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Date: 03/05/2025

1. A circuit has 2.5K ohm, 3.6K ohm, and 9.5K ohm resistors in **series.** (a) How much is the total resistance of the entire circuit? (b) How much current flows in each resistance with a voltage of 180 V applied across the series circuit? (c) Find the voltage drop across each resistor.

Givens

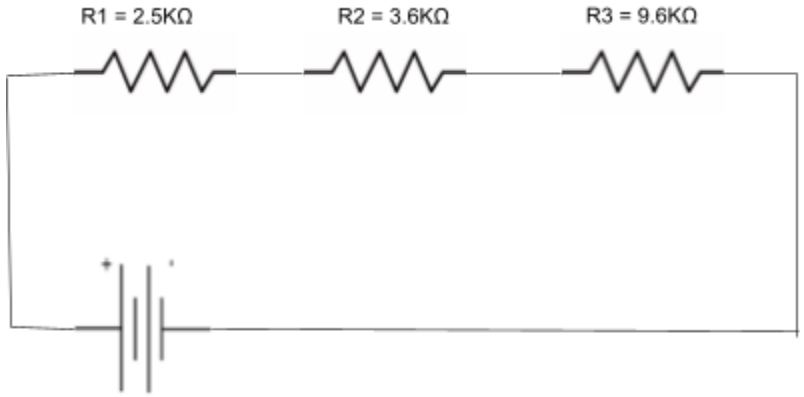
R1=2.5K ohm
R2 = 3.6K ohm
R3 = 9.5K ohm
Vt = 180 V

Find?

Voltage drop across each resistor

Sketch the Schematic Diagram

	Power	Voltage	Current	Resistance
Resistor 1	309.46 mW	26.84 V	11.53 mA	2.5K ohm
Resistor 2	478.49 mW	41.50 V	11.53 mA	3.6K ohm
Resistor 3	1.26 W	109.61 V	11.53 mA	9.5K ohm
Total	2.07 W	180V	11.53 mA	15.6K ohm



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2. A 1.5K ohms resistor is in **series** with an unknown resistance. The applied voltage equals 36V, and the series current is 14.4mA. (a) Calculate the value of the unknown resistor. (b) Calculate I1? I2? It? (c) Calculate Rt?

Givens

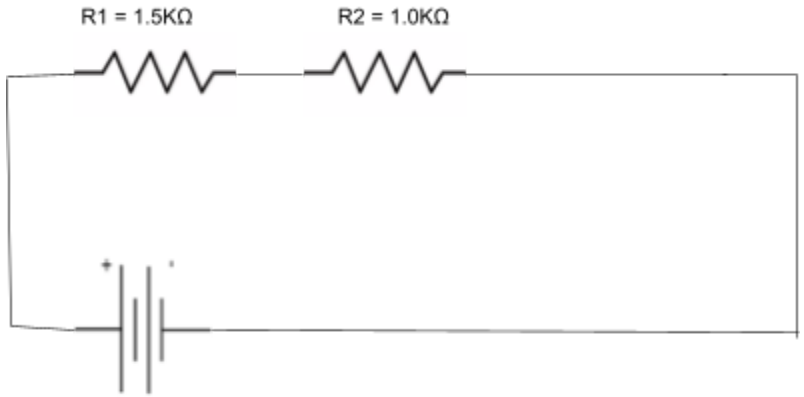
R1 = 1.5K ohm
Vt = 36 V
It = 14.4 mA

Find?

R2
I1, I2, I3
Rt

Sketch the Schematic Diagram

	Power	Voltage	Current	Resistance
Resistor 1	311.04 mW	21.6 V	14.4 mA	1.5K ohm
Resistor 2	207.36 mW	14.4 V	14.4 mA	1K ohm
Total	518.4 mW	36V	14.4 mA	2.5K ohm



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3. A circuit has a source voltage of 180V with a current of 3mA. Three resistors are connected in **series**: R1 is 10K ohms; R2 is 30K ohms while R3 is unknown. Analyze the series circuit to calculate the total resistance, current of all three resistors, and the voltage drop across R1, R2, and R3.

Givens

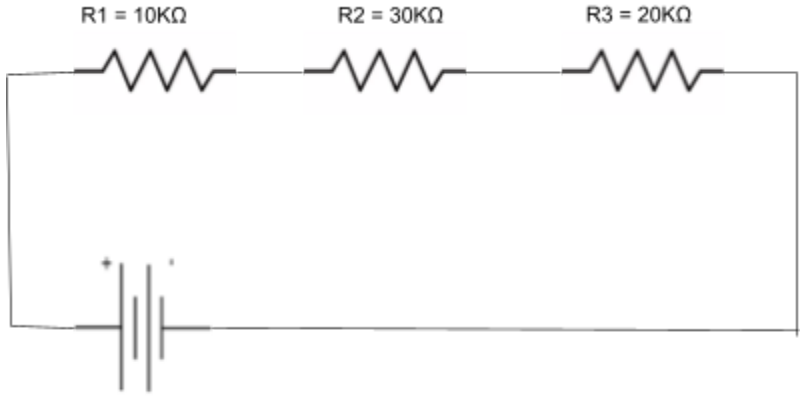
Vt = 180V
R1 = 10K ohm
R2 = 30K ohm

Find?

Rt
I1, I2, I3
V1, V2, V3

Sketch the Schematic Diagram

	Power	Voltage	Current	Resistance
Resistor 1	90 mW	30 V	3 mA	10K ohm
Resistor 2	270 mW	90 V	3 mA	30K ohm
Resistor 3	180 mW	60 V	3 mA	20K ohm
Total	540 mW	180V	3 mA	60K ohm



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4. A 5.5K ohms resistor is in **series** with an unknown resistance. The applied voltage equals 110V, and the series current is 1.4mA. Complete the chart below. Show all work.

	Power	Voltage	Current	Resistance
Resistor 1	**10mW**	**7.7V**	**1.4 mA**	**5.5k ohm**
Resistor 2	**143mW**	**102.29 V**	**1.4 mA**	**73.07k ohm**
Total	**154mW**	**110 V**	**1.4 mA**	**78.57k ohm**

Show all work

110/0.0014 = 78.57K
78570-5500= 73.07k
73070 * 0.0014 = 102.29
5500*0.0014= 7.7
7.7*0.0014=0.0107
102.29*0.0014=0.143
110*0.0014=0.154

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5. A circuit has a source voltage of 180V. Three resistors are connected in **parallel**: R1 is red, black, and orange ohms; R2 is yellow, black, and orange ohms, while R3 is 3.5K ohms. Complete the chart below. Show all work.

	Power	Voltage	Current	Resistance
Resistor 1	**1.62 W**	**180V**	**9mA**	**20k ohms**
Resistor 2	**810mW**	**180V**	**4.5mA**	**40k ohms**
Resistor 3	**9.26W**	**180V**	**51.4mA**	**3.5k ohms**
Total	**11.69W**	**180V**	**64.9mA**	**3.09k ohms**

Show all work

R1= 20000
R2= 40000
Req = 1/(1/20000 + 1/40000 + 1/3500) = 3093
180/20000 = 0.009
180/40000 = 0.0045
180/3500 = 0.0514
180/3090 = 0.0649
180*0.009 = 1.62
180*0.0045 = 0.81
180*0.0514 = 9.26

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180*0.0649 = 11.69

6. Four resistors are connected in **parallel** with a voltage source of 4V. The resistors are R1= 1K ohms, R2= red, red, red while R3= blue, grey, red, and R4= 470 ohms. Complete the table below.

	Power	Voltage	Current	Resistance
Resistor 1	**16mW**	**4 V**	**4mA**	**1k ohms**
Resistor 2	**7.27mW**	**4 V**	**1.82mA**	**2.2k ohms**
Resistor 3	**2.35mW**	**4 V**	**588uA**	**6.8k ohms**
Resistor 4	**34mW**	**4 V**	**8.51mA**	**470 ohms**
Total	**59.62mW**	**4 V**	**14.92mA**	**268.2 ohms**

Show all work
R2 = 2200
R3 = 6800

req = 1/(1/1000 + 1/2200 + 1/6800 + 1/470) = 268.2
4/1000 = 0.004
4/2200 = 0.00182
4/6800 = 0.000588
4/470 = 0.00851
4/268.2 = 0.01492
4*0.004 = 0.016
4*0.00182 = 0.00727
4*0.000588 = 0.00235
4*0.00851 = 0.034
4*0.01492 = 0.05962

7. A circuit contains four resistors connected in **parallel** across a 24V voltage source. R1= brown, black, black; R2= red, black, black; R3= orange, black, black, and R4= 40 ohms. Complete the table below.

	Power	Voltage	Current	Resistance
Resistor 1	**57.6W**	**24V**	**2.4A**	**10 ohms**
Resistor 2	**28.8W**	**24V**	**1.2A**	**20 ohms**
Resistor 3	**19.2W**	**24V**	**800mA**	**30 ohms**
Resistor 4	**14.4W**	**24V**	**600mA**	**40 ohms**
Total	**120W**	**24V**	**5A**	**4.8 ohms**

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Show all work
R1 = 10
R2 = 20
R3 = 30
req = 1/(1/10 + 1/20 + 1/30 + 1/40) = 4.8
24/10 = 2.4
24/20 = 1.2
24/30 = 0.8
24/40 = 0.6
24/4.8 = 5A
24*2.4 = 57.6
24*1.2 = 28.8
24*0.8 = 19.2
24*0.6 = 14.4
24*5 = 120

8. A parallel circuit has a total voltage of 120V and contains resistors with the following color bands.

R1= Red, Green, Red **R2= White, Black, Red**

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a) Using the resistor color codes table, identify the resistive value of the resistor.
R1 = 2.5K ohms
R2 = 9K ohms

b) If the fourth band for all the resistors is gold, determine the tolerance range for each resistor.
R1 = 2.375K ohms to 2.625K ohms
R2= 8.55K ohms to 9.45K ohms

c) A series circuit with a voltage source of 120V is connected with two resistors using the minimum tolerance value of each resistor stated above. Complete the chart.

	Power	Voltage	Current	Resistance
Resistor 1	286mW	26.08V	10.98mA	2.375K ohms
Resistor 2	1.031W	93.92V	10.98mA	8.55K ohms
Total	1.317W	120V	10.98mA	10.925K ohms