3 March 2022

Warm Up Question 1

Two resistors, with resistances of 5Ω and 10Ω are connected in series to a 30 V battery. Which of the following are the same for the two resistors: current, voltage, power dissipated? Explain your answer.

- 1. Same current. Different voltage, different power.
- 2. Same current, same voltage, same power.
- 3. Same voltage since the battery is the same. Different current, different power.
- 4. Same voltage since the voltage divides in half. Different current, different power.

Question 1

Consider the following circuit, where $R_1 = 5 \Omega$ and $R_1 = 10 \Omega$.



Let ΔV_1 be the potential difference across R_1 and ΔV_2 be the potential difference across R_2 . How are these related? (Hint: Consider energy between points on the circuit).

1.
$$\Delta V_1 = \Delta V_2$$

2.
$$\Delta V_1 = 2\Delta V_2$$

3.
$$\Delta V_1 = \frac{1}{2} \Delta V_2$$

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Warm Up Question 2

Two identical resistors are connected in parallel. Describe as precisely as possible how the equivalent resistance of the combination is related to the resistance of a single resistor in the combination. Explain your answer.

- 1. It will be double. Add the two resistances.
- 2. It will be double. There is twice as much resistance.
- 3. It will be half. Using the formula.
- 4. The same.

Question 2





Consider the current through resistor 3 when the switch is open versus when it is closed.

1.
$$I_{\text{closed}} = \frac{2}{3} I_{\text{open}}$$

2.
$$I_{\text{closed}} = I_{\text{open}}$$

3.
$$I_{\text{closed}} = \frac{3}{2} I_{\text{open}}$$