AE 237: Week-2 Exercises In ***Pencil*** please or deduct ____ points

NAME:_____DATE_____

1. There are three ways to Express OHM's LAW - in terms of Current (I = Amps), Volts (V or E) and Resistance (R in ohms Ω). The trick is to be able to recall any one of them, from which the others can be derived. Some brains are good at recalling formulas while others remember images better. How many of the 'memory tricks' can you recall? **HINT:** Ohm's Triangle, the analog computer (CLUE: Measuring a device in a way that pictorially represents the formula) or any version of the formula.

2. From any of the above: Show all the variations of Ohm's Law.

I = E = R =

---

3. Express the Power Formula three ways — Current and Resistance, Volts and Resistance, Volts and Current. **HINT:** What is the instructor's favorite dessert?

P = P = P =

EXERCISE: Parallel Resistance (use circuit-1 schematic on next page)

In this exercise, the voltage drop across each resistor is the same as the power source, but each branch current is resistor-dependent and therefore will be different. *All the branch currents will add up to the total current.*

In the image below, **E** = 10v, **R1** = 5 Ω, **R2** = 10 Ω, **R3** = 20 Ω

Calculate the following:

4. The three branch currents: I_1 _____ + I_2 _____ + I_3 _____ = I_{total} _____

5. Power dissipated by each resistor: R1 = _____ R2 = _____ R3 = _____

6. Equivalent Resistance: (Formula: 1/Rtotal = 1/R1 + 1/R2 + 1/R3 + etc)

   - **NOTE:** total resistance will be less than the smallest value resistor.

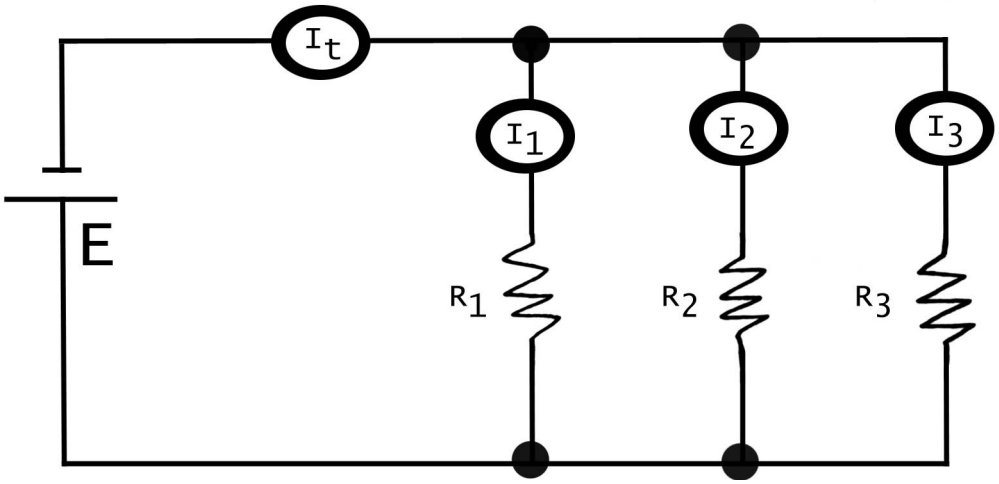
_____

_____

7. Total Current (using Equivalent Resistance) _____

8. Compare branch current with total current: I_{branch} = _____ *vs* I_{equiv} = _____
   If not the same, find your mistake(s).

- Show work on this or reverse side!



circuit-1

SERIES RESISTANCE: Simply add the resistors up!

In Circuit-2, the current THROUGH each resistor will be the same, but the voltage drop ACROSS each resistor will add up to the power source.

Same E- and R-values as the previous problem. Calculate the following:

Total Resistance:

9. $\mathbf{R}_1$ _____ + $\mathbf{R}_2$ _____ + $\mathbf{R}_3$ _____ = $\mathbf{R}_{total}$ = _____

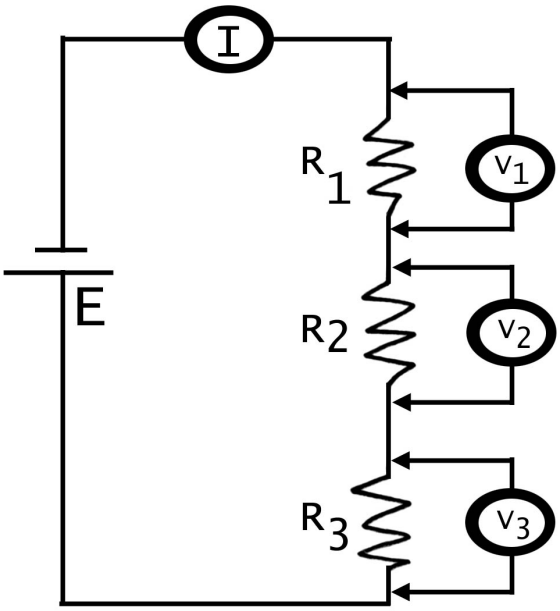
10. Total Current = $\mathbf{E}$ / $\mathbf{R}_{total}$ =

_____

The voltage drop across each resistor: Use this formula > ____ = ____ ____

11. V_{R1}= _____ V_{R2}= _____ V_{R3}= _____

12. Power dissipated by each resistor: P_{R1}_____ P_{R2} _____ P_{R3}_____



circuit-2

13. **Calculate Resister Values.** Note **the difference** between *precision* (5-band) and *standard* (3-band) types. Tolerance is the right-most 'precious metal' band. Below each color, write the respective significant digits, multiplier and tolerance as dictated by their positions.

1st band	2nd band	3rd band	4th band	5th band	VALUE @ %
Brown	Black	Orange	Gold		
Brown	Black	Black	red	Brown	
Orange	Orange	Red	Silver		
Orange	Orange	Black	Brown	Brown	
Yellow	Violet	Gold	Gold		
Red	Red	Green	None		
Blue	Gray	Black	Brown	Brown	