

Name: _____

Date: _____

Quiz name: **Circuits**

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1. Which of the following light bulbs has the largest current through it when operated at the voltage for which it's rated?

☐ (A) 4.0 W, 7.5 V
☐ (B) 30 W, 15 V
☐ (C) 20 W, 23 V
☐ (D) 40 W, 30 V

2. Which of the following light bulbs has the largest resistance when operated at the voltage for which it's rated?

☐ (A) 6.4 W, 12 V
☐ (B) 48 W, 24 V
☐ (C) 32 W, 36 V
☐ (D) 64 W, 48 V

3. A copper wire is stretched so that its length increases and its diameter decreases.

☐ (A) The wire's resistance decreases, but its resistivity stays the same.
☐ (B) The wire's resistivity decreases, but its resistance stays the same.
☐ (C) The wire's resistance increases, but its resistivity stays the same.
☐ (D) The wire's resistivity increases, but its resistance stays the same.

4. The potential difference (voltage) across a length of wire is increased. Which of the following does not increase as well?

☐ (A) The power dissipated in the wire.
☐ (B) The resistance of the wire.
☐ (C) The current in the wire.

5. A stereo amplifier creates a 7.0V potential difference across a speaker. To double the power output of the speaker, the amplifier's potential difference (voltage) must be increased to

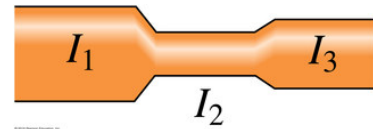
☐ (A) 9.9 V
☐ (B) 20 V
☐ (C) 14 V
☐ (D) 49 V

6. A resistor connected to a 3.0 V battery dissipates 1.0 W. If the battery is replaced by a 6.0 V battery, the power dissipated by the resistor will be

☐ (A) 1 W
☐ (B) 2 W
☐ (C) 3 W
☐ (D) 4 W

7. The figure shows a side view of a wire of varying circular cross section. Rank in order the currents flowing in the three sections

- (A) $I_1 > I_2 > I_3$
- (B) $I_3 > I_2 > I_1$
- (C) $I_1 = I_2 = I_3$
- (D) $I_1 > I_3 > I_2$

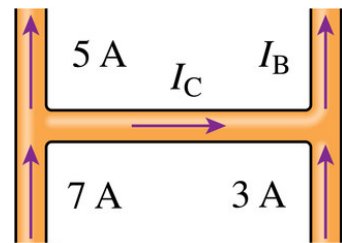


8. A person gains weight by adding fat - and therefore adding girth - to his body and his limbs, with the amount of muscle remaining constant. How will this affect the electrical resistance of his limbs?

- (A) the resistance will increase
- (B) the resistance will decrease
- (C) the resistance will stay the same

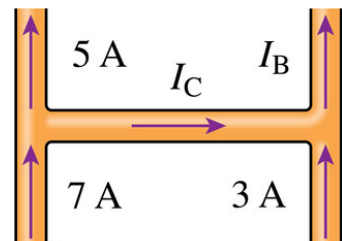
9. What is the current through I_C

- (A) 2 A
- (B) 3 A
- (C) 5 A
- (D) 7 A
- (E) 12 A



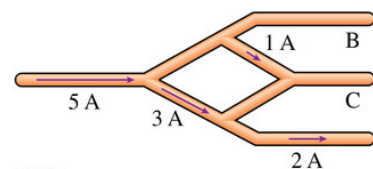
10. What is the current through I_B

- (A) 2 A
- (B) 3 A
- (C) 5 A
- (D) 7 A
- (E) 12 A



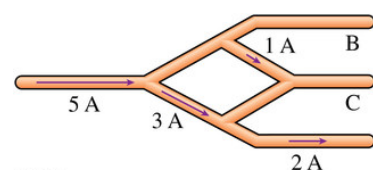
11. What is the current through section B?

- (A) 1 A
- (B) 2 A
- (C) 3 A
- (D) 4 A
- (E) 5 A



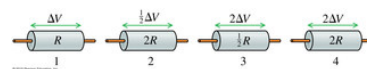
12. What is the current through section C?

- (A) 1 A
- (B) 2 A
- (C) 3 A
- (D) 4 A
- (E) 5 A



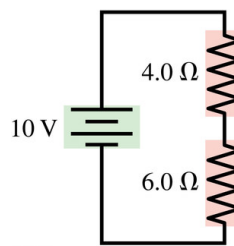
13. Which of these has the most current?

- (A) 1
- (B) 2
- (C) 3
- (D) 4



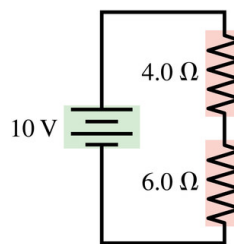
14. What is the current in the circuit of the figure?

- (A) 1.0 A
- (B) 1.7 A
- (C) 2.5 A
- (D) 4.2 A



15. Which resistor in the figure dissipates the most power?

- (A) The 4 Ω resistor
- (B) The 6 Ω resistor
- (C) Both dissipate the same power



16. A metal wire of length L and resistance R is cut into two pieces of equal length. The two pieces are connected together side by side. What is the new resistance?

- (A) $R/4$
- (B) $R/2$
- (C) R
- (D) $2R$
- (E) $4R$

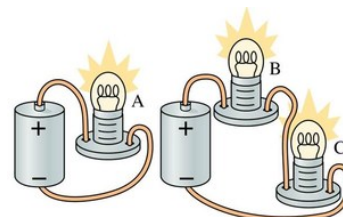
17. Does the bulb light?

- (A) Yes
- (B) No



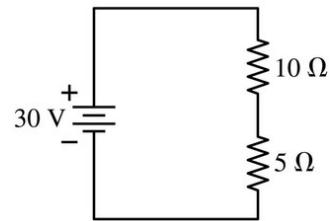
18. The three bulbs are identical and the two batteries are identical. Compare the brightnesses of the bulbs.

- (A) $A > B > C$
- (B) $A > C > B$
- (C) $A > B = C$
- (D) $A < B = C$
- (E) $A = B = C$



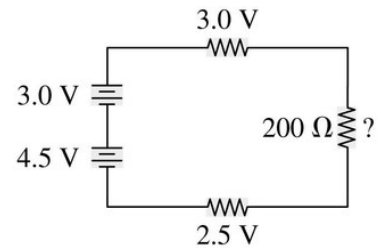
19. The potential difference across the 10 resistor is

- (A) 30 V
- (B) 20 V
- (C) 15 V
- (D) 10 V
- (E) 5 V



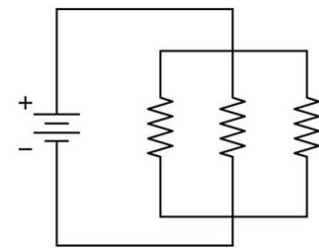
20. The diagram below shows a circuit with two batteries and three resistors. What is the potential difference across the $200\ \Omega$ resistor?

- (A) 2.0 V
- (B) 3.0 V
- (C) 4.5 V
- (D) 7.5 V
- (E) There is not enough information to decide.



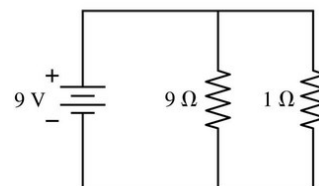
21. What things about the resistors in this circuit are the same for all three?

- (A) Current I
- (B) Potential difference ΔV
- (C) Resistance R
- (D) A & B
- (E) B & C



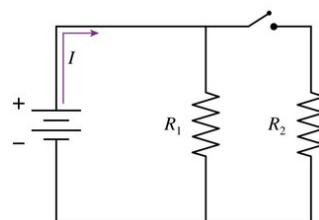
22. Which resistor dissipates more power?

- (A) The $9\ \Omega$ resistor
- (B) The $1\ \Omega$ resistor
- (C) The dissipate the same power



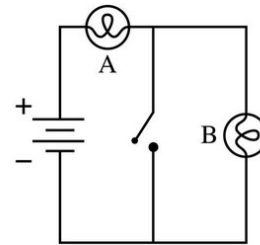
23. When the switch closes the battery current

- (A) increases
- (B) stays the same
- (C) decreases



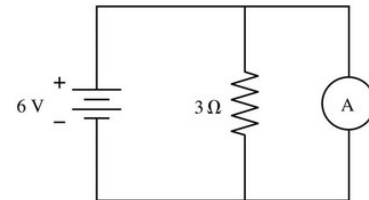
24. The lightbulbs are identical. Initially both bulbs are glowing. What happens when the switch is closed?

- (A) Nothing
- (B) A stays the same; B gets dimmer.
- (C) A gets brighter; B stays the same.
- (D) Both get dimmer.
- (E) A gets brighter; B goes out.



25. What does the ammeter read?

- (A) 6 A
- (B) 3 A
- (C) 2 A
- (D) Some other value
- (E) Nothing because this will fry the meter.



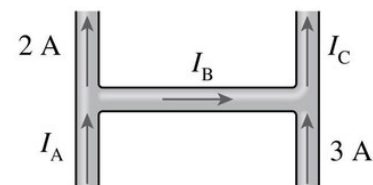
26. Every minute, 120 C of charge flow through this cross section of the wire.

- (A) 240 A
- (B) 120 A
- (C) 60 A
- (D) 2 A
- (E) Some other value



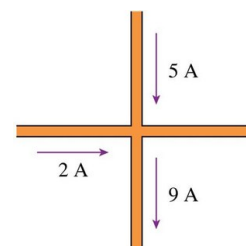
27. The wires shown next carry currents as noted. Rate the currents I_A , I_B , and I_C .

- (A) $I_A > I_B > I_C$
- (B) $I_B > I_A > I_C$
- (C) $I_C > I_A > I_B$
- (D) $I_A > I_C > I_B$
- (E) $I_C > I_B > I_A$



28. Consider the junction: The current in the fourth wire is

- (A) 16 A to the right.
- (B) 4 A to the left.
- (C) 2 A to the right.
- (D) 2 A to the left.
- (E) Not enough information to tell

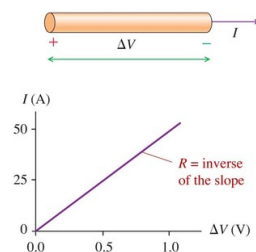


29. A battery is connected to a wire, and creates a current in the wire. Which of the following changes would increase the current?

- (A) Increasing the length of the wire
- (B) Keeping the wire the same length, but making it thicker
- (C) Using a battery with a lower emf (voltage)
- (D) Making the wire into a coil, but keeping its dimensions the same
- (E) Changing the wire material from copper to nichrome

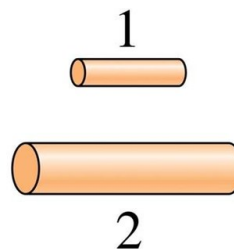
30. The current through a wire is measured as the potential difference ΔV is varied. What is the wire's resistance?

- (A) $0.01\ \Omega$
 (B) $0.02\ \Omega$
 (C) $50\ \Omega$
 (D) $100\ \Omega$
 (E) Some other value



31. Wire 2 is twice the length and twice the diameter of wire 1. What is the ratio R_2/R_1 of their resistances?

- (A) $1/4$
 (B) $1/2$
 (C) 1
 (D) 2
 (E) 4



32. Several light bulbs, different rated voltages, powers. Which one has highest resistance?

- (A) A
 (B) B
 (C) C
 (D) D
 (E) E

Bulb	Voltage across Bulb	Power Dissipated by Bulb
A	10 V	1 W
B	8 V	1 W
C	12 V	2 W
D	6 V	2 W
E	3 V	3 W

33. Which has a larger resistance, a 60 W lightbulb or a 100 W lightbulb, assuming they are both rated for a 120 V socket.

- (A) The 60 W bulb
 (B) The 100 W bulb
 (C) Their resistances are the same.
 (D) There's not enough information to tell.

34. What would the slope of a Current (y-axis) vs Voltage (x-axis) represent?

- (A) R
 (B) $1/R$
 (C) P
 (D) $1/P$

35. What would the area under a Voltage (y-axis) vs Current (x-axis) represent?

- (A) R
 (B) $1/R$
 (C) P
 (D) $1/P$

36. What would the slope of a Power (y-axis) vs. Current (x-axis) represent?

- ☐ A V
- ☐ B $1/V$
- ☐ C R
- ☐ D $1/R$