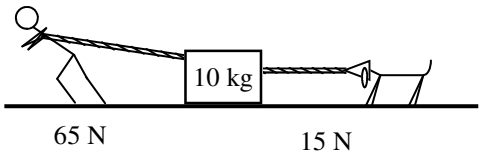
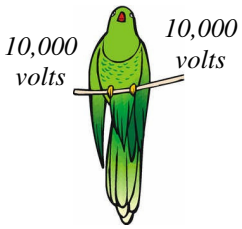
B-Day: Due Wed., Feb 10
A-Day Due Thurs., Feb 11

2009-10 PreAP Circuits 2



1. Slim Jim is trying to move a 10 kg box. Unfortunately his dog, Bim, is trying to be "helpful".
   A. How much force is actually pulling the box?
   B. What is the acceleration of the box?

   C. So, it is not the force that matters, but the n_____ force.
   Voltage are kind of like forces.



2. A bird perches on a high voltage wire.
   A. What is the difference of voltage between the bird's legs?
   B. How big of a shock does the bird feel?
   C. What would happen if the wire sagged down until the bird's foot touched the ground?

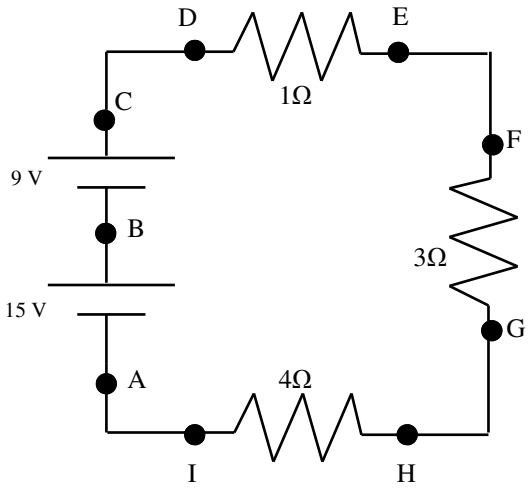
3. After working the circuit at the left, answer the following questions.
   A. Just by looking, which resistor uses the least amount of voltage?
   B. How much voltage does a wire use?
   C. Which resistor has the greatest current?
   D. What is the total voltage?
   E. What is the total resistance?
   F. What is the total current?
   G. How many paths are there for the current to flow?
   H. How much current is flowing thru the 3Ω resistor?
   I. Given that V=IR (always) how much voltage does the 3Ω resistor use?

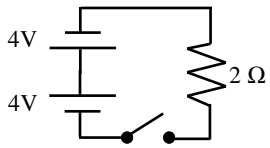
   J. Since resistors use up voltage, how much voltage is left at letter E?

   K. Since P=VI, how much power is used by the 3Ω resistor?

   L. Calculate the voltage used by the 12Ω resistor.

   M. What is the voltage difference between point C and point E?





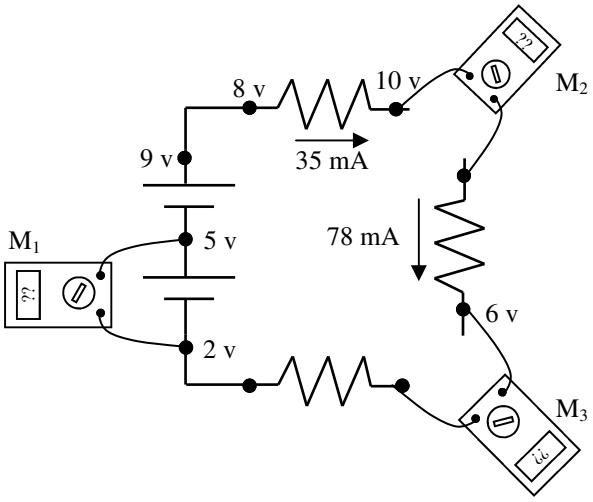
4. A. As drawn right now, is it an open or closed circuit?
   B. With the switch is closed, what is the current in the circuit?

5. The diagram at the right is from our lab in class.
   A. Which meter or meters is an ammeter?
   B. Which meter or meters is a voltmeter?
   C. Which meter or meters is an ohmmeter?
   D. Explain three mistakes with the voltage around the circuit.
      1.

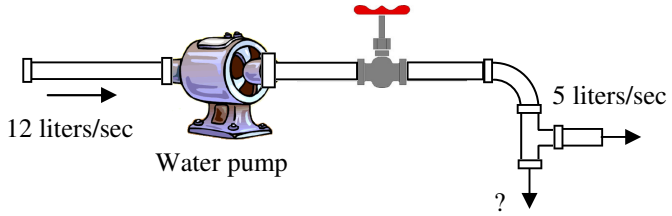
      2.

      3.

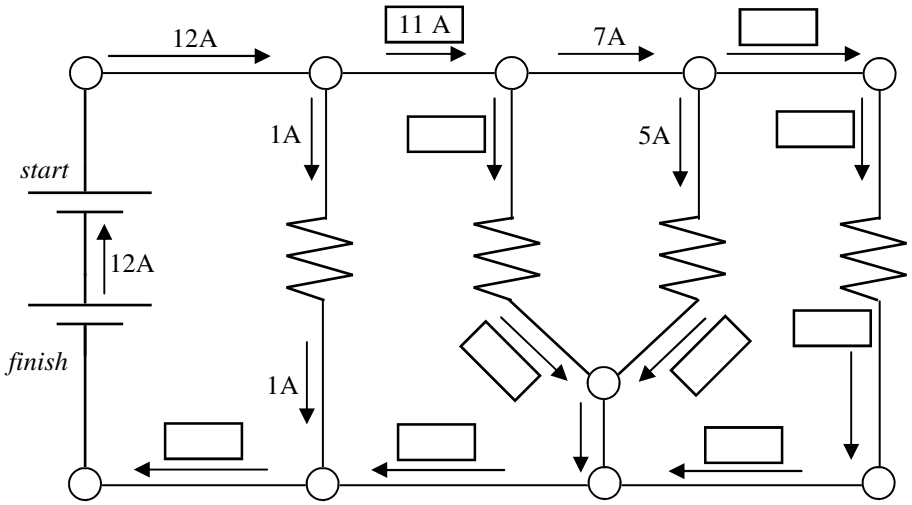
   E. Explain one mistake with the current in the circuit.



6. 12 liters/sec of water is being pumped thru pipes by a water pump. The valve is open the whole time.
   A. The water pump is like what part of a circuit?
   B. What is the valve like?
   C. How much water flows thru the valve?
   D. How much water flows out of the bottom end of the pipe?



This split point is called a junction.



7. Think of current like water flowing thru pipes. You will start at the top of the batteries (at "start").
   A. In each of the circles, put one of the following:
   S (split) - one wire splits into two.
   J (join) - two wires combine.
   T (turn) - the wire only turns.
   B. Just like in the pipe example at the top of the page, the amount of current going into a junction (split or join) must equal the amount that flows out. In each of the boxes, fill in the current for that part of the circuit. (*Hint: this is just addition and subtraction.)*

Current is like water flowing. Current is defined as the amount of charge that flows per second: $I = Q/t$. (Just like gallons per second. More water flowing each second = more current.) Q is in coulombs (still) and t is in seconds.

8. Using the total current in Q7, above,
   A. How much charge is flowing thru the batteries in 2 minutes?

   B. How many electrons is that?

9. How long does it take 12 coulombs to pass a point if there is 200 mA of current (convert to amps).

10. A. What is the most basic equation for power? (Go back to energy.)

    B. How much power is used by a 180Ω resistor that has 0.25A of current flowing thru it?

    C. How much time would it take for the resistor to use 150 J?

11. Use the book to fill in the following table:

Type	Abbreviation	What provides it	Defined	Graph of current
Alternating				
Direct				

Taxonomy—how we name species.

Kingdom, Phylum, Class, Order, Family, Genus, Species
Most general *Most specific.*
Less related *More closely related*

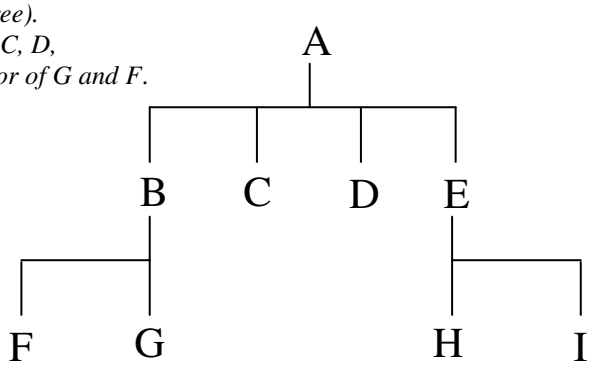
Scientific names: two parts; genus and species:
Ex: Human (*Homo sapiens*):

The farther to the right that the words are the same, the closer the species are:

Roses and Humans - different *Kingdoms*
Worms and Humans - different *Phylums*
Eagles and Humans – different *Classes*
Horses and Humans – different *Order*
Monkeys and Humans – different *Family*
Neanderthals and Humans – different *Species*
(but very closely related)

12. Which of the badgers below are most closely related?
    A. North American Badgers – *Taxidea taxus*
    B. Palawan Badger – *Mydaus marchei*
    C. Eurasian Badgers – *Meles meles*
    C. Javan Stink Badger – *Mydaus javanensis*
13. Which are more closely related: organisms of the same family or same class?

The diagram at the right shows represents a phylogenetic tree (a family tree). Each letter shows a different organism. Organism A is the ancestor of B, C, D, and E, meaning Organism A mutated into B thru E. Also, B is the ancestor of G and F.

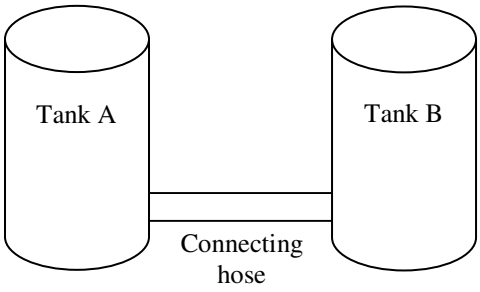


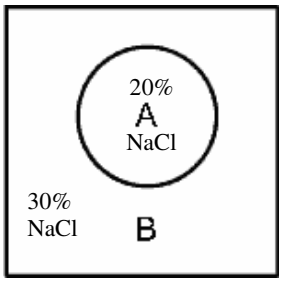
14. Which is most related to G?
15. Which letter represents the organism that eventually mutated into all of the others?

Diffusion—Movement of molecules from high to low concentration (how a smell spreads out around a room).
Osmosis—Movement of water thru a membrane from an area of high water concentration to low.
Semi-permeable—Allows some things thru, but not others (cell wall does this).

16. If Tank A is full of water and Tank B is empty, which way does the water flow?
17. If Tank A has a pressure of 20 pascals and Tank B has a pressure of 55 Pascals, which way does air flow?

Note: Almost ALL of nature works in such a way that thing move from high to low. Objects roll down hill (high to low). Air moves from high pressure to low pressure (like letting out a filled balloon).





18. A) In which region is there more table salt (by percent)?
    B) In which region is there more water (by percent)?
    C) If there is a semi-permeable membrane around A than allows only water to flow, does water flow from A to B or from B to A?
    D) Over time, does A swell (get bigger) or shrink (get smaller)?
    E) This flow of water is known as:

    F) If the salt were moving, it would be known as d_____.

(*Note: This is why a fresh water fish (A) would die if placed in salt water (B). It would lose water and shrink.*)

	Kingdom	# of cells	Characteristics
Prokaryotes (no nucleus)	**Archeabacteria**	unicellular (1)	Live in extreme environments (very hot, no oxygen)
	Eubacteria	unicellular (1)	common bacteria, live on and around us/ some are beneficial (like in our stomachs).
Eukaryotes (with a nucleus)	**Plants**	multicellular	sexual or asexual/ don't move/ cell wall of cellulose/ true roots, stems, leaves/ Autotrophs (producer own food)
	Animals	multicellular	move/ sexual reproduction/ heterotrophs (eats other organisms)
	Fungi	mostly multicellular	sexual or asexual reproduction/ cell wall of chitin/ decomposers/ Heterotrophs or saprobes (digests outside of body)
	Protista	multi or uni	sexual or asexual reproduction/ animal or plant-like/ auto or heterotrophs/ no cellulose or true leaves or stems

19. Which kingdom (might be more than one)?
    A. Flat worms.
    B. Ferns.
    C. A bacteria that lives in a thermal vent at the bottom of the ocean.
    D. Made up of decomposers with a spongy cell wall.
    E. Makes there own food.
    F. Live with humans and help with digestion.