

Name _____ Date _____
Science Olympiad Shock Value Test
Free Response

1. Draw the schematic symbol for (1 point each):

A. Light Bulb

B. Battery

C. Ammeter

D. Resistor

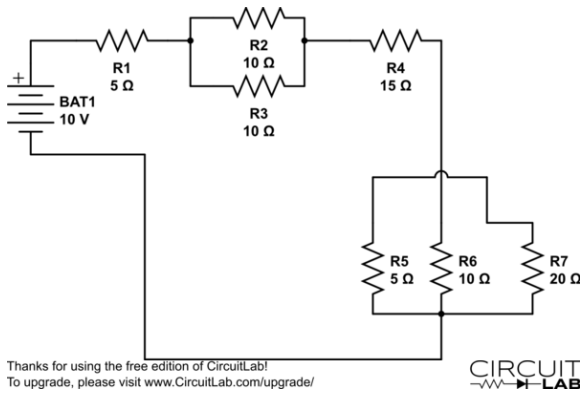
2. What does electricity's root, *electron*, mean in Greek (1 point)?

3. Which Greek Philosopher discovered electricity (1 point)?

4. How was electricity discovered (1 point)?

5. How is lightning produced (don't just answer the type, explain how and don't go into a too detailed explanation) (3 points)?

6. Find the total amount of ohmic resistance to the nearest hundredth. (1 point)



Supposed to be one node

7. How many electrons are in one coulomb of charge? (1 point)

8. In a dry cell, what is the electrolyte (what happens to it)? (1 point)

9. What is the anode of a battery? (1 point)

10. Which magnetic pole is the North Pole located in? (1 point)

11. How does heat obstruct current at the atomic level? (1 point)

12. In Fleming's left-hand rule, what do the thumb, pointer, and middle finger represent. (3 points)

Thumb:

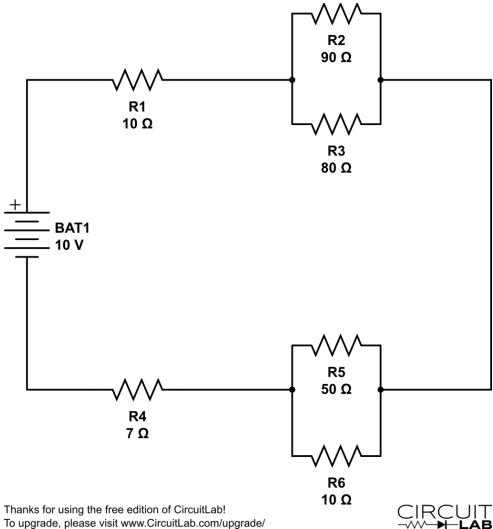
Pointer:

Middle:

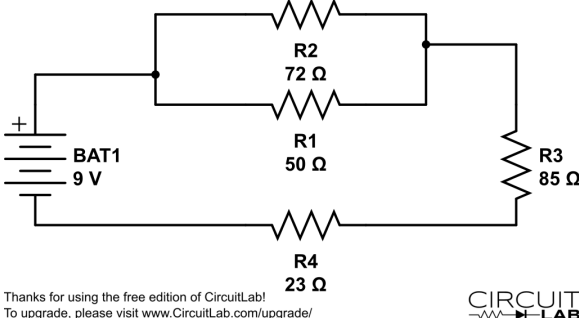
13. How do you define the North and South pole of a magnet? (2 points)

14. Who united electricity and magnetism? (1 point)

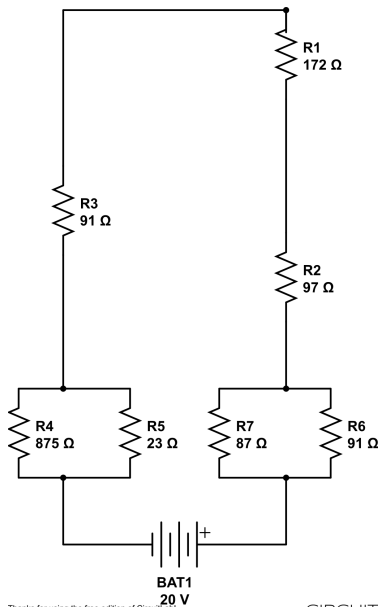
15. What is the total amount of Ohmic resistance? (1 point)



16. What is the total amount of Ohmic resistance? (1 point)



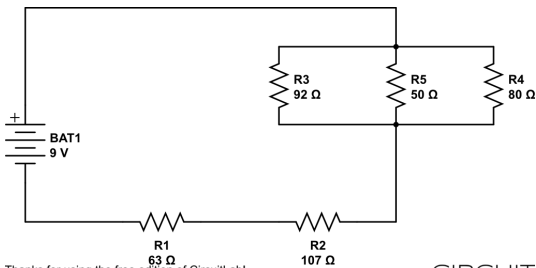
17. What is the total amount of Ohmic resistance? (1 point)



Thanks for using the free edition of CircuitLab!
To upgrade, please visit www.CircuitLab.com/upgrade/

CIRCUIT
LAB

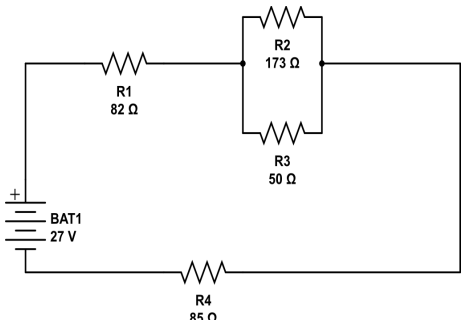
18. What is the total amount of Ohmic resistance? (1 point)



Thanks for using the free edition of CircuitLab!
To upgrade, please visit www.CircuitLab.com/upgrade/

CIRCUIT
LAB

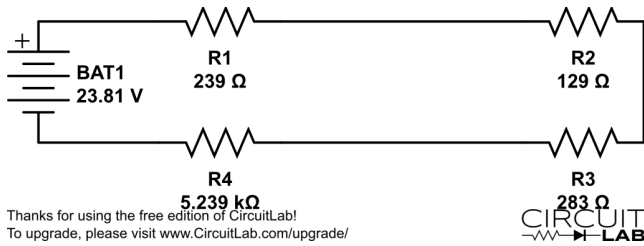
19. What is the total amount of Ohmic resistance? (1 point)



Thanks for using the free edition of CircuitLab!
To upgrade, please visit www.CircuitLab.com/upgrade/

CIRCUIT
LAB

20. What is the amount of voltage drop in R4? (2 points)



21. What is the total amount of amps coursing through number 21 (to the nearest thousandth)? (2 points)

22. What is a short circuit? (1 point)

23. Why is a short circuit dangerous? (1 point)

24. What is a closed circuit? (1 point)

25. What is an open circuit? (1 point)

26. What two items does a fuel cell use? (1 point)

27. If batteries are connected in a parallel circuit, is it safe for them to each be separate voltages (e.g. a parallel circuit with three batteries, one being 2 volts, the second being 4 volts, and the third being 6)? Why? (2 points)

28. Does an open switch allow electrons to flow through it? (1 point)

29. What is Joule's law (formula)? (1 point)

30. How are resistors rated (hint: it's not only resistance)? (1 point)
31. What is a device called if it can perform a *useful* task with power? (1 point)
32. What is a varistor? (1 point)
33. Does the arrangement of a resistive circuit matter when calculating power (e.g. parallel, series, etc.)? (1 point)
34. What is dynamic electricity also known as? (1 point)
35. What is negative resistance? (1 point)
36. What is the Earth's magnetic field also known as? (1 point)
37. If a cell is large, is its internal resistance large or small? (1 point)
38. Do normal conductors contain resistance? (1 point)
39. To become a superconductor, what is the maximum amount of resistance allowed? (1 point)
40. For presently known superconductors, what must be done so that they may superconduct? (1 point)

Multiple Choice

1. What does one horsepower equal? (1 point)

- A. 745.7 watts
- B. 612.2 watts
- C. 587.21 watts
- D. Horsepower does not compute into watts

2. What does an electron equal (to the nearest hundredth)? (1 point)

- A. $-1.62 \cdot 10^{-19}$ C
- B. $-1.60 \cdot 10^{-19}$ C
- C. $-1.62 \cdot 10^{-18}$ C
- D. $-1.60 \cdot 10^{-18}$ C

3. Say there was a motor generating power (watts) by the second. If the current was .36 Amps and the resistance was 75.26 Ohms, how many watts would it generate per second? (1 point)

- A. 9.8 watts.
- B. 27.2 watts.
- C. 20.5 watts.
- D. None of the above

4. What happens when two unlike charges are brought together? (1 point)

- A. They Attract
- B. They Repel
- C. Nothing happens

5. What happens when two like charges are brought together? (1 point)

- A. They Attract
- B. They Repel
- C. Nothing happens

6. Who founded Ohm's law? (1 point)

- A. Alexander Ohm
- B. Edward Ohm
- C. Gustav Ohm
- D. Georg Ohm

7. According to Kirchhoff's laws, what is the sum of all the currents in a node? (1 point)

- A. 0
- B. 1
- C. -1
- D. 10

8. Electrons move _____ (1 point)

- A. alongside the current
- B. in the opposite way of the current

9. What is the Joule equal to? (1 point)

- A. A force of 1 newton exerted for 1 meter
- B. A force of 1 newton exerted for 1 dekameter
- C. A force of 1 newton extended for 1 decimeter
- D. A force of 1 newton extended for 1 hectometer

10. How many Ohms does the ideal Ammeter have? (1 point)

- A. 2 Ohms
- B. 1 Ohm
- C. 0 Ohms
- D. 3 Ohms