

Circuits Worksheet**Multiple Choice**

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

- _____ 1. In order for current to flow in a circuit, you must have
- a switch that is open.
 - a complete path for the current.
 - two light bulbs in parallel.
 - two light bulbs in series.
 - all of the above
- _____ 2. Electrical resistance is measured in
- volts.
 - amperes.
 - joules.
 - watts.
 - none of the above.
- _____ 3. A closed circuit is a circuit in which charge
- can flow.
 - is prevented from flowing.
- _____ 4. When two light bulbs are connected in series, the
- current through each light bulb is proportional to the resistance of the bulb.
 - same amount of current always flows through each bulb.
 - neither A nor B
- _____ 5. The symbol used to represent resistance in a schematic diagram is
- two straight lines.
 - a single line that is broken and has a bend in it.
 - one straight line.
 - a zigzag line.
 - none of the above
- _____ 6. When resistors are put in series next to each other, their overall resistance is
- the same as the resistance of one of the resistors.
 - larger than the resistance of any individual resistor.
 - smaller than the resistance of any of the resistors.
- _____ 7. When resistors are put in parallel with each other their overall resistance is
- smaller than the resistance of any of the resistors.
 - larger than the resistance of any other resistor.
 - the same as the resistance of one of the resistors.
- _____ 8. As more lamps are put into a series circuit, the overall current in the circuit
- stays the same.
 - increases.
 - decreases.

- _____ 9. As more lamps are put into a parallel circuit, the overall current in the circuit
- increases.
 - stays the same.
 - decreases.
- _____ 10. Compared to the resistance of two resistors connected in series, the same two resistors connected in parallel have
- less resistance.
 - more resistance.
 - the same resistance.
- _____ 11. When one light bulb in a series circuit containing several light bulbs burns out
- none of the other bulbs will light up.
 - nothing changes in the rest of the circuit.
 - the other light bulbs burn brighter.
- _____ 12. When one light bulb in a parallel circuit containing several light bulbs burns out, the other light bulbs
- do not burn at all.
 - burn brighter.
 - burn the same as before.
- _____ 13. In a simple parallel circuit
- current through each branch is always the same.
 - voltage across each branch is always the same.
 - the value of each resistor is the same.
 - the circuit won't work unless there is a fuse in it.
 - none of the above
- _____ 14. In a simple parallel circuit
- voltage across each branch is the same.
 - current through each resistor is inversely proportional to the resistance.
 - current is divided at each branch.
 - all of the above
 - none of the above
- _____ 15. Electrical devices in our homes are connected in
- parallel.
 - series.
- _____ 16. Fuses and circuit breakers are used to
- protect us.
 - prevent overloading.
 - keep wires from getting overheated.
 - break the circuit when too much current is being used.
 - all of the above

- _____ 17. A short circuit occurs when
- the positive wire is connected directly to the negative wire.
 - very short wires are used in the circuit.
 - current lasts in the circuit for only a short time.
 - all of the above
 - none of the above
- _____ 18. Two lamps, one with a thick filament and one with a thin filament, are connected in series. The current is greater in the lamp with the
- thin filament.
 - thick filament.
 - Current is the same in each lamp.
- _____ 19. Two lamps, one with a thick filament and one with a thin filament, are connected in parallel to a battery. The voltage is greater across the lamp with the
- thin filament.
 - thick filament.
 - Both voltages are the same.
- _____ 20. Two lamps, one with a thick filament and one with a thin filament, are connected in parallel to a battery. The current is larger in the lamp with the
- thick filament.
 - thin filament.
 - Current is the same in both.
- _____ 21. Two lamps, one with a thick filament and one with a thin filament, are connected in series to a battery. The voltage is greater across the lamp with the
- thin filament.
 - thick filament.
 - Voltage is the same for both.
- _____ 22. A 60-W light bulb is connected to a 12-V car battery. When another 60-W bulb is connected in parallel with the first bulb, the battery's output energy
- doubles.
 - halves.
 - remains the same.
- _____ 23. The total resistance of a 10-ohm resistor and a 7-ohm resistor in series is
- 2 ohms.
 - 3 ohms.
 - 7 ohms.
 - 17 ohms.
 - 70 ohms.
- _____ 24. The total resistance of a 6-ohm resistor and a 12-ohm resistor in parallel is
- 4 ohms.
 - 6 ohms.
 - 18 ohms.
 - 20 ohms.
 - 73 ohms.

- _____ 25. A 60-W light bulb and a 100-W light bulb are both connected in parallel to a 120-V outlet. Which light bulb has more current in it?
- the 100-W bulb
 - the 60-W bulb
 - Both have the same current.
- _____ 26. The current through two identical light bulbs connected in series is 0.25 A. The total voltage across both bulbs is 120 V. The resistance of a single light bulb is
- 24 ohms.
 - 48 ohms.
 - 240 ohms.
 - 480 ohms.
 - none of the above

Problem

27. How many 6-ohm resistors must be connected in parallel to create an equivalent resistance of 1 ohm?
28. What is the equivalent resistance of a 30-ohm and a 20-ohm resistor connected in parallel?
29. Two identical resistors in parallel have an equivalent resistance of 7 ohms. If the same resistors were instead connected in series, what would be the equivalent resistance?
30. A 30-V potential difference is applied across a series combination of an 8.0-ohm resistor and a 3.0-ohm resistor. What is the current in the 8.0-ohm resistor?
31. A 60-V potential difference is applied across a parallel combination of a 10-ohm and a 20-ohm resistor. What is the current in the 10-ohm resistor?
32. A 20.0-V potential difference is applied across a parallel combination of a 60.0-ohm and a 10.0-ohm resistor. What is the current in the 10.0-ohm resistor?
33. A 2.0-ohm resistor is connected in series with a 20.0-V battery and a three-branch parallel network with branches whose resistances are 6.0 ohms each. Ignoring the battery's internal resistance, what is the current in the battery?
34. A 50.0-V battery is connected across a 10.0-ohm resistor and produces a current of 4.5 A. What is the internal resistance of the battery?