# 2009-10 PreAP Circuits 5

1. *Referring to the "Total Resistance" notes to answer the following.   You should redraw the circuit at least 3 times, as you simplify it.   The first question is exactly from the notes. I will walk you thru the other questions, so do them in order. HINT: it may be easier to refer to one of your simplified circuits, instead.*
    A. What is the total resistance of the circuit above?

    B. How much current is flowing thru the 5Ω resistor?

    C. How much voltage is used by the 5Ω resistor?

    D. How much voltage is used by the 4Ω resistor?

    E. How much voltage is left for the 2Ω resistor to use?

    F. What is the current thru the 2Ω resistor?
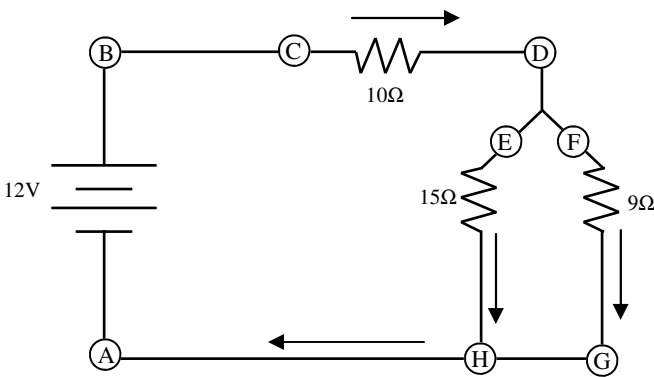
2. First let me talk you thru this circuit.   It would be VERY helpful if you labeled the diagram as you answer the questions.   I didn't take the time to work out even numbers.
    A. What is the voltage at A?
    B. What is the voltage at B?
    C. What is the voltage at C
    D. What is the total resistance between the 15Ω and 9Ω resistors?

    E. Using your answer above and the 10Ω resistor, what is the total resistance of the circuit?

    F. What is the total current?
    G. How much current is flowing thru the 10Ω resistor?
    H. How much voltage is used by the 10Ω resistor?

    I. How much voltage is left at D?
    J. How much voltage is at E and F?
    K. How much current flows thru the 15Ω resistor?
    L. How much current flows thru the 9Ω resistor?
   M. What is the total current of the circuit?
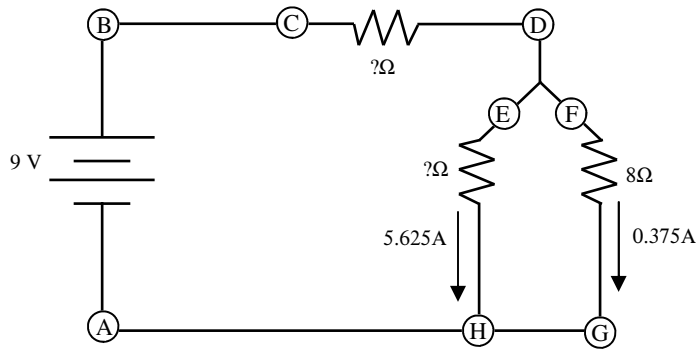
3. Figure out the two unknown resistors. There is enough information given. *(Use the same principles as the previous circuit. Work backwards, if you have to.)*

4. You are given a bunch of 20Ω resistors. You can put them together in any combination of series and parallel.
   A. How could you put them together to make 50Ω worth of resistance.

   B. How can you put them together to make a 5Ω worth of resistor?

5. Two light bulbs are in the circuit shown.
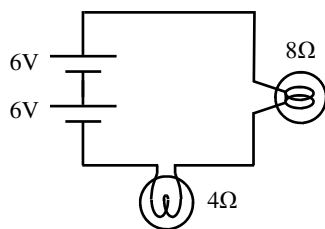
   A. Are they in parallel or series?
   B. What is the current flowing thru each bulb?

   C. Calculate the voltage used by each.

   D. Which light bulb has the most current?
   E. Calculate the power used by each.

   F. Since brightness is about power, which bulb is brighter?

6. Two light bulbs are in the circuit shown.
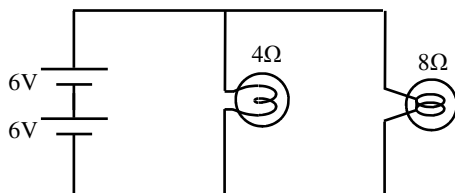
   A. Are they in parallel or series?
   B. What is the voltage across each bulb?

   C. Which light bulb has the most current?

   D. Calculate the power used by each.

   E. Since brightness is about power, which bulb is brighter?

7. A. Two light bulbs of different resistance are in series, which one is brighter?
   B. Why? *(Talk about current and voltage.)*

8. A. Two light bulbs of different resistance are in parallel, which one is brighter?
   B. Why?

9. What do these units break down?   V = J/C   Watt =   Amp =

10. Heat is also measure in joules. A 3kΩ resistor has 2.5A flowing thru it. How much heat is does it generate in 2 minutes?

11. Identify each of the meters at the right as an ammeter (A), ohmmeter (O), or voltmeter (V).

12. A 4.5kΩresistor is hooked up to a 120V circuit. How long is it on if 113 coulombs passes thru it?

3V   1 Ω

8 Ω   6 Ω

6V   3 Ω
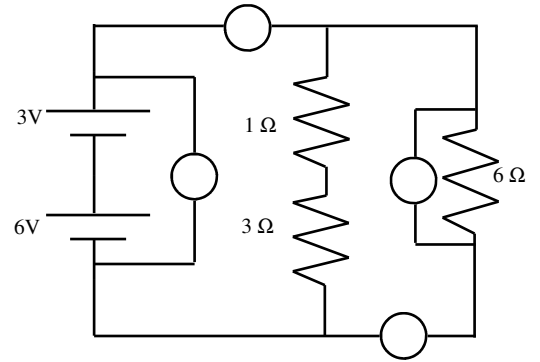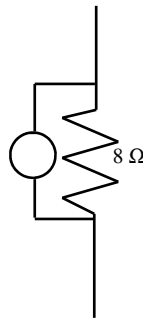
13. A. The slope of the line on the graph gives what?

B. How would the line change in the following situations?
  i.   If the temperature of the conductor is lowered?
  ii. If wire is made longer?
  iii. If the wire is thicker?
  iv. If the wire is changed from silver to copper?

Voltage

Current
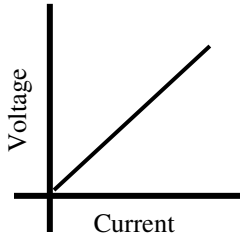
TAKS, next page.

Plants—

Autotrophic—make their own food (glucose) thru photosynthesis: $CO_2 + H_2O + energy \rightarrow C_6H_{12}O_6 + O_2$

sunlight   (plant sugar) *Glucose*

Photosynthesis occurs in the plant cells in the chloroplast organelle.

Plant structures—

Leaves—absorb sunlight. Bigger leaves = more absorption. Have a waxy coating (cuticle) to reduce water loss.
   Leaves have stoma/ stomata on underside of leaves—opening that lets in CO_2 and lets out O_2.
   Stomas open if there is enough water in the plant and close if there is not enough water, to protect against more water loss.
Stems—support structure (cell wall) and for veins (circulation) for moving water and nutrients around.
        Phloem (flow-em) - moves sugars down ("flows low" or "flows food").
        Xylem—draws water up ("xy—high").
        Allow **Transpiration**—water is pulled up thru plant (called "capillary action" - water sticking to itself,
            like a straw).   This water "chaining" pulls water up from the roots, which pull in water by **osmosis**.
**Roots**—draw up water and dissolved nutrients from the ground.
        Fibrous root—spreads out like spider webs. Holds top soil.
        Tap root—goes down deep (like a carrot), searching for water.
Wilting—when plants don't have enough water. Water give **turgor pressure** (like a balloon). When plants don't have
        enough water they wilt, lose turgor pressure and become **flaccid** (limp).

14. All plants make their own food, so plants are called _____.

15. Where do plants get their energy?

16. What is glucose?

17. Where is glucose produced in a plant cell?

18. If plants make their own food (glucose), where do plants use glucose?

19. The process of water evaporating from leaves and pulling more water up thru the plant is called:

20. Leaves, Stems, or Roots?
    A. _____ Absorbs water thru osmosis.
    B. _____ Pulls water up to the leaves.
    C. _____ Has stomas.
    D. _____ Supports the plant, like a skeleton.
    E. _____ Helps keep land from eroding.
    F. _____ Have waxy coating (called the _____).

21. The _____ transports water up the plant, while the _____ transports glucose back down.
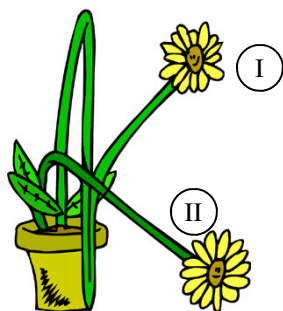
22. Flower I or Flower II?
    A. _____ Is wilting.
    B. _____ Has sufficient water.
    C. _____ Is flaccid.
    D. _____ Has less turgor pressure.
    E. _____ Is probably closing its stomas.
    F. _____ Will be drawing water up thru its roots.

23. Cacti grow in harsh desert environments, where there is a lack of _____. This is why cacti grow slowly and must defend themselves from consumers. For this defense, the leaves of cacti have evolved into small, sharp n_____.   These are not green, so they do not have c_____.   To make food, p_____ occurs in a cacti's green stem. Also to retain moisture cacti stems have a very waxy, called the c_____. The stems also act like plant leaves by having the s_____.

24. Why do cacti only open their stomas at night?