Capacitors

You should have noticed in the “hands-on” electronics module that capacitors come in many different sizes and shapes. Electrolytic capacitors are often used for inexpensive storage of charge, but they are frequent troublemakers and sometimes have to be replaced.

a. sketch an electrolytic capacitor.

b. some electrolytic capacitors have to be installed with a polarity; what happens if you install them backwards?

they heat up rapidly and may explode

c. suppose the power module in your laser has three bad electrolytic capacitors (they tend to ooze goo when they go bad, so you can sometimes tell that way). They are labeled 22 μF 35 volts. Against all odds, you find a 22 μF 50 V at Southern Electronics and a two 22 μF 35 V capacitors at Ralph’s (these are two stores every LSU graduate student should know about; they are just north of I110, one is on Plank road the other on Scenic Highway). Anyway, can you mix the 35 V and 50 V capacitors and get your instrument back in operating condition?

\[ C_{\text{total}} = \frac{C_1 C_2 C_3}{C_1 + C_2 + C_3} \]

Yes, the voltage rating tells you the maximum operating condition so as long as the capacitance is correct you can mix the different volts.