

Practice problems for chapter 25: Capacitance

- 1 The two metal objects in Fig. 25-24 have net charges of $+70 \text{ pC}$ and -70 pC , which result in a 20 V potential difference between them. (a) What is the capacitance of the system? (b) If the charges are changed to $+200 \text{ pC}$ and -200 pC , what does the capacitance become? (c) What does the potential difference become?

Figure 25-24 Problem 1.



- 3 **SSM** A parallel-plate capacitor has circular plates of 8.20 cm radius and 1.30 mm separation. (a) Calculate the capacitance. (b) Find the charge for a potential difference of 120 V .
- 4 The plates of a spherical capacitor have radii 38.0 mm and 40.0 mm . (a) Calculate the capacitance. (b) What must be the plate area of a parallel-plate capacitor with the same plate separation and capacitance?
- 5 What is the capacitance of a drop that results when two mercury spheres, each of radius $R = 2.00 \text{ mm}$, merge?

- 14 **GO** In Fig. 25-30, the battery has a potential difference of $V = 10.0 \text{ V}$ and the five capacitors each have a capacitance of $10.0 \mu\text{F}$. What is the charge on (a) capacitor 1 and (b) capacitor 2?

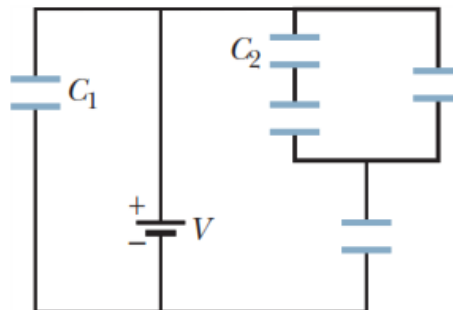


Figure 25-30 Problem 14.

- 15 **GO** In Fig. 25-31, a 20.0 V battery is connected across capacitors of capacitances $C_1 = C_6 = 3.00 \mu\text{F}$ and $C_3 = C_5 = 2.00 C_2 = 2.00 C_4 = 4.00 \mu\text{F}$. What are (a) the equivalent capacitance C_{eq} of the capacitors and (b) the charge stored by C_{eq} ? What are (c) V_1 and (d) q_1 of capacitor 1, (e) V_2 and (f) q_2 of capacitor 2, and (g) V_3 and (h) q_3 of capacitor 3?

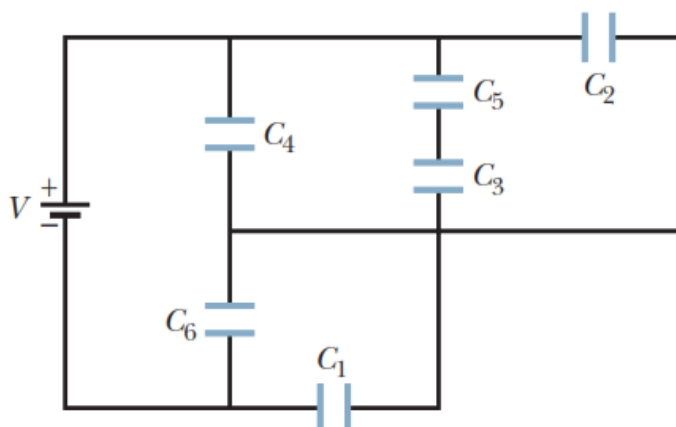


Figure 25-31 Problem 15.

••21 **SSM** **WWW** In Fig. 25-36, the capacitances are $C_1 = 1.0 \mu\text{F}$ and $C_2 = 3.0 \mu\text{F}$, and both capacitors are charged to a potential difference of $V = 100 \text{ V}$ but with opposite polarity as shown. Switches S_1 and S_2 are now closed. (a) What is now the potential difference between points a and b ? What now is the charge on capacitor (b) 1 and (c) 2?

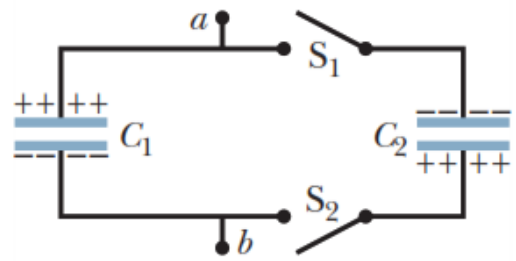


Figure 25-36 Problem 21.