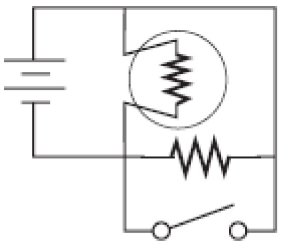
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Phys.G12-Q4W1-Electric Circuits-Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

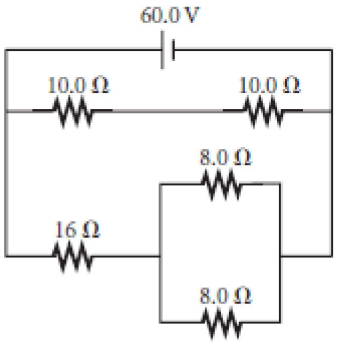
Choose the best answer from the options that follow each question.

____ 1. What happens when the switch is closed in the circuit shown below?



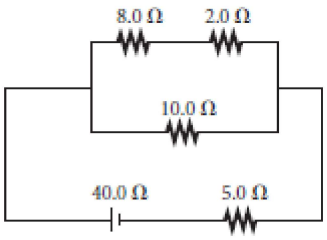
a. Current from the battery flows through the resistor.
b. The lamp goes out, because the battery terminals connect to each other.
c. Current from the battery flows through both the lamp and the resistor.
d. The lamp lights because current from the battery flows through the lamp.

____ 2. What is the equivalent resistance of the resistors in the figure shown below?



a. 16 Ω
b. 18 Ω
c. 7.5 Ω
d. 10 Ω

____ 3. What is the equivalent resistance for the resistors in the figure shown below?



a. 25 Ω
b. 7.5 Ω
c. 10.0 Ω
d. 5.0 Ω

Choose the best answer from the options that follow each question.

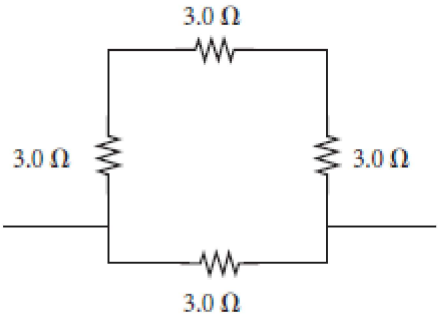
____ 4. You have three 100 Ω resistors available. How would you connect these three resistors to produce a 150 Ω equivalent resistance? You must use all of the resistors.
a. Connect one resistor in series with two resistors in parallel.
b. Connect all three resistors in series.
c. Connect all three resistors in parallel.
d. Connect two resistors in series with the third resistor in parallel to the first two.

Choose the best answer from the options that follow each question.

____ 5. Three resistors connected in parallel have potential differences across them labeled ΔV_1, ΔV_2, and ΔV_3. Which of the following expresses the potential difference across all three resistors?
a. $\Delta V_t = \Delta V_1 = \Delta V_2 = \Delta V_3$
b. $\Delta V_t = \left(\frac{1}{\Delta V_1} + \frac{1}{\Delta V_2} + \frac{1}{\Delta V_3} \right)$
c. $\Delta V_t = \Delta V_1 + \Delta V_2 + \Delta V_3$
d. $\Delta V_t = \left(\frac{1}{\Delta V_1} + \frac{1}{\Delta V_2} + \frac{1}{\Delta V_3} \right)^{-1}$

____ 6. Three resistors with values of 3.0 Ω, 6.0 Ω, and 12 Ω are connected in parallel. What is the equivalent resistance of this combination?
a. 0.26 Ω
b. 33 Ω
c. 1.7 Ω
d. 9.0 Ω

____ 7.



What is the equivalent resistance for the resistors in the figure shown above?

a. 2.2 Ω
b. 3.0 Ω
c. 1.3 Ω
d. 0.75 Ω

____ 8. Three resistors connected in parallel carry currents labeled I_1, I_2, and I_3. Which of the following expresses the total current I_t in the combined system?

a. $I_t = \left(\frac{1}{I_1} + \frac{1}{I_2} + \frac{1}{I_3} \right)$

b. $I_t = I_1 + I_2 + I_3$

c. $I_t = \left(\frac{1}{I_1} + \frac{1}{I_2} + \frac{1}{I_3} \right)^{-1}$

d. $I_t = I_1 = I_2 = I_3$

____ 9. The equivalent resistance of a complex circuit is usually determined by

a. adding and subtracting individual resistances.
b. inspection.
c. simplifying the circuit into groups of series and parallel circuits.
d. dividing the sum of the individual resistances by the number of resistances.

Choose the best answer from the options that follow each question.

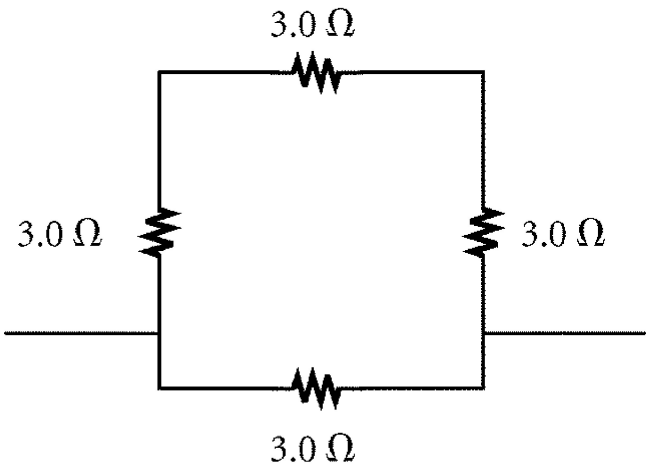
____ 10. The part of a circuit that converts electrical energy to other forms of energy is

a. the load.
b. the switch.
c. a battery.
d. a wire.

____ 11. The equivalent resistance of a complex circuit is usually determined by

a. simplifying the circuit into groups of series and parallel circuits.
b. adding and subtracting individual resistances.
c. dividing the sum of the individual resistances by the number of resistances.
d. inspection.

____ 12. To find the current in a complex circuit, it is necessary to know the
a. number of branches in the circuit.
b. equivalent resistance of the circuit.
c. current in each device in the circuit.
d. potential difference in each device in the circuit.



____ 13. What is the equivalent resistance for the resistors in the figure shown above?
a. 2.2 Ω
b. 3.0 Ω
c. 1.3 Ω
d. 12.0 Ω

Choose the best answer from the options that follow each question.

____ 14. What distinguishes a parallel circuit from a series circuit?
a. A parallel circuit always has more than one current path.
b. The equivalent resistance of a parallel circuit is less than that of a series circuit.
c. The voltage across the resistors in a parallel circuit is greater than it is in a series circuit.
d. The current in a parallel circuit is greater than in a series circuit.

____ 15. Four resistors having equal values are wired as a parallel circuit. How does the equivalent resistance of the circuit compare to the resistance of a single resistor?
a. The equivalent resistance is greater than the resistance of any single resistor.
b. The equivalent resistance is one-fourth the resistance value of a single resistor.
c. The equivalent resistance is one-half the resistance value of a single resistor.
d. The equivalent resistance is the same as the resistance of any single resistor.

____ 16. Six resistors are wired in a parallel circuit. What is the voltage across each resistor in the circuit if the first resistor is connected to a 24 V battery?
a. 24 V
b. 4 V
c. Voltage cannot be determined without the resistance values.
d. 0.25 V

____ 17. If the batteries in a portable CD player provide a terminal voltage of 12 V, what is the potential difference across the entire CD player?
a. 4.0 V
b. 12 V
c. 3.0 V
d. 6.0 V

____ 18. Three resistors with values of R_1, R_2, and R_3 are connected in parallel. Which of the following expresses the total resistance, R_{eq}, of the three resistors?

a. $R_{eq} = R_1 = R_2 = R_3$

b. $R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right)$

c. $R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right)^{-1}$

d. $R_{eq} = R_1 + R_2 + R_3$

____ 19. If the potential difference across a pair of batteries used to power a flashlight is 6.0 V, what is the potential difference across the flashlight bulb?

a. 3.0 V
b. 6.0 V
c. 12 V
d. 9.0 V

____ 20. Three resistors connected in parallel carry currents labeled I_1, I_2, and I_3. Which of the following expresses the total current I_t in the combined system?

a. $I_t = I_1 = I_2 = I_3$

b. $I_t = I_1 + I_2 + I_3$

c. $I_t = \left(\frac{1}{I_1} + \frac{1}{I_2} + \frac{1}{I_3} \right)$

d. $I_t = \left(\frac{1}{I_1} + \frac{1}{I_2} + \frac{1}{I_3} \right)^{-1}$

____ 21. Three resistors with values of 3.0 Ω, 6.0 Ω, and 12 Ω are connected in parallel. What is the equivalent resistance of this combination?

a. 21 Ω
b. 0.26 Ω
c. 1.7 Ω
d. 9.0 Ω

____ 22. Three resistors with values of 3.0 Ω, 6.0 Ω, and 12 Ω are connected in series. What is the equivalent resistance of this combination?

a. 0.58 Ω
b. 1.7 Ω
c. 21 Ω
d. 7.0 Ω

____ 23. Three resistors connected in series have potential differences across them labeled ΔV_1, ΔV_2, and ΔV_3. Which of the following expresses the potential difference taken over the three resistors together?

a. $\Delta V_t = \Delta V_1 = \Delta V_2 = \Delta V_3$

b. $\Delta V_t = \left(\frac{1}{\Delta V_1} + \frac{1}{\Delta V_2} + \frac{1}{\Delta V_3} \right)^{-1}$

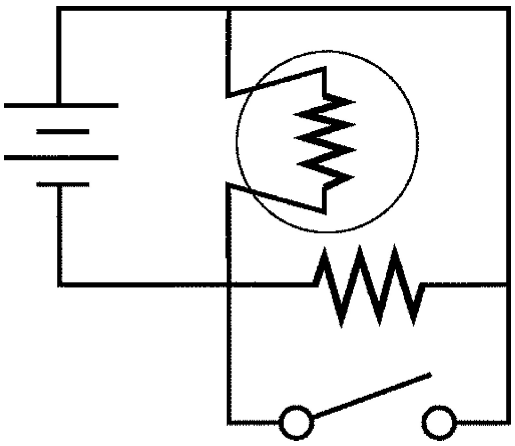
c. $\Delta V_t = \Delta V_1 + \Delta V_2 + \Delta V_3$

d. $\Delta V_t = \left(\frac{1}{\Delta V_1} + \frac{1}{\Delta V_2} + \frac{1}{\Delta V_3} \right)$

____ 24. Two resistors having the same resistance value are wired in parallel. How does the equivalent resistance compare to the resistance value of a single resistor?

a. The equivalent resistance is twice the value of a single resistor.
b. The equivalent resistance is the same as a single resistor.
c. The equivalent resistance is greater than that of a single resistor.
d. The equivalent resistance is half the value of a single resistor.

____ 25.



What happens when the switch is closed in the circuit shown above?

a. The lamp lights because current from the battery flows through the lamp.
b. Current from the battery is carried through both the lamp and the resistor.
c. Current from the battery is carried through the resistor.
d. The lamp goes out, because the battery terminals connect to each other.

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