$^{8}/_{10}$

I2 Capacitor Networks

I2.1 Calculate the capacitance of each of the following combinations:

a) A 3.0 μF capacitor connected in parallel with a 2.0 μF capacitor.

b) A 3.0 μF capacitor connected in series with a 2.0 μF capacitor.

c) A 6.0 μF capacitor is connected in parallel with a 4.0 μF capacitor. The combination is then connected in series with a 20 μF capacitor.

d) A 220 nF capacitor is connected in series with a 440 nF capacitor. The combination is connected in parallel with a 1.0 μF capacitor.

e) A 1.0 nF, 2.0 nF and 3.0 nF capacitor, all connected in parallel.

f) A 1.0 nF, 2.0 nF and 3.0 nF capacitor, all connected in series.

I2.2 A 200 μF capacitor is in series with a 2200 μF capacitor and they are charged until the 200 μF capacitor stores 30 μC. What is the charge on the other capacitor?

I2.3 A 200 μF capacitor is in series with a 2200 μF capacitor. The capacitors are charged until the 200 μF capacitance has a voltage of 12 V across it. What is the voltage across the 2200 μF capacitor?

I2.4 A 470 μF capacitor is charged using a 10 V battery. It is then disconnected from the battery, and connected to an uncharged 220 μF capacitor. Calculate the voltage across the capacitors once the current has stopped flowing. (Hint: capacitors are effectively in parallel, and total charge has not changed.)

I2.5 A 6.0 nF capacitor is in parallel with a 10 nF capacitor. The voltage across the 6.0 nF capacitor is 36 V. What is the voltage across the other capacitor?