Series and parallel circuits worksheet answers pdf free pdf printable

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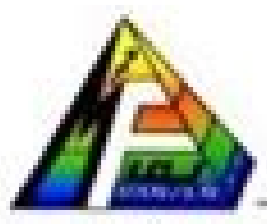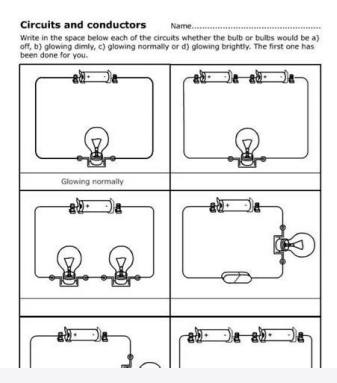
Technical Education

Name: SOLUTION
Date: _____ Section _____

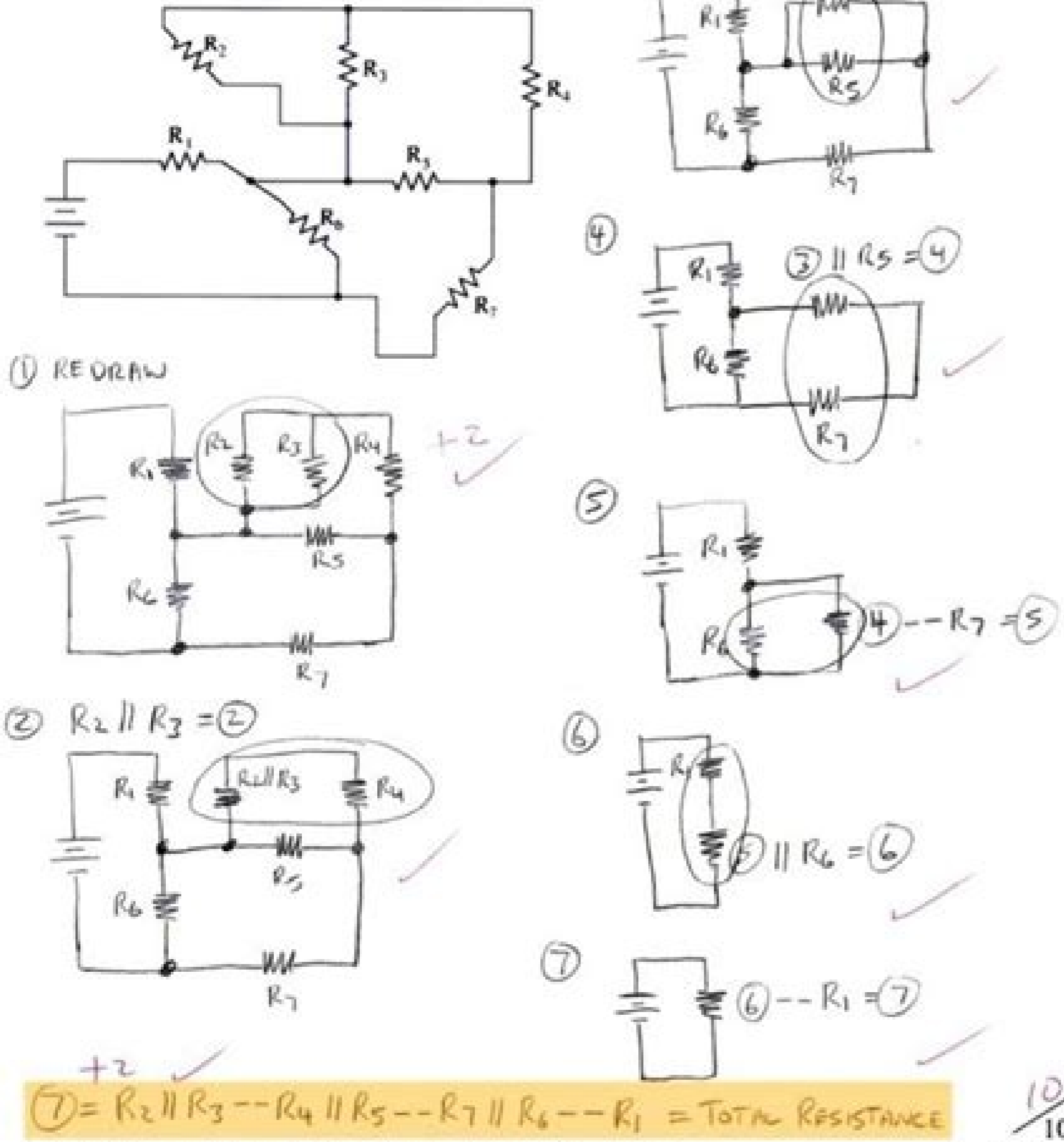## Complex Series Parallel Circuit Analysis

Show circuit analysis with letter identified circuit simplification drawings, equivalent circuit formulas using symbols $-\,-$ for series and $|\,|$ for parallel

③

② $= R_4 = $ ②

④

③ $|| R_5 = $ ④

① REDRAW

⑤

④ $-- R_7 = $ ⑤

② $R_2 || R_3 = $ ②

⑥

$\circledS || R_6 = $ ⑥

⑦

⑥ $-- R_1 = $ ⑦

+2

⑦ $= R_2 || R_3 -- R_4 || R_5 -- R_7 || R_6 -- R_1 = $ TOTAL RESISTANCE

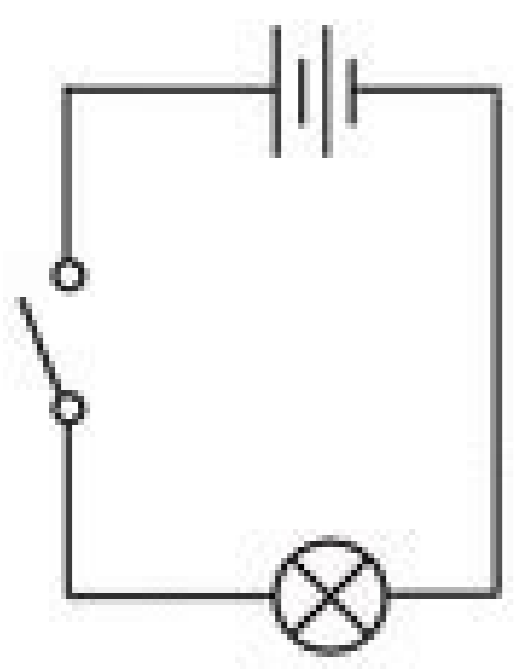10/10

All About Circuits

In this two page worksheet, you will learn about circuits, including what they look like, how they work, how to draw a diagram of them, and how to make one.

Circuits are all around us; they can be as simple as a battery connected to a lightbulb, and as complex as those found within computers. Circuits are like highways for electrons, which are particles that make up electricity. Electrons will always travel between positive and negative terminals of a power source, like a battery. Like people, electrons will never leave "home" unless they can get back; therefore, electrons will only flow through a circuit that has a complete path between positive and negative terminals. If the electrons dont flow, then power won't flow, and anything connected to the circuit will not turn on. In addition, electrons are lazy: they will always take the path of least resistance, or the easiest route between terminals. For example, if given the choice between a path with a lightbulb or a path without, they will take the path without the lightbulb.
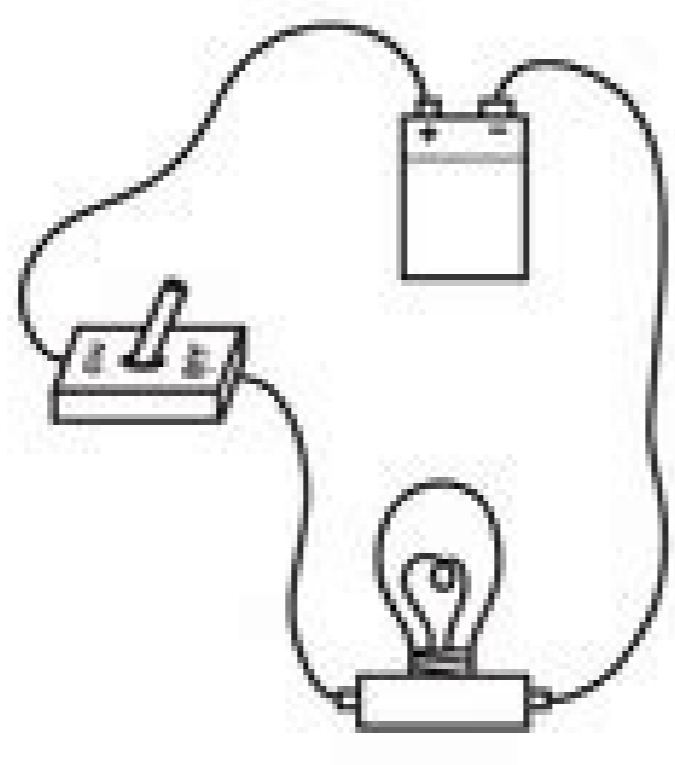
Symbols used to represent circuit parts:

BATTERY:

WIRE:

LIGHTBULB:

SWITCH: (OPEN) (CLOSED)

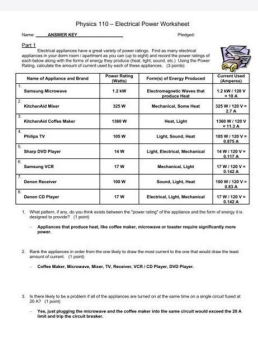## Circuit Diagram:

Drawing of Circuit:

KEY

Circuits Worksheet

Multiple Choice

____ 1. The following three appliances are connected in series to a 120 V house circuit: a toaster, 1200 W; a coffee pot, 750 W; and a microwave, 6.0×10^2 W. If all were operated at the same time, what total current would they draw?
  a. 3 A
  b. 5 A
  c. 10 A
  d. 21 A

____ 2. Three resistors connected in series carry currents labeled I_1, I_2 and I_3, respectively. Which of the following expresses the total current, I_t, in the system made up of the three resistors in series?
  a. $I_t = I_1 + I_2 + I_3$
  b. $I_t = (1I_1 + 1/I_2 + 1/I_3)$
  c. $I_t = I_1 = I_2 = I_3$
  d. $I_t = (1I_1 + 1/I_2 + 1/I_3)^{-1}$

____ 3. Three resistors connected in parallel have voltages labeled ΔV_1, ΔV_2, and ΔV_3. Which of the following expresses the total voltage across the three resistors?
  a. $\Delta V_t = \Delta V_1 + \Delta V_2 + \Delta V_3$
  b. $\Delta V_t = (1/\Delta V_1 + 1/\Delta V_2 + 1/\Delta V_3)$
  c. $\Delta V_t = \Delta V_1 = \Delta V_2 = \Delta V_3$
  d. $\Delta V_t = (1/\Delta V_1 + 1/\Delta V_2 + 1/\Delta V_3)^{-1}$

____ 4. Three resistors with values of R_1, R_2, and R_3 are connected in series. Which of the following expresses the total resistance, R_t, of the three resistors?
  a. $R_t = R_1 + R_2 + R_3$
  b. $R_t = (1/R_1 + 1/R_2 + 1/R_3)$
  c. $R_t = R_1 = R_2 = R_3$
  d. $R_t = (1/R_1 + 1/R_2 + 1/R_3)^{-1}$

____ 5. 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. 7.0 Ω
  d. 21 Ω

____ 6. Three resistors with values of 4.0 Ω, 6.0 Ω, and 10.0 Ω are connected in parallel. What is their equivalent resistance?
  a. 20.0 Ω
  b. 7.3 Ω
  c. 6.0 Ω
  d. 1.9 Ω

____ 7. Two resistors with values of 6.0 Ω and 12 Ω are connected in parallel. This combination is connected in series with a 4.0 Ω resistor. What is the overall resistance of this combination?
  a. 0.50 Ω
  b. 2.0 Ω
  c. 8.0 Ω
  d. 22 Ω

____ 8. Three resistors with values of 18 Ω, 26 Ω, 9 Ω, respectively, are connected in series. What is their equivalent resistance?
  a. 9.2 Ω
  b. 53 Ω
  c. 60 Ω
  d. 13 Ω

____ 9. Three resistors with values of 15 Ω, 41 Ω, 58 Ω, respectively, are connected in parallel. What is the overall resistance of this combination?
  a. 9.2 Ω
  b. 53 Ω
  c. 60 Ω
  d. 13 Ω

____ 10. Two resistors with values of 6.0 Ω and 12 Ω are connected in parallel. This combination is connected in series with a 2.0 Ω resistor and a 24 V battery. What is the current in the 2.0 Ω resistor?
  a. 2.0 A
  b. 4.0 A
  c. 6.0 A
  d. 12 A

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