Hints:
#1 - Charge refers to the magnitude on each plate, not the total which would be zero.
#4 - 1 fF=1x10^-15 F
#5 - Watch units carefully.

Name _____

Homework Questions

Potential + Capacitance #2

1. How much charge is on each plate of a 4.00 µF capacitor:

   a. when it is connected to a 18.0 V battery?

   72 µC

   b. when it is connected to a 1.50 V battery?

   6 µC

2. Two conductors having net charges of +16.0 µC and -16.0 µC have a potential difference of 16.0 V between them.

   a. Determine the capacitance of the system.

   1.00e-6 F

   b. What is the potential difference between the two conductors if the charges on each are increased to +256 µC and -256 µC?

   256 V

3. When a potential difference of 138 V is applied to the plates of a parallel-plate capacitor, the plates carry a surface charge density of 35.0 nC/cm^2. What is the spacing between the plates?

   3.49 µm

4. An air-filled capacitor consists of two parallel plates, each with an area of 7.60 cm^2, separated by a distance of 1.50 mm.

    a. If a 21.0 V potential difference is applied to these plates, calculate the electric field between the plates.

    14 kV/m

    b. What is the surface charge density?

    124 nC/m^2

    c. What is the capacitance?

    4.48 pF

    d. Find the charge on each plate.

    94.2 pC

5. A 1 megabit computer memory chip contains many 62.0 fF capacitors. Each capacitor has a plate area of 23.0 $\times 10^{-12}$ m^2. Determine the plate separation of such a capacitor (assume a parallel-plate configuration). The characteristic atomic diameter is 10^{-10} m = 0.100 nm. Express the plate separation in nanometers.

    3.28 nm

6. When a potential difference of 152 V is applied to the plates of a parallel-plate capacitor, the plates carry a surface charge density of 30.0 nC/cm^2. What is the spacing between the plates?

    4.49 µm