

## Unit 06 – Vocabulary and Equations – Current Electricity & Circuits

### Vocabulary:

previous vocabulary  
 electric current, ampere, amp (A), Coulomb (C)  
 electrical potential, voltage (V), electromotive force (emf)  
 potential difference  
 resistor, resistance ( $\Omega$ ), equivalent resistance, load  
 power (W)  
 Ohm's law, ohmic  
 conventional current, drift velocity, drift speed  
 cross sectional area  
 circuit breaker, fuse, potentiometer  
 direct current (DC), alternating current (AC)  
 kilowatt-hour  
 electric circuit, series circuit, parallel circuit  
 resistors in series, resistors in parallel  
 closed circuit, open circuit, short-circuit  
 switch  
 multimeter, COM port, conductivity tester  
 wire, conductor, insulator  
 circuit diagram, schematic, schematic symbols  
 battery, positive terminal, negative terminal

### Symbols:

V,  $\Delta V$ , i,  $\Delta Q$ ,  $\Delta t$ , R, A,  $\Omega$ , W, P

### Equations & constants:

#### You get these on test:

$$i = \Delta Q / \Delta t \quad \Delta V = i R$$

#### Equivalent resistance:

Series  $R_e = R_1 + R_2$

Parallel  $1/R_e = 1/R_1 + 1/R_2$

$$P = E/t \quad P = iV \quad P = V^2/R$$

Cost = rate x energy

### Resistor codes (use these, don't memorize them)

Number	Color	Number	Color
0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Violet
3	Orange	8	Gray
4	Yellow	9	White

**NOT** provided on test: 1<sup>st</sup> digit/2<sup>nd</sup> digit/# of zeros

### Unit Objectives - Williams

- I understand all the vocabulary & math of this unit and all demos, videos, equations, and class assignments.
- I remember objectives & vocabulary from previous units.
- I know electrical potential (V), electrical potential energy, can distinguish them, and batteries provide energy for this
- I understand conventional current, know current flow direction versus electron flow and know about drift speed
- I know the difference between how quickly current starts to flow versus how fast electrons move
- I understand resistance and how/why it's impacted by wire length, area and temperature
- I know the wide variety of the human body's electrical resistance and its possible deadly consequences
- I can contrast AC/DC and know North American AC's standards and common battery voltage standards
- I know what an electrical panel, circuit breaker/fuse, and 120V/240 household voltages are and their dangers
- I can use Ohm's law, equations of power, and equivalent resistance to solve problems
- I understand and can compute circuit energy costs for local household rates
- I know the function and operation of the multimeter and circuits we used and learned about in this class
- I understand how a light bulb works including its entry and exit points for current
- I know that it only makes sense to transport electrical energy over long distances using high voltages
- I can draw/ recognize schematic symbols we use in class: emf (battery single/multiple), wire, resistor, switch
- I can find  $R_e$  for series, parallel and mixed circuits
- I know computationally zero voltage drop occurs along wires and can solve complex circuit diagrams using  $R_e$
- I understand the differences between light bulbs in series compared to light bulbs in parallel, including how brightly they shine, the power consumed,  $\Delta V$ , and the consequence of losing one of those bulbs
- I understand the consequences of additional resistors being added in parallel versus series
- I can explain electrical analogies like how water/electricity/shopping lines are similar
- When given a table with resistor stripe codes, I can use these codes to find the ohms of the resistor
- I can use electrical test equipment and build circuits from both equipment and schematic diagrams (\*from using)
- I know where voltmeters, ammeters and ohmmeters go in circuits and understand **why**

### DuPage ROE Objectives

- I can apply Ohm's Law.
- I can recognize and analyze series and parallel circuits.
- I can identify how to measure voltage and current with an appropriate meter.
- I can calculate the power used by an electronic device.