

## Section 11.2 Comparing Circuits – Answer Key

1) What is a big difference between parallel and series circuits regarding changes in one component?

**One of the big differences between them is that in a series circuit, changes in one part have a much greater effect on the rest of the circuit than parts of a parallel circuit.**

2) Why are homes wired using parallel circuits?

**Homes are wired using parallel circuits because there are many electrical devices used at the same time. If they were wired in series, the addition of a load would affect the rest of the devices.**

3) How much voltage do power companies supply your home with? **Power companies provide your home with a system that can provide 120 V or 240 V. However, in China, homes are supplied with 220 V.**

4) What is the potential difference across each load in a parallel circuit?

**The potential difference across each load in a parallel circuit is the same as the source.**

5) What is one serious problem with parallel circuits? **One serious problem with parallel circuits is that the current through the wire connected to the source (battery) increases as more loads are turned off. This can cause the wire to heat up and possibly start a fire.**

6) What happens when current increases? **When the current increases, then the wires heat up.**

7) What do household circuits always have to prevent fires from happening?

**Households always have fuses or circuit breakers.**

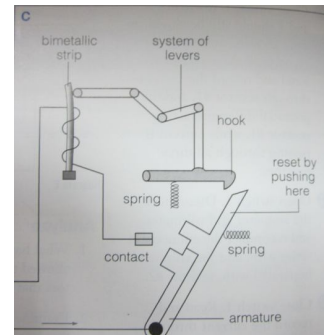
8) Define fuse. **A fuse is a piece of metal with a melting much lower than the melting point of the conducting wires.**

9) Where are fuses most often found? **They are commonly found in electric stoves and car electrical systems.**

10) Define circuit breaker. **A circuit breaker is a switch that automatically breaks the current when there is a dangerously high amount of current flowing through the circuit.**

11) Describe how a circuit breaker works. Include a diagram.

**As the temperature in the circuit increases, the metal expands. The piece of metal that expands causes the strip to bend and release from the hook.**



12) What happens to the current in a parallel circuit each time you add a resistor to another branch?

**Each time you add a resistor to another branch in a parallel circuit, the current increases.**

13) Define equivalent resistance.

**The equivalent resistance of a series or parallel circuit is the resistance of one resistor that would give you the exact same current and potential difference that circuit produces.**

14) What is the formula for calculating resistance?  $R = V/I$

Series Circuit

$$R_{\text{equivalent}} = R_1 + R_2 + R_3 + \dots$$

Parallel Circuit

$$\frac{1}{R_{\text{equivalent}}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$$