BE LAB TASK # 06

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TOPIC: Power heat Light.

TASK:

Observation and Calculations:

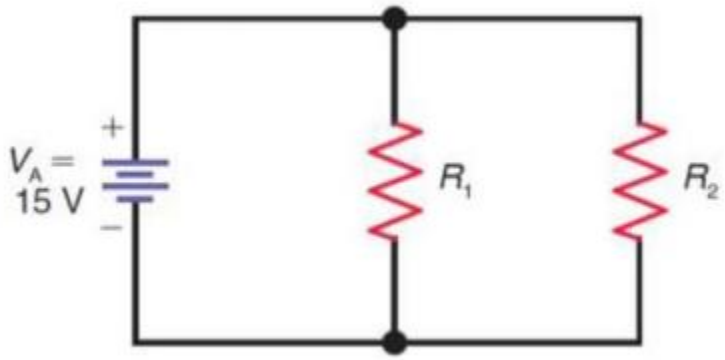
Objectives:

A. Demonstrates that electrical power is a function of voltage and current by calculating and measuring the power dissipated in a resistance as the voltage increased.

Objective A:

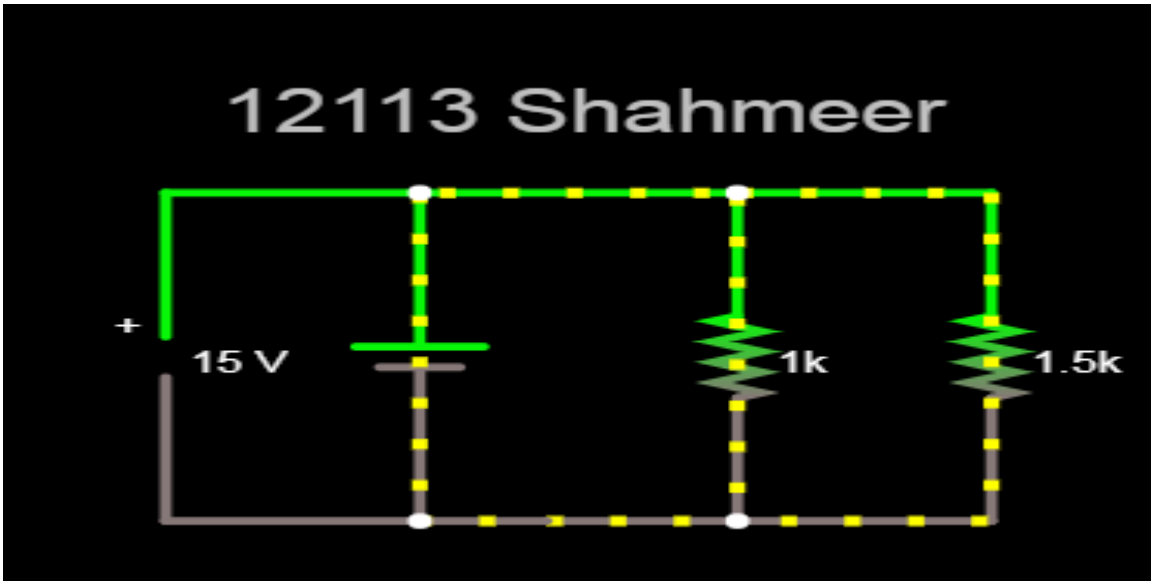
. Demonstrates that electrical power is a function of voltage and current by calculating and measuring the power dissipated in a resistance as the voltage increased.

- Connect resistor R1 and R2 in parallel the connect them through the ammeter source to the power source as shown in Fig below.



- Set the voltmeter dc source and connect it across the parallel circuit as shown.
  Note: Resistors R1 and R2 (rated at one watt each) are connected in parallel so that they can dissipate two watts of power.

Screenshot:



- Find out the parallel resistance of above two resistors.

  Answer: 600 Ohms.

  RT Calculation:

  According to the Fig.:

  1/RT=1/R1+1/R2.

  1/RT=1/1000+1/1500.

  1/RT=1/600.

  1/RT=600 Ohms.

- Refer to table below use Ohm's Law to calculate the current through each resistor for each of the voltages given. Use Resistance calculated in previous step.

  I=V/R.

  Answer:

Voltage (V)	***Current (I)(A)***	***Power (W)***
2	0.0034 A	0.0068 W
4	0.0067 A	0.0268 W
6	0.01 A	0.06 W

8	0.0133 A	0.1064 W
10	0.0167 A	0.1670 W

Table-1

Current Calculation:

CURRENT MEASUREMENT USING OHM'S LAW:

* ***V = IR WHERE R = 600 Ω (CONSTANT)***

A, When V = 2:

V = I R

2 = I x 600

I = 2/600

I = 0.0034 A

Or

I = 3.4 mA

B, When V = 4

V = I R

4 = I x 600

I = 4/600

I = 0.0067 A

Or

I = 6.7 mA

C, When V = 6:

V = I R

6 = I x 600

I = 6/600

I = 0.01 A

Or

I = 10 mA

D, When V = 8:

V = I R

8 = I x 600

I = 8/600

I = 0.01334 A

Or

I = 13.34 mA

E, When V = 10

V = I R

10 = I x 600

I = 10/600

I = 0.0167 A

Or

I = 16.7 mA

- Record your calculated current values in Table-1.

  Answer: Done see the table-1.

- Calculate the power dissipated in the resistors for each voltage and enter it in the Table.

  $$P=V \times I.$$

  Answer:

  Current Calculation:

  CALCULATING POWER USING Power's Formula: P = V x I

  A, When Voltage (V) = 2 volts and Current (I) = 0.0034 Amperes (A):

  P = V x I

P = 2 x 0.0034

P = 0.0068 Watt (W)

B, When Voltage (V) = 4 volts and Current (I) = 0.0068 Amperes(A):

P = V x I

P = 4 x 0.0067

P = 0.0268 Watt (W)

C, When Voltage (V) = 6 volts and Current (I) = 0.01 Amperes:

P = V x I

P = 6 x 0.01

P = 0.06 Watt (W)

D, When Voltage (V) = 8 volts and Current (I) = 0.0133 Amperes:

P = V x I

P = 8 x 0.0133

P = 0.1064 Watt (W).

E, When Voltage (V) = 10 volts and Current (I) = 0.0167 Amperes:

P = V x I

P = 10 x 0.0167

P = 0.1670 Watt (W).

- Set the Milli-Ammeter to 100 mA DC range.
- Adjust the power source to 2Vdc as indicated by the voltmeter.
- Record the current reading from the Milli-Ammeter in Table-2.
  Answer: Done see the table-2.
- Adjust the power supply to each of the remaining voltages listed in Table-2 and record the current for each voltage. After the 4-volt

reading is recorded, reset the Voltmeter to the 15Vdc range and the milli ammeter to 1Adc range of other voltages.

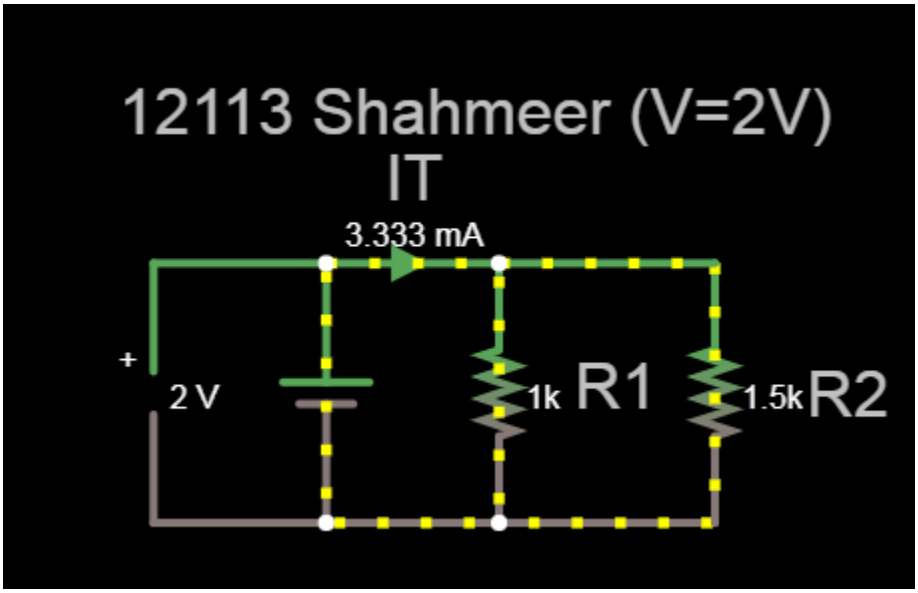
- Return the voltage to zero.

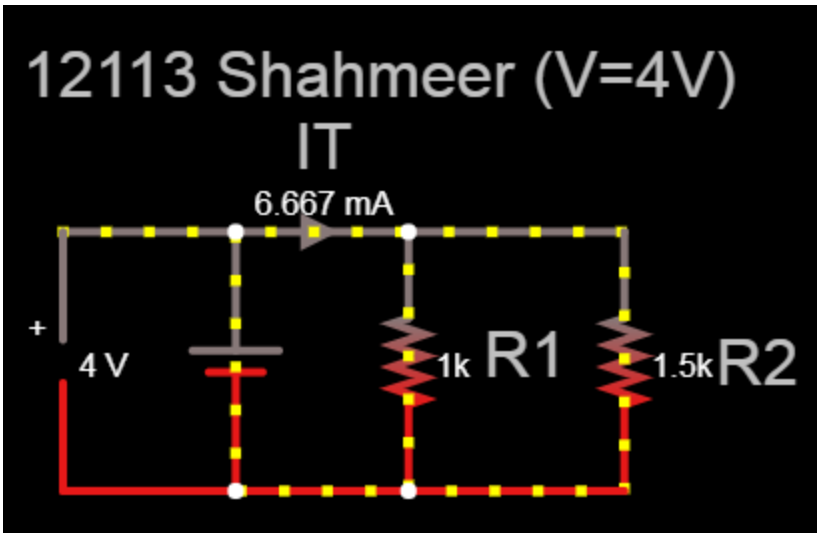
Voltage (V)	Current (I)(mA)	Power (mW)
2	3.4 mA	6.800 mW
4	6.7 mA	26.80 mW
6	10 mA	60.00 mW
8	13.34 mA	106.4 mW
10	16.7 mA	167.0 mW

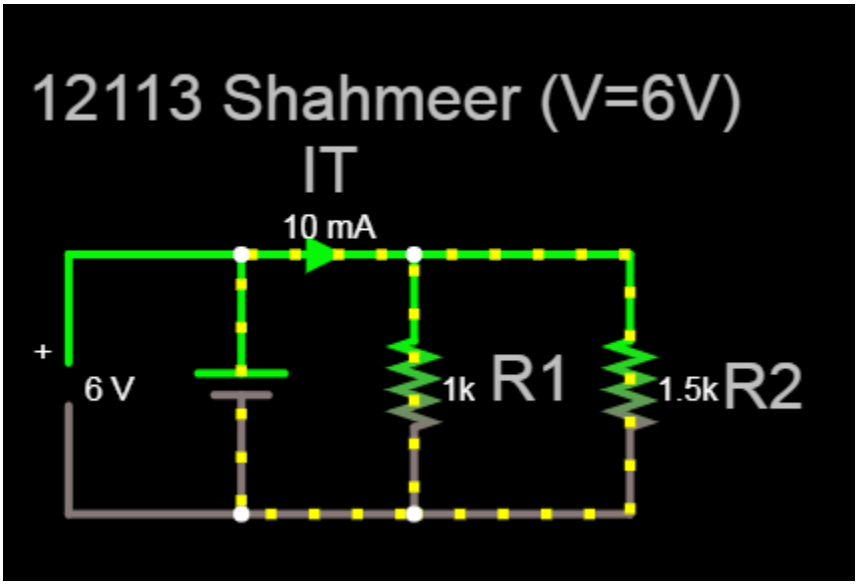
Table-2

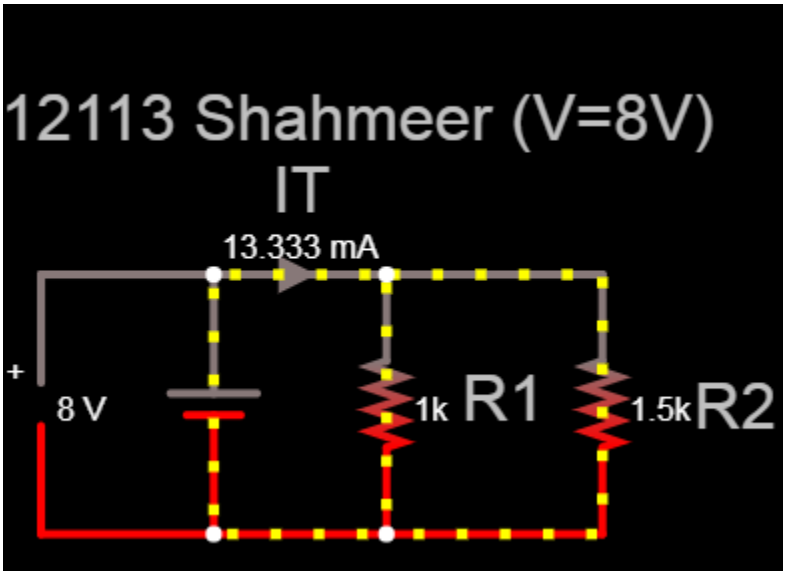
- Now calculate and record the power for each of the voltages and currents listed in Table-2.

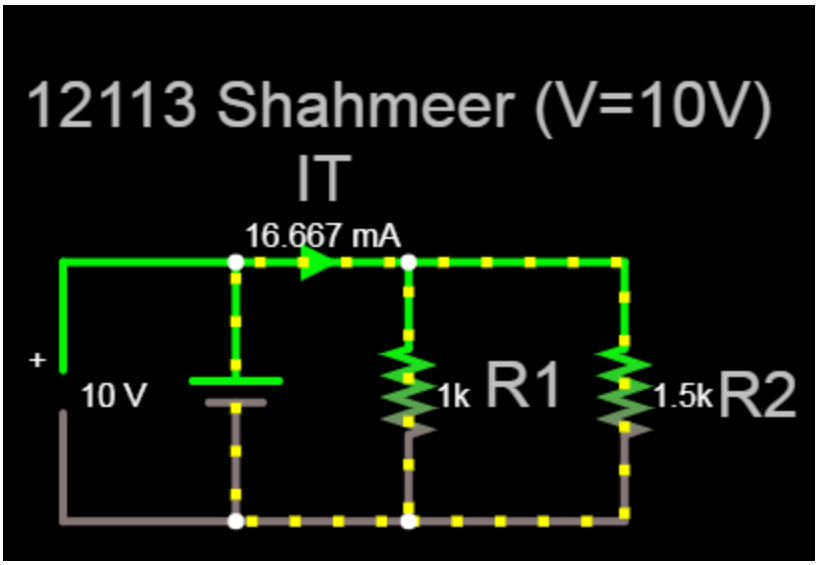
Screenshots:




12113 Shahmeer (V=4V)
IT
6.667 mA
+
4 V
1k R1
1.5k R2


12113 Shahmeer (V=6V)
IT
10 mA
+
6 V
1k R1
1.5k R2


12113 Shahmeer (V=8V)
IT
13.333 mA
+
8 V
1k R1
1.5k R2



- Compare the calculated values of table-1 with the measured values of Table-2. What factors would account for any differences in the sets of values?

  Answer:

  1. There would be Tolerance factor in Resistors 1 and Resistor 2. The Tolerance Factor will directly result in varying values of Resistance which will directly effect the measured value of the Current in Ammeter. Hence, Resistor's tolerance is the First factor for the difference between Calculated values and Measured Values.
  2. Other factors from Apparatus can include; - Instrumental Error etc.
  3. Other Errors can be simple Human Errors, like Calculation errors, Reading errors etc.

- Consider the current and power levels for 2 and 4 volts in Table-2. As the voltage doubles from 2 to 4 volts what does current do?

  Answer: The Current will also get doubled.

What does Power do?

Answer: The Power will also get increased 4 times.

Proof:

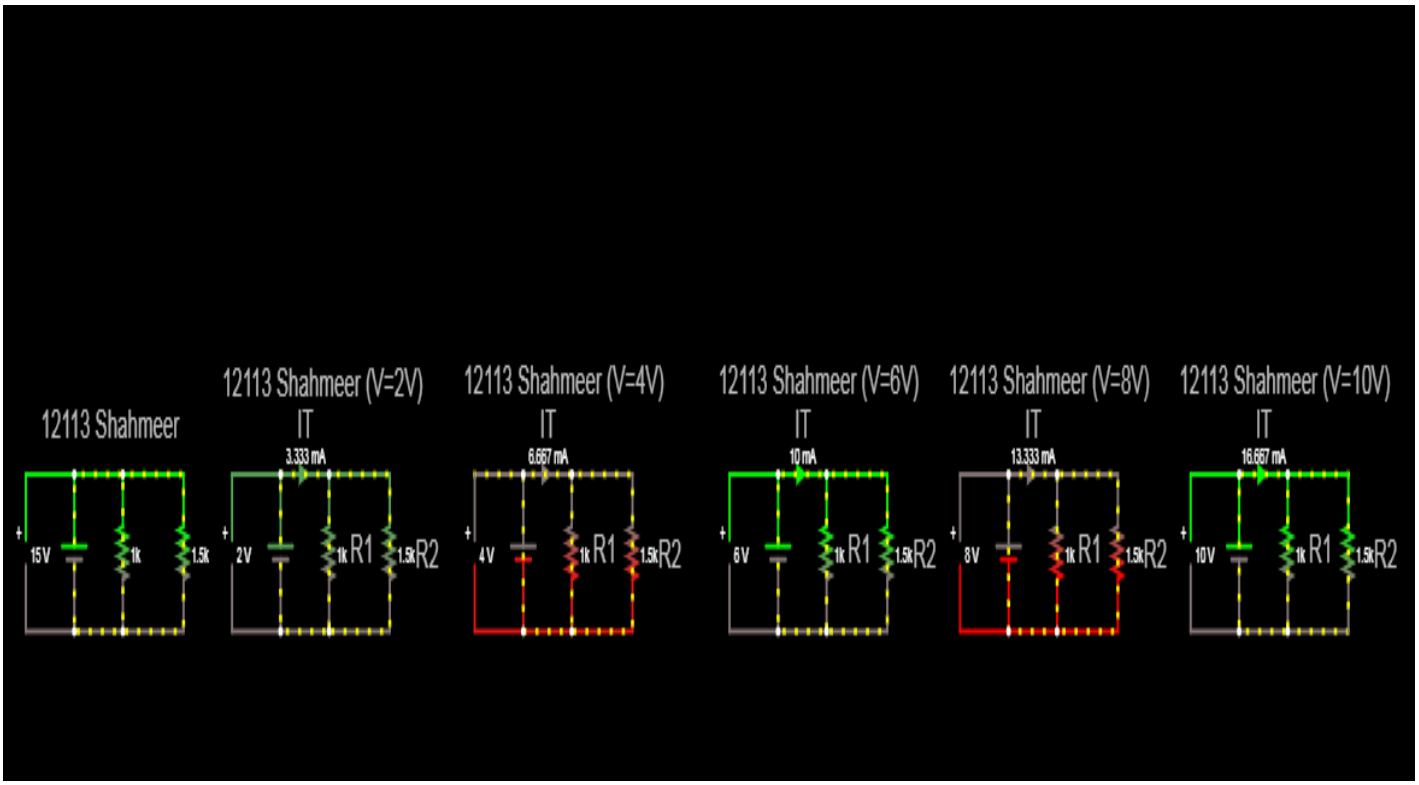
- Power at 2 volt = 0.006666.
- Power at 4 volt = 0.026666
  =>0.026666/0.006666
  => 4.0003 (Proved).
- Now consider the current and power values recorded for 4 and 8 volts. Did current doubles?

  Answer: Yes!! Current got doubled between 4 and 8.

  Did power increases four times?

  Answer: Yes!!.

Screenshot:



Link:

https://tinyurl.com/yahgfpzf

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