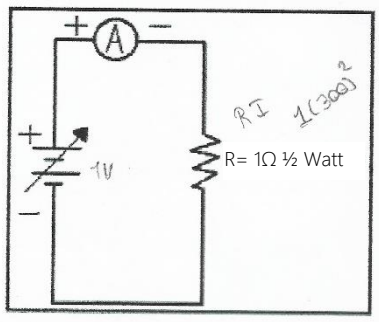


Figure 3. Circuit

What is the value of the electric current? I = 1 milliamp.

What is the value of the electric power which the resistance dissipates? 1 milliwatt.

What is the effect in the resistance? It absorbed electric current.

Why? That is the objective of the power.

Now, use the same circuit, but in this attempt, use a resistance of 1Ω with 1 watt, now repeat the process, make sure that you set the max value of the ammeter.

What is the value of the electric current? I = 300 milliamps.

What is the value of the electric power which the resistance dissipates? 0.09 watts.

What is the effect in the resistance? It absorbed electric current.

What is the difference with the last circuit? It did the same thing but not with the same values.

Why? Because the values of the resistances.

CONCLUSIONS

CABAÑAS BAXCAJAY JESÚS FRANCISCO

Thanks to this practice, we learn about how resistances and potentiometers work, and the way we can use them for other projects. Although, it is easy to measure the values from the resistances. We observe that they always vary their values, and there are many factors that affect them.

HERNÁNDEZ VELÁZQUEZ ÁNGEL

In this practice, we could observe how the resistance affects several variables within the circuit, which preserves the law of ohm, we also saw how it is that having a variable resistance, as it is the potentiometer, being in series, the resistances they were added and we obtained the expected result, in case they had been in parallel, the result would have been the inverse of the sum of their inverses.

MARTÍNEZ CORONEL BRAYAN YOSAFAT

Now we can talk about the dependency of the variables, we have just checked the law of Ohm, and it is very interesting, but what about the electric power, I mean, I have never done something like this, even talking about electricity makes feel like I am going to get into trouble. But with every practice, I think I trust in myself more than before. It is getting better and better. I have never taught we can make things like this. Now I believe we need more engineers in our nation. Maybe one day, every Mexican could talk about electricity with the same frequency as soccer, and I hope I will be one of the.

CALCULATIONS

For the 1st Circuit:

V=IR; I=V/R where R=(2.5KΩ+1KΩ)

So, I = V / 3500Ω

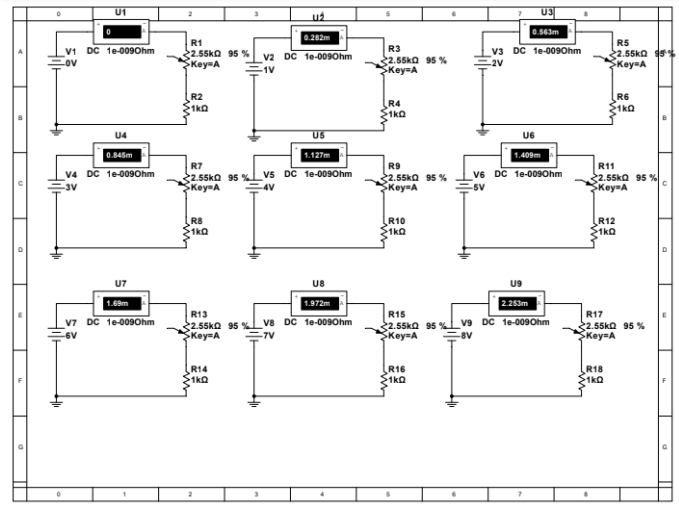
Then, we just substitute voltage from 0 to 15 Volts.

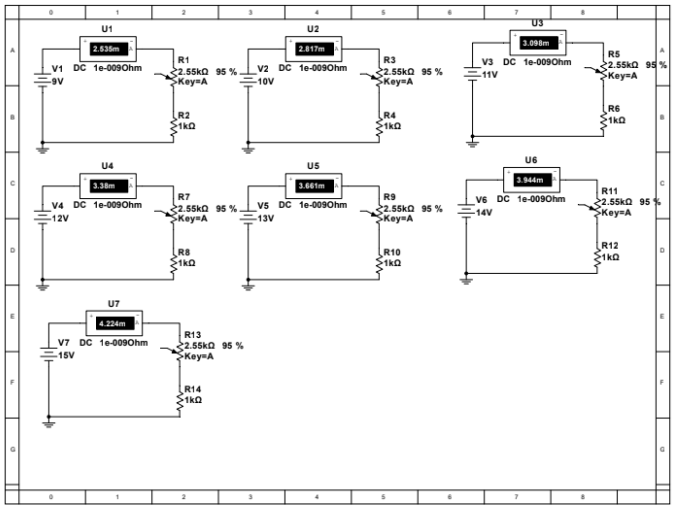
For 2nd circuit:

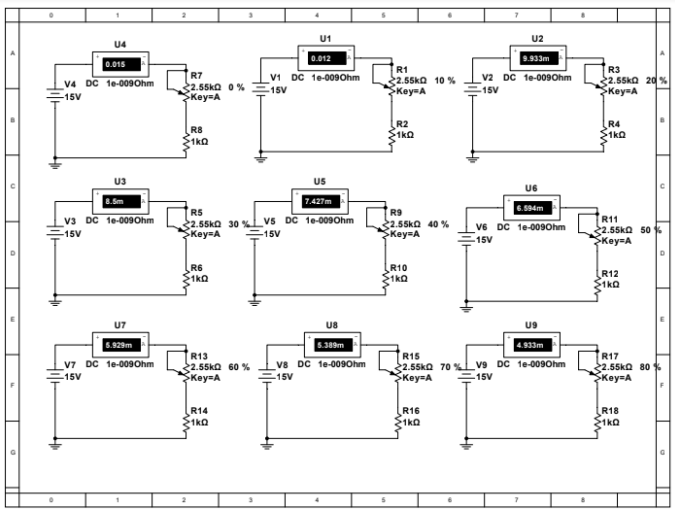
I = V / R, where Voltage = 15 V and Resistance = 1000Ω + R_p (Resistance from the potentiometer from 0 to 2500Ω).

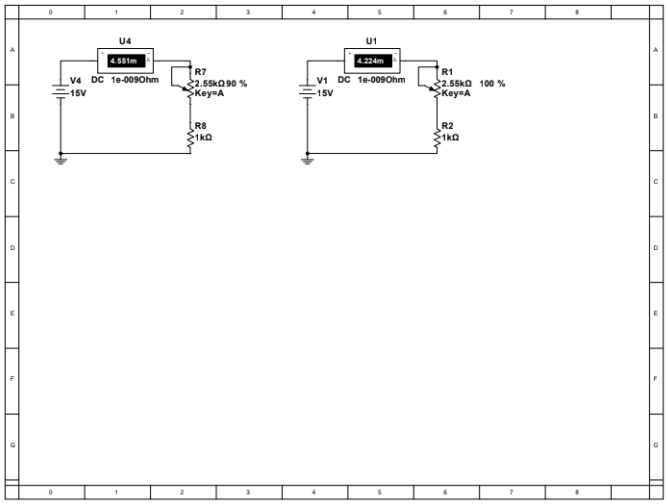
So, I = 15V / (1000+Rp).

SIMULATIONS





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4.551m
V4
15V
DC 1e-009Ohm
R7
2.55kΩ 90 %
Key=A
R8
1kΩ
U1
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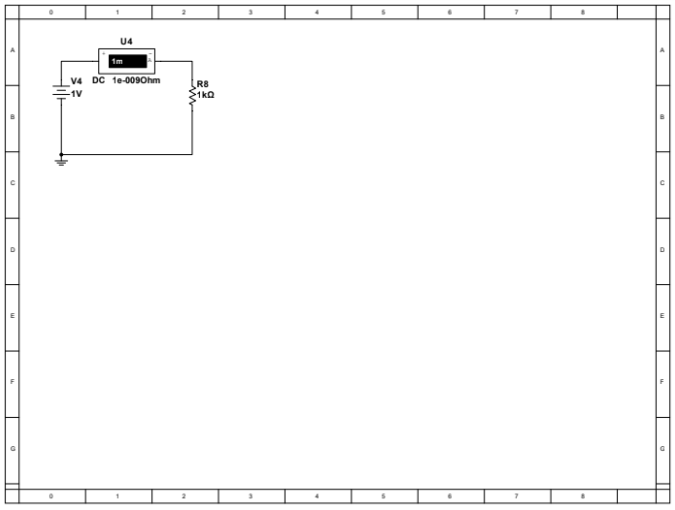
V1
15V
DC 1e-009Ohm
R1
2.55kΩ 100 %
Key=A
R2
1kΩ


U4
1m
V4
1V
DC 1e-009Ohm
R8
1kΩ

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ESCUELA SUPERIOR DE CÓMPUTO
LABORATORIO DE ANÁLISIS FUNDAMENTAL DE CIRCUITOS

ANÁLISIS FUNDAMENTAL DE CIRCUITOS

M. en C. Alberto J. Molina Morales
18 FEB 2019
REVISADO

PRÁCTICA No. 2
"LEY DE OHM"

GRUPO: 1CM10

EQUIPO: 10

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PROFESOR:

FECHA DE REALIZACIÓN: 25/Feb/19

FECHA DE ENTREGA: _____

Laboratorio Tiempo de Recuperación
Ing. Saúl del Angel Avalos
Fecha: 27/MAR/19

COMENTARIOS: