

Homework 7

1. The plates of a capacitor are separated by 0.0060 m. The capacitor is charged by a potential difference of 5.0 V and then disconnected. Now you separate the plates to a distance of 0.015 m. What is the new potential difference between the plates?
2. A capacitor is composed of a solid, spherical ball of gold surrounded by a thin spherical shell of copper with radius 2.10 cm. You measure the capacitance to be 13.0 pF. What volume of gold is in the center?
3. A parallel-plate capacitor is charged with 0.220 C. If the area of each of its plates is 0.620 m², what is the electric field energy density between the plates?
4. It is possible to make a cylindrical capacitor out of a soft drink can by wrapping a layer of paper and then aluminum foil around it. The top and bottom of the can are left exposed. The diameter of a soda can is about 6.50 cm, and its height is 12.0 cm. The layer of paper is 0.300 mm thick and its dielectric constant is 1.97. Calculate the capacitance of this contraption.