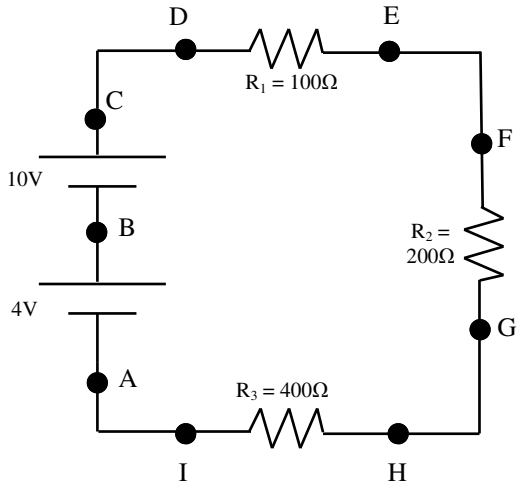
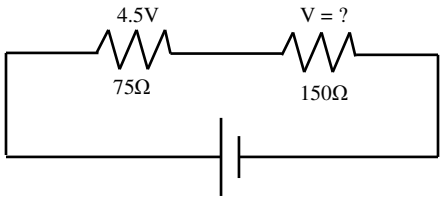
B-Day: Due Wed., Feb 17
A-Day: Due Thurs., Feb 18

2009-10 PreAP Circuits 4

1. After working the circuit at the right, answer the following.
   A. Calculate the current flowing thru the circuit.
   B. If one of the resistors is replaced by a wire, how will the current change?
   C. If a third battery is added to the circuit, how will the current change?
   D. How much current is flowing thru the 100Ω resistor?
   E. How much voltage is used by the 100Ω resistor?
   F. How much power is used by the 100Ω resistor?
   G. Calculate how much voltage is left at point E.
   H. On the diagram, calculate the voltage used by the other two resistors.
   I. How does the voltage drop across R_1 compare with R_2?
   J. How does the resistance of R_1 compare with R_2?
   K. How does the voltage drop across R_2 compare with R_3?
   L. How does the resistance of R_2 compare with R_3?
   M. Calculate the power used by the other two resistors
   N. How much power does the whole circuit use?

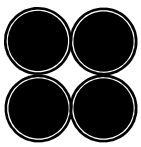


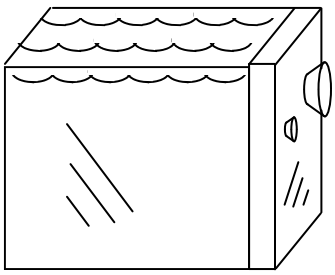


2. Now, using what you learned from parts I-L above,
   A. How much voltage is used by the 150Ω?
   B. What is the voltage of the battery?
   C. How much current is flowing?

3. Series or parallel? (*Using your lab notes or the "Types of Circuits" notes*)
   A.____Only one path for the electricity to flow.
   B.____Paths are dependent on each other (*one affects the other*).
   C.____How your house is wired.
   D.____Paths are independent of each other.
   E. ___ If one light turns off, the others stay on.
   F. ___ If you turn off one light, all the lights turn off.
   G. ___ Has more than one path for the electricity to flow.
   H. ___ Two devices have the same current.
   I. ___ Two devices have the same voltage.

4. The holes at the right are pipes.
   A. Are the four holes in parallel or series, as shown?
   B. Together is there a bigger hole or a smaller hole for water to flow thru?
   C. Each pipe can allow 2 gal/sec, how much can flow thru them together?
   D. So, is the resistance increasing or decreasing?
   This is why 4 equal resistors in parallel are the same as a single resistor that is 1/4th as big.



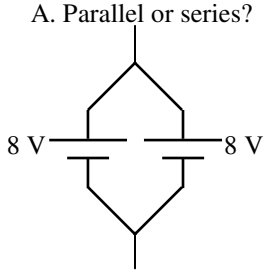


5. Five 100Ω resistors are placed in a circuit.
   A. What is the total resistance if they are in series?
   B. What is the total resistance if they are in parallel?

6. Imagine a large tank of water. In one side of the tank are two holes with plugs in them: a large hole and a small hole.
   A. When removed, which hole will have more resistance?
   B. Which hole will have more water flowing (current) thru it?
   C. Water, like electricity, always takes the path of:

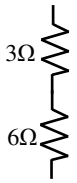
7. Decide if the following are in parallel or series and find the total voltage or total resistance. (*See "Types of Circuits")*

A. Parallel or series?



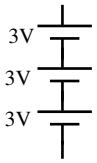
Vt = _____

B. Parallel or series?



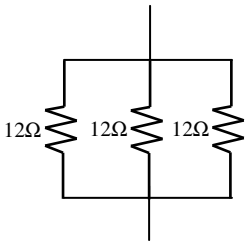
Rt = _____

C. Parallel or series?



Vt = _____

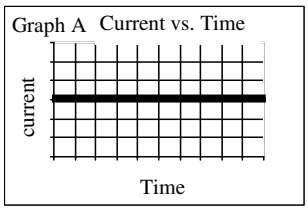
D. Parallel or series?

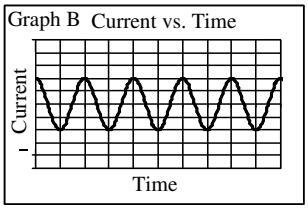


Rt = _____

8. AC or DC Current?

A. ____ Current that changes polarity.
B. ____ Current that is constant.
C. ____ What comes from a battery.
D. ____ What comes from the power outlet.
E. ____ Graph A
F. ____ Graph B.



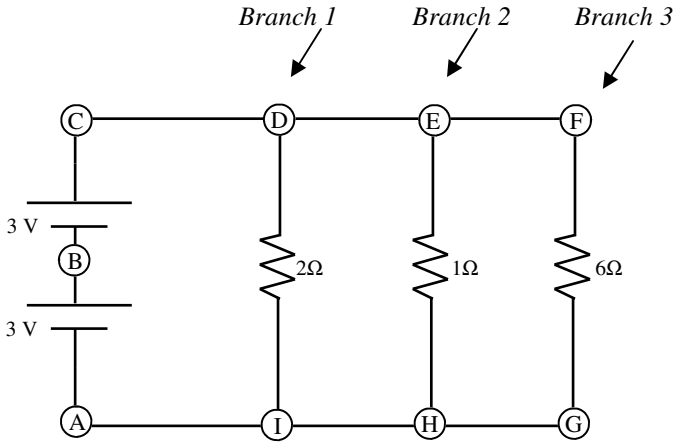


9. How long does it take for a 6 volt battery to push 12 coulombs thru a 960Ω resistor?

10. In a circuit, the resistance doubles and the voltage is halved. How does the power change?

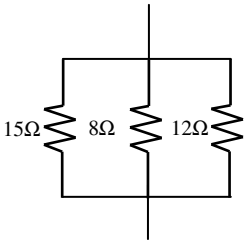
11. A vacuum cleaner pulls 12A when hooked up to a 120V wall outlet.
A person uses the vacuum 30 minutes a day every day for 2 weeks.
A. How much power does it use?
B. How many hours is it run?
C. How many kWhrs, were used?
D. If the power company charges 11 cents per kWhr, how much did this cost?

12. Use the circuit at the right to answer the following.



A. If the 6Ω resistor is disconnected,
   i. how will it affect the current in the 2Ω resistor?
   ii. how will the total current change?
   iii. how will the total resistance change?
B. What is the voltage at point H?
C. What is the voltage at point F?
D. What is the voltage from point E to point H?
E. Calculate the current in each branch.
F. Which resistor has the most voltage across it?
G. Which resistor has the most current running thru it?
H. What is the current flowing from H to I?
I. What is the total current of the circuit?
J. How much power is used by the 6Ω resistor?
K. Calculate the total resistance of the circuit.
L. Calculate the power dissipated by the 1Ω resistor.
M. Calculate the power dissipated by the 6Ω resistor.
N. How much power is used by the entire circuit?

13. Calculate the total resistance of the resistors shown.



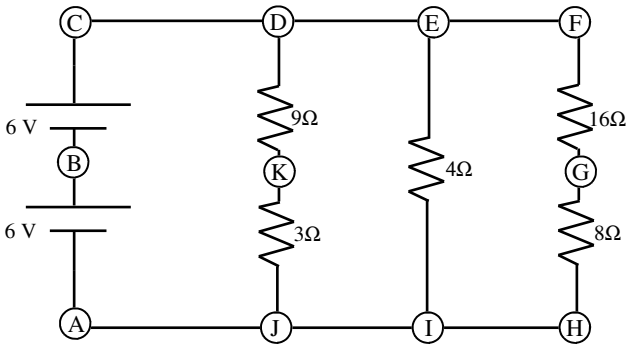
Resistors in Parallel

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots$$

Resistors in Series

$$R_{total} = R_1 + R_2 + R_3 \ldots$$

14. After working the circuit, answer the following.



A. What is the total resistance of branch 1 (*write this at K*)?

B. What is the current flowing thru branch 1?

C. What is the current flowing thru the 9Ω?

D. How much voltage does the 9Ω use?

E. How much current flows thru the 4Ω?

F. What is the total resistance of branch 3 (*write this at G*)?

G. What is the current flowing thru the 16Ω?

H. How much voltage does the 16Ω use?

I. How much voltage is left at point G?

J. How much charge passes thru the 16Ω each minute?

K. How much current flows from I to J?

L. What is the total current of the circuit?

M. Using the total current and voltage, calculate the total resistance of the circuit.

N. Using the total resistances of the branches (*4Ω and what's at K and G*), calculate the total resistance of the circuit.

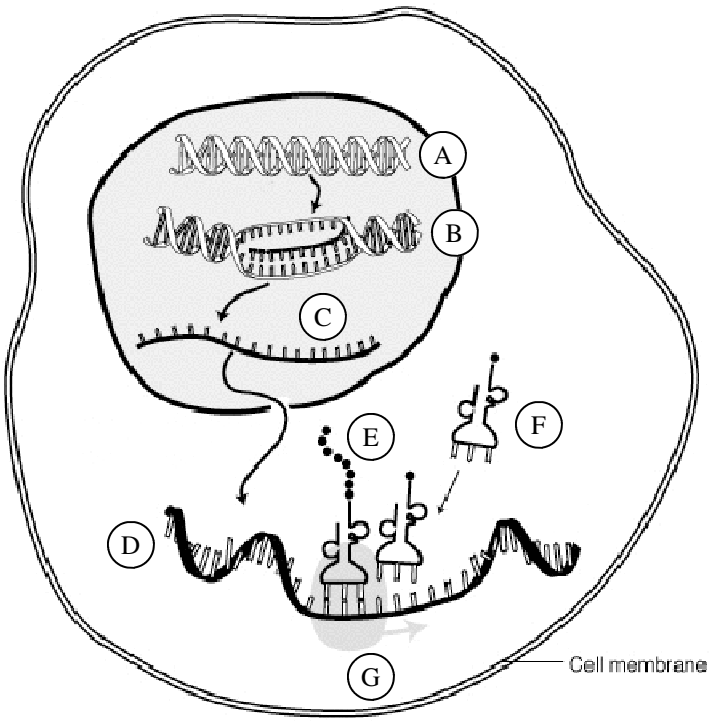
O. Calculate the total power of the circuit.

P. How much energy does the circuit use in 20 seconds?

Transcription:	Process in which DNA is copied into mRNA. (*Before it can ride it must transcribe.*)
Translation:	Process in which proteins are made from tRNA. (*Before it can create it must translate.*)
Ribosomes:	Cell organelle where proteins are created.
Amino Acids:	Building blocks of proteins.
Codon:	Three base code that tells the ribosome what amino acid to make. Ex. AGA

15. Translation (TL) or Transcription (TS)?
    A. ____ When mRNA is turned into tRNA.
    B. ____ When DNA is turned into mRNA.
    C. ____ Occurs in the nucleus.
    D. ____ Occurs at the ribosomes.

16. The three nitrogen base code that tells the r_____ which a_____ a_____ to make is called a:



17. The picture at the left shows the steps in protein synthesis in an animal cell.
    A. The double coiled molecule at letter A is called the _____.
    B. The double coiled molecule is unzipping and giving its code to the single stranded molecule at letter B. This single stranded molecule is the _____.
    C. The process in which molecule A becomes molecule C is called t_____.
    D. Molecule F is called the _____.
    E. When D becomes F is called t_____.
    F. Letter E shows the chaining of amino acids to make a p_____.
    G. Two of the major organelles are shown in grey.
       i. A, B, and C are in the _____.
       ii. G shows the _____.

18. From the codon chart below, what amino acid comes from the codon: CAG?

Second Nitrogen Base (2nd letter)

First Nitrogen Base (1st letter)	U		C		A		G		Third Nitrogen Base (3rd letter)
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
	UUC		UCC		UAC		UGC		C
	UUA	Leucine	UCA		UAA	Ochre	UGA	Opal	A
	UUG		UCG		UAG	Amber	UGG	Tryptophan	G
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine	AGA	Arginine	A
	AUG	Methionine	ACG		AAG		AGG		G
G	GUU	Alanine	GCU	Alanine	GAU	Aspartic acid	GGU	Glycine	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic acid	GGA		A
	GUG		GCG		GAG		GGG		G