Resistance, Circuits, and Power

1. Complete the following sentences with words from the list below. (The words may be used more than once, and all words may not necessarily be used.)

   (a) In a series circuit the Current is the same through all resistors.

   (b) The voltage is the same across resistors that are connect in parallel.

   (c) The rate at which energy is transferred is known as power.

   (d) When two batteries are connected in parallel their voltage adds together.

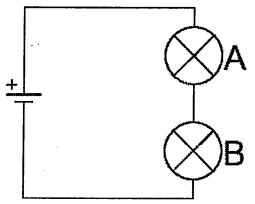
   (e) The energy of moving charges is transformed into heat due to resistance in a wire.

Current	Power	Series
Parallel	Resistance	Voltage

2. In an electrical circuit, if the current increases while the resistance is constant, the voltage

   (A) increases.
   (B) decreases.
   (C) remains constant.

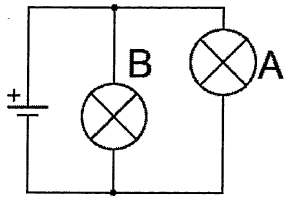
3. Consider the following circuit.



   If bulb A is removed, bulb B will

   (A) get brighter.
   (B) get dimmer.
   (C) glow just as brightly as before.
   (D) go out.

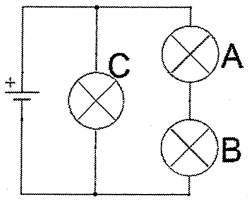
4. Consider the following circuit.



If bulb A is removed, bulb B will

(A) get brighter.
(B) get dimmer.
(C) glow just as brightly as before.
(D) go out.

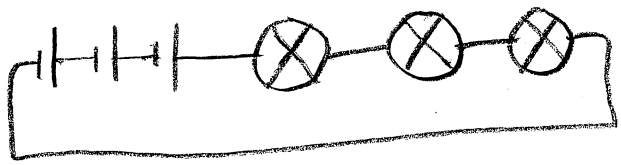
5. Consider the following circuit.



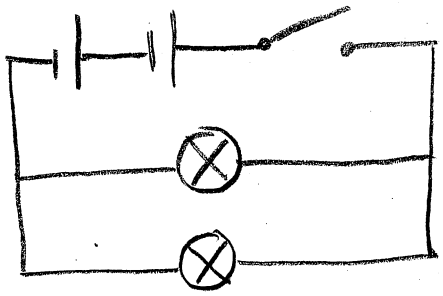
If bulb A is removed, bulb C will

(A) get brighter.
(B) get dimmer.
(C) glow just as brightly as before.
(D) go out.

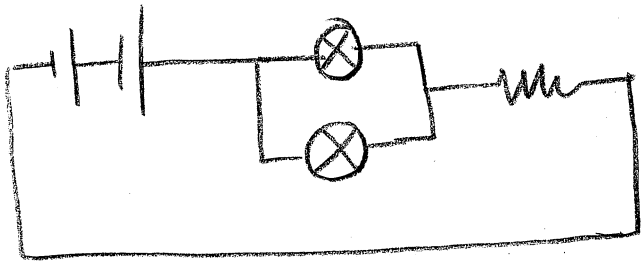
5. Draw a circuit diagram for a circuit containing three batteries (cells) in series, connected to three light bulbs in series.



6. Draw a circuit diagram of a circuit containing two batteries (cells) in series connected to two light bulbs in parallel, and a switch that controls both light bulbs at the same time.



7. Draw a circuit diagram of a circuit containing two batteries (cells) in series connected to two light bulbs in parallel and a resistor in series.



8. Why are the circuits in a house wired in parallel?

- All appliances receive the same amount of energy (voltage)

9. What is the purpose of a circuit breaker?

- To limit the amount of current flowing through the circuit

10. A car engine heater, rated at 750 W, is used for 8 hours each night. The cost is 9¢/kwh.

(a) Calculate the cost for

(i) 1 night.

$\frac{750W}{1000} \times 8 \times \$0.09 = \$0.54$

(ii) 1 month (30 days).

$\$0.54 \times 30 = \$16.20$

(b) How much could you save each month if the heater is used only 4 hours each night?

4 hours is half the time so

$\frac{\$16.20}{2} = \$8.10$

11. An electric hot water heater, rated at 1500 W, is used for 5 hours a day, 20 days a month. Electricity costs $0.09/kWh. Calculate the monthly cost of using the hot water heater.

$\frac{1500}{1000} \times 5 \times 20 \times \$0.09 = \$13.50$