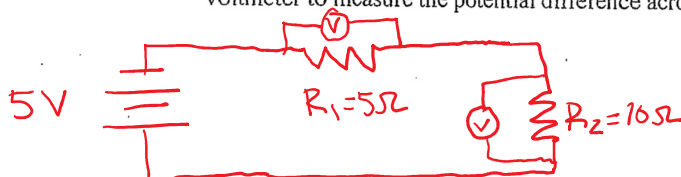


Name _____
Series Circuit

Regents Physics
Electricity Unit

1. A 5 ohm and a 10 ohm resistor are connected in series and hooked up to a battery that provides a potential difference of 5 V.

A) Draw a circuit diagram. Include an ammeter to measure the total current and a voltmeter to measure the potential difference across each resistor.



	V	I	R	P
1	1.65V	0.33A	5Ω	
2	3.33V	0.33A	10Ω	
T	5V	0.33A	15Ω	

B) Calculate the total resistance.

$$R_{eq} = R_1 + R_2 = 5\Omega + 10\Omega = 15\Omega$$

C) Calculate the total current for the circuit.

$$R = \frac{V}{I} \rightarrow I_T = \frac{V_T}{R_T} = \frac{5V}{15\Omega} = 0.33A$$

D) What is the current through each of the resistors.

$$I_T = I_1 = I_2 = 0.33A$$

E) Calculate the potential difference across each resistor.

$$R = \frac{V}{I} \rightarrow V = IR \quad V_1 = I_1 R_1 = (0.33A)(5\Omega) = 1.65V$$

$$V_2 = I_2 R_2 = (0.33A)(10\Omega) = 3.33V$$

F) What does the sum of these potential differences add up to? Does this make sense?

$$V_T = V_1 + V_2 = 1.65V + 3.33V = 4.98V \approx 5V$$

G) Calculate the total amount of power used by the circuit

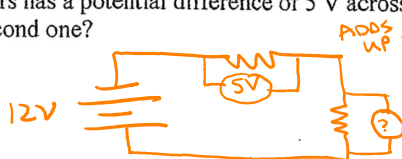
$$P_T = I_T V_T = (0.33A)(5V) = 1.65W$$

YES, IT SHOULD EQUAL 5V

H) Calculate the amount of energy used by the circuit if it was on for 120 s.

$$W = Pt = (1.65W)(120s) = 198J$$

2. Two resistors are hooked up in series to a battery that supplies 12 V. If one of the resistors has a potential difference of 5 V across it, what is the potential difference across the second one?



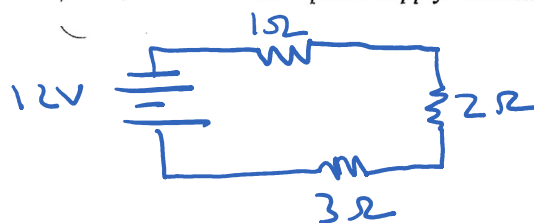
	V	I	R	P
1	5V			
2				
T	12V			

$$V_T = V_1 + V_2$$

$$12V = 5V + V_2$$

$$V_2 = 7V$$

3. A one ohm, two ohm, and three ohm resistor are hooked up in series with each other to a 12 V power supply. Calculate the current through each one.



	V	I	R	P
1			1Ω	
2			2Ω	
3			3Ω	
T	12V		6Ω	

1st: FIND R_T

$$R_T = R_1 + R_2 + R_3$$

$$= 1\Omega + 2\Omega + 3\Omega$$

$$R_T = 6\Omega$$

2nd: FIND I_T

$$R = \frac{V}{I} \rightarrow I_T = \frac{V_T}{R_T} = \frac{12V}{6\Omega} = 2A$$

$$I_T = I_1 = I_2 = I_3 = 2A$$

Unit 11 Work Packet: pg. 14