

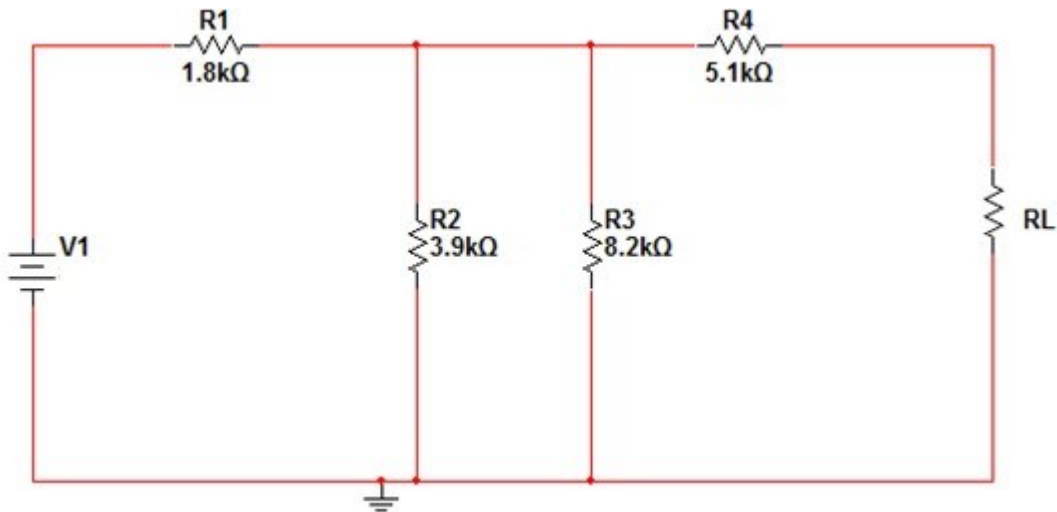
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- Implement the following circuit on the bread board.(V1=10V)



1- Based upon the circuit above, find the following parameters experimentally.

Parameter	V _{th}	I _N	R _{th}
Measured Value	5.92 V	0.96 mA	6.15 KΩ
Theoretical Value	5.9 V	0.956 mA	6.17 KΩ

To find R_{th} : ((R1||R2) || R3)+R4 :

$$\frac{1.8 * 3.9}{1.8 + 3.9} = 1.23 \quad \frac{1.23 * 8.2}{1.23 + 8.2} = 1.07 \quad 1.07 + 5.1 = 6.17 \text{ K}\Omega$$

To find V_{th}: Find I₂ and use V = I * R :

$$-10 + I_1 * 1.8 + (I_1 - I_2) * 3.9 = 0 \quad \dots \dots \dots 1$$

$$(I_2 - I_1) * 3.9 + I_2 * 8.2 = 0 \quad \dots \dots \dots 2$$

solve 1,2 : I₁ = 2.25 mA I₂ = 0.72 mA

$$V_{th} = I_2 * R_3 = 0.72 * 8.2 = 5.9 \text{ Volt}$$

To finde I_N use V_{th} = I_N * R_{th}

$$I_N = \frac{5.9}{6.17} = 0.956 \text{ mA}$$

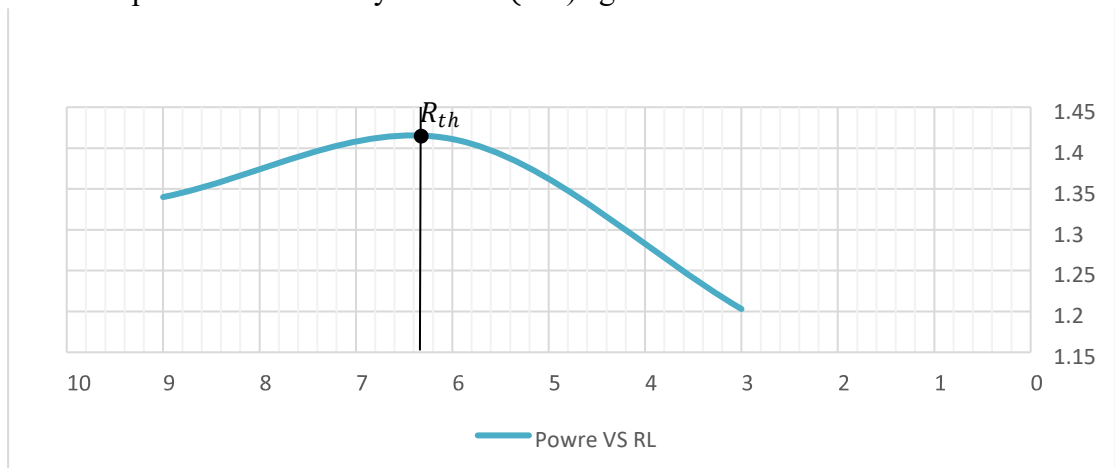
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2- Use the potentiometer as a load then fill the table below.

R_L (K Ω)	V_L	P_L (mW)
3K Ω	1.9	1.203
6 K Ω	2.91	1.411
9.1 K Ω	3.5	1.34

3- Draw the power consumed by the load (P_L) against R_L .



4- Draw the Thevenin equivalent circuit.

Down

5- Draw the Norton equivalent circuit.

Down

6- Determine which resistor consumes the largest power from the second table.

The Resistor with 6 K Ω .

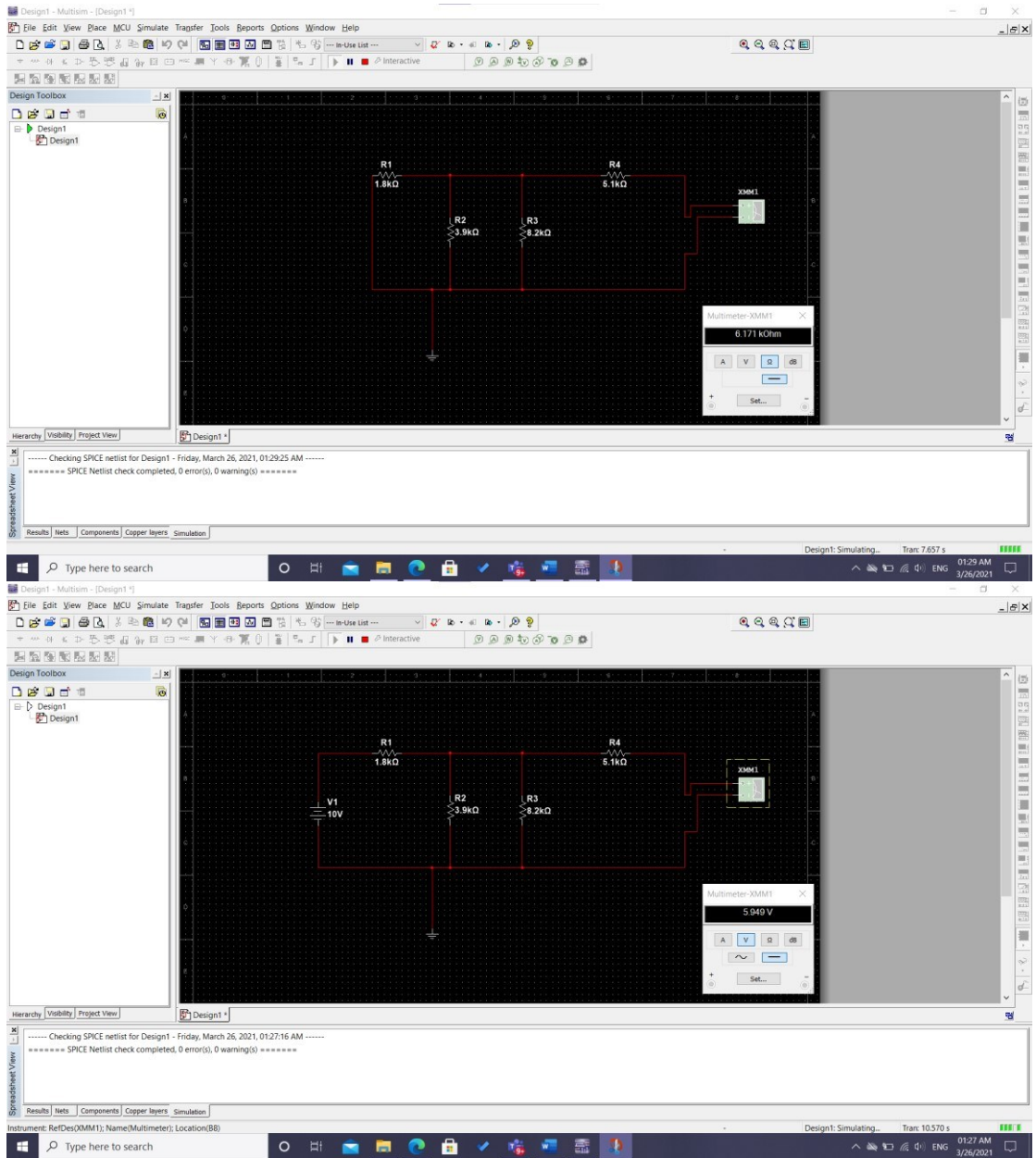
$$V_{th2}$$

7- Is this formula $P_{max} = \frac{V_{th}^2}{4R_{th}}$ verified the maximum power calculated from your measurements? If yes, prove that.

$$P_{max} = \frac{V_{th}^2}{4R_{th}} = \frac{5.92^2}{4 * 6.15} = 1.42 \text{ mW} , \text{ so yes it' verified.}$$

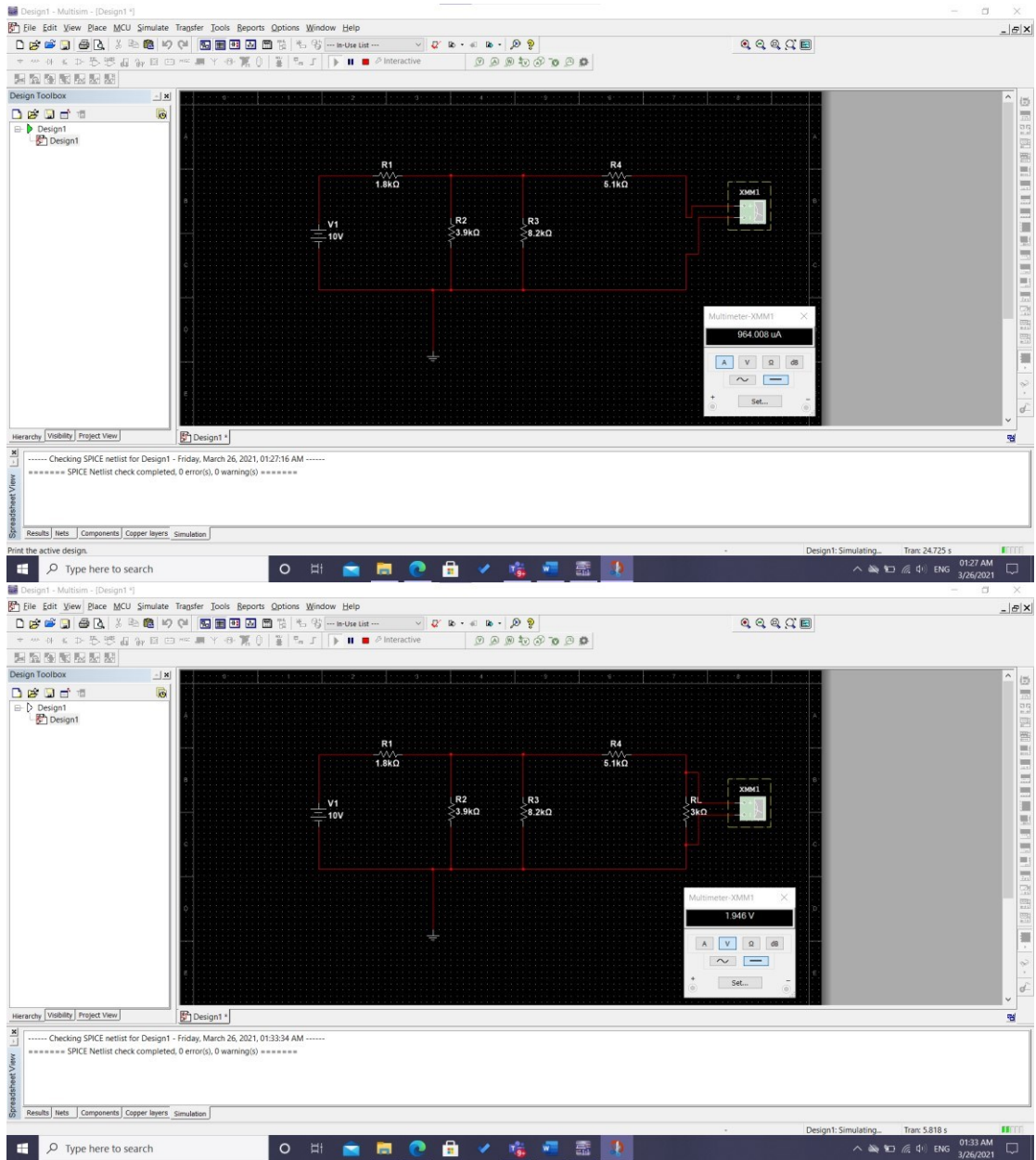
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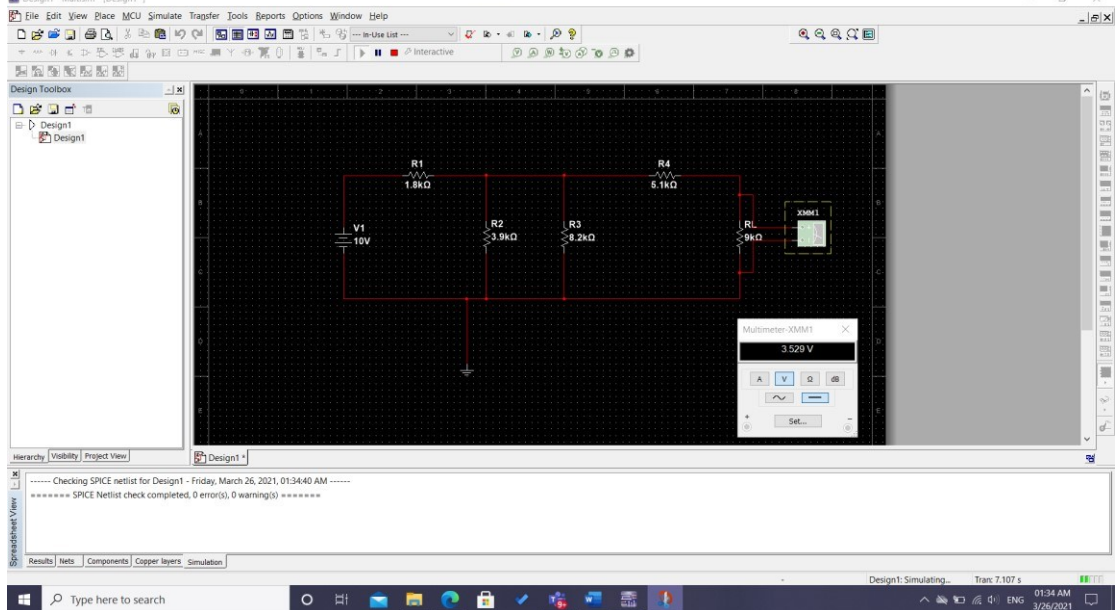
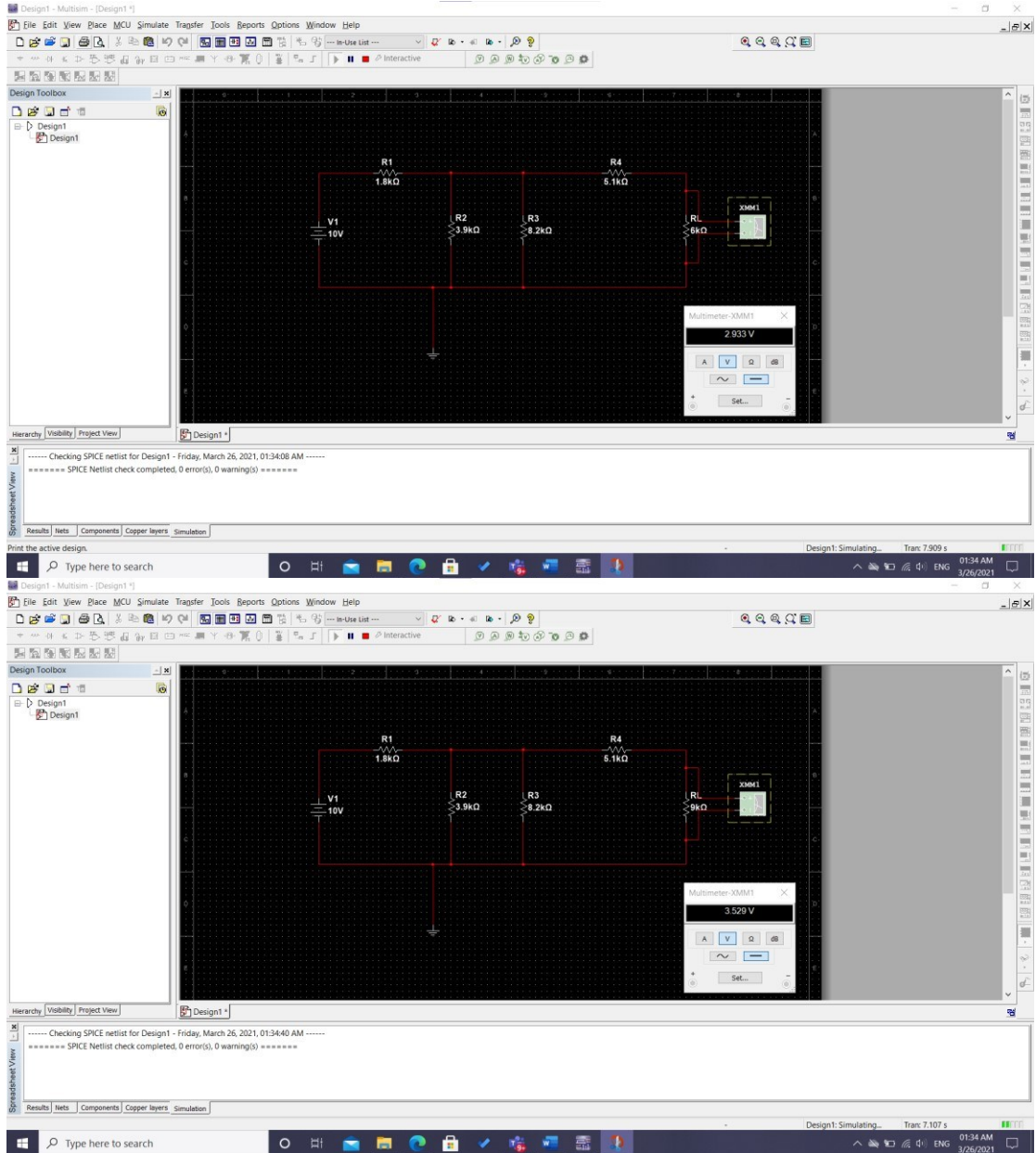
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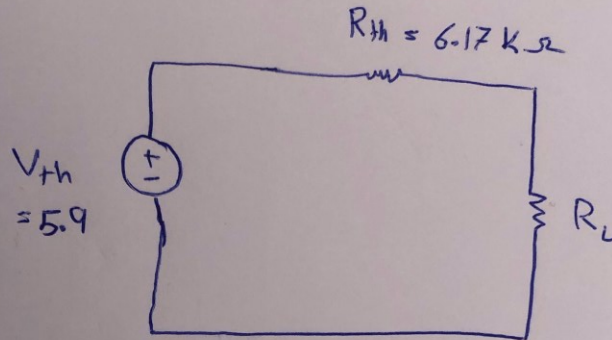
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