Tuesday Reading Assessment: Unit 1, Ohm's Law and Batteries, DC Circuits and Power

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1 Memory Bank

- $C_{\rm tot} = C_1 + C_2 + ...$ ... Capacitors in *parallel*.
- $U = \frac{1}{2}CV^2$ ... Stored energy in a capacitor.
- $P = \Delta U / \Delta t$ ... Power is the consumption or change in stored energy versus time.
- $y(x) = mx + b$ ... Linear function with slope m, and y-intercept b
- $m = \Delta y / \Delta x$ ... Formula for slope.
- $V = iR$ ... Ohm's Law, with V for voltage, i for current, and R for resistance.
- $R_{\rm tot} = R_1 + R_2 + ...$ ... Resistors in *series.*

2 Power and Capacitance

1. Suppose a 1 μF capacitor is fully charged with 5 Volts. (a) How much energy is stored? (b) If the energy is released in 25 ms, what is the power delivered, in mW? (c) If a bank of 10 such capacitors were charged *in parallel,* what power would be delivered?

3 Ohm's Law: Calculating Slope from Data

1. Suppose you encounter the data in Tab. 1. If you treat the voltage as the y-variable, and current as the x-variable, what is the slope of the data? What are the units of the slope?

Current (mA)	Volts (V)
5	1
10	2
15	3
20	4
25	5
30	6

Table 1: A measurement of current through a resistor, given a voltage dropped across the resistor.

2. If two resistors with the resistance implied by the previous exercise are connected *in series,* what is the total resistance?