

Problem T1

(a) A large capacitor is constructed of square metal plates 2.0 cm on a side sandwiching a bakelite sheet 0.02 mm thick. Using the fact that the dielectric constant of bakelite is $\kappa=7.0$ and that the permittivity of free space is $\epsilon_0 = 8.85 \times 10^{-12}$ F/m, compute the capacitance of this capacitor in Farads.



(b) The capacitor above is placed next to a smaller capacitor and the two are wired together as shown below. The smaller capacitor is constructed from the same materials as the large one; however the bakelite sheet is 0.04 mm thick and the metal plates are 1.0 cm on a side. Compute the total capacitance of this device in Farads.

