**Chapter-25**

1. When a potential difference of 150 V is applied to the plates of a parallel-plate capacitor, the plates carry a surface charge density of 30.0 nC/cm2. What is the spacing between the plates?

1. (a) Find the equivalent capacitance between points a and b for the group of capacitors connected as shown in Figure P25.12. Take C1 = 5.00 µF, C2 = 10.0 µF, and C3 = 2.00 µF. (b) What charge is stored on C3 if the potential difference between points a and b is 60.0 V?
2. Two identical parallel-plate capacitors, each with capacitance C, are charged to potential difference $∆$V and then disconnected from the battery. They are then connected to each other in parallel with plates of like sign connected. Finally, the plate separation in one of the capacitors is doubled. (a) Find the total energy of the system of two capacitors before the plate separation is doubled. (b) Find the potential difference across each capacitor after the plate separation is doubled. (c) Find the total energy of the system after the plate separation is doubled. (d) Reconcile the difference in the answers to parts (a) and (c) with the law of conservation of energy.

Ans

1. A 2.00-nF parallel-plate capacitor is charged to an initial potential difference $∆$Vi 5 100 V and is then isolated. The dielectric material between the plates is mica, with a dielectric constant of 5.00. (a) How much work is required to withdraw the mica sheet? (b) What is the potential difference across the capacitor after the mica is withdrawn?