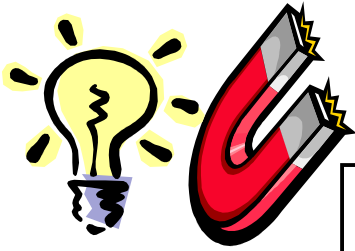


Science 10-Electricity & Magnetism

Activity 13—Household Circuits and Power Transmission



Page 98-108 ScProbe

10

Name _____

Due Date _____

Show Me Hand In

Correct and Hand In Again By _____

1. Current which keeps on reversing it's direction is called _____
_____ or abbreviated _____.
2. The number of cycles per second in alternating current is called the _____ and it is measured in units called _____ abbreviated _____.
3. Household circuits in North America have a frequency of _____ Hz.
4. There are three wires coming into your house. Two are called _____ and the other one is called neutral. The difference in potential between:
 - A hot wire and the neutral is _____ volts
 - Two hot wires is _____ volts
 - Between the neutral & the ground is _____ volts
5. What is the main function of the service panel in your home?
6. In your home, the electric meter is usually on the (*outside/inside*) _____ while the service panel is on the (*outside/inside*) _____.
7. What are **branch circuits**?
8. All branch circuits are connected to the main supply wires by _____
_____ in the service panel.

9. Which circuit breaker controls the main power supply to the whole house? _____
10. What happens to a circuit breaker if there is too much current in a circuit?
11. What is the difference between an **overload** and a **short circuit**?
12. Draw a simple diagram of a circuit breaker like the one on page 101. Explain using the bimetallic strip, how this device cuts off the circuit when there is too much current.
13. Most 120 volt circuits have a ____A breaker except those intended for electric motors. These could have a ____ A breaker. 240 volt circuits have a _____ breaker and typically have a breaker of about ____ A. In circuits designed to carry more current, the wires must be _____ than in circuits with less current. If too much current passes through too small a wire, what could happen? _____

14. What happens to a fuse if too much current passes through it? _____
_____ What happens to the circuit after this happens? _____.
15. What problem could result if a fuse or a breaker is replaced by one with a higher rating (eg. a 15 A fuse or breaker is replaced by a 30 A fuse or breaker.)?
16. In a normal 120 V household circuit, one wire is _____ and the other is neutral.
17. Devices in a household circuit are connected in (*series or parallel*) _____
18. In a **polarized** plug, the narrow prong is connected to the (*hot or ground*) _____ wire.

19. A polarized plug is made so that the center of the “screw in” part of a light bulb is connected to the (*hot or ground*) _____ wire. Why is this?
20. The outside of metal appliances is always connected to a wire which is directly connected to the _____. If a hot wire accidentally touches the outside of a grounded appliance, what will happen? _____

 What could happen if the appliance was not grounded and you touched it?
21. The ground wire is attached to which prong in a 3-prong plug, the wide one, the narrow one or the round one? _____. Should you ever cut the round prong off of a plug-in so it will fit in a socket made for only two prongs? _____ Explain why not.
22. What does GFCI stand for? _____
 How is this better than a normal breaker?
 Where are GFCI circuits found?

Now Go to Page 124 of Science Probe Text and answer the following:

23. Lines that carry electricity to homes and buildings etc. are called _____
 _____.
24. Transmission lines have very (high/low) _____ voltages and relatively (high/low) _____ currents. Voltages are typically _____ to _____ volts.
25. Give the reason for the high voltage and low current. _____

26. 1 kV = _____ volts and 1 MW = _____ W
27. If you touched a 500 kV (_____ V) transmission line (don't try it!) and your resistance is 500 000 Ω , how much current would go through your body? _____ A.

What 2 effects would this current have? _____

28. The picture on the bottom of page 128 is a _____ station. Here, devices called _____ lower the voltage and _____ the current, so the power ($P = I \times V$) remains the same. Some energy is transformed into _____ in these devices.

29. Will transformers work with DC current? _____ What about AC? _____

30. At distribution stations, 60 kV to 138 kV is lowered to _____ kV and transported around cities and towns.

31. Before coming into your home, the voltage is lowered to _____ V by a _____ either located on power poles or on the ground in a metal box.

32. Why are the towers for high voltage transmission lines so high? _____

33. Why aren't birds electrocuted when they sit on power lines? _____

34. What is a "Step-Up" Transformer? _____

Where is it used in power transmission? _____

35. What is a "Step-Down" Transformer? _____

Where is it used in power transmission? _____
