

Tuesday Reading Assessment: Energy and Power in Capacitors

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1 Memory Bank

- $C_{tot} = C_1 + C_2 + \dots$... Total capacitance for capacitors in parallel.
- $U = \frac{1}{2}CV^2$... Energy stored in a capacitor.
- $P = U/T$... Power consumed in a system, assuming U is energy or work done, and T is time duration.

2 Energy and Power with Capacitors

1. Suppose a system stores 0.1 J of energy, and releases all of it in 10 ms. To what power consumption does this correspond?
2. Consider Fig. 1, in which three parallel capacitors are being charged by a battery voltage. Suppose we measure the following:
 - $C_1 = 2\mu\text{F}$
 - $C_2 = 2\mu\text{F}$
 - $C_3 = 4\mu\text{F}$(a) What is the total capacitance of the system? (b) If the battery voltage is 12V, how much energy is stored?
3. If the energy stored in the system in Fig. 1 is released in 10 ms, what is the power provided?

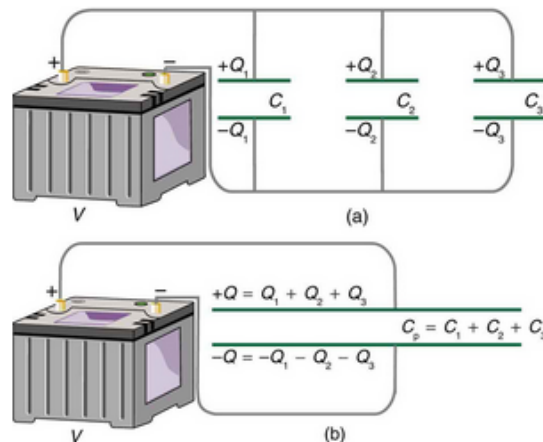


Figure 1: A system of three parallel capacitors charged by a battery voltage.