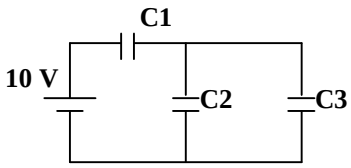
Chapter 26

1- Consider the circuit shown in the figure. If C1 = 1 micro F, C2 = 6 micro F and C3 = 3 micro F, what is the charge on C3? [3 micro C]



2- A 2.5 micro F capacitor, C1, is charged to a potential difference V1 = 10 V, using a 10 V battery. The battery is then removed and the capacitor is connected to an uncharged capacitor, C2, with capacitance of 10 micro F. What is the potential difference across C1 and C2, respectively? [2 V, 2 V]

3- A parallel-plate capacitor has a plate area of 0.2 m^2 and a plate separation of 0.1 mm. If the charge on each plate has a magnitude of $4.0*10^{-6}$ C the electric field between the plates is approximately: [$2.3*10^6$ V/m.]

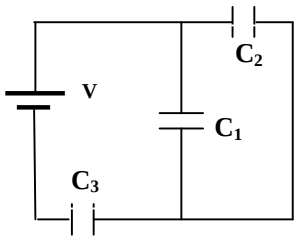
4- A 2 micro-F and a 1 micro-F capacitor are connected in series and a potential difference is applied across the combination. What is the ratio of the potential difference across each of them? [The 2 micro-F capacitor has half the potential difference of the 1 micro-F capacitor]

5- Capacitors A and B are identical. Capacitor A is charged so it stores 4 J of energy and capacitor B is uncharged. The capacitors are then connected in parallel. The total stored energy in the capacitors is now: [2 Joules].

6- Find the equivalent capacitance of three capacitors connected in series. Assume the three capacitors are: C1 = 2.00 micro-F, C2 = 4.00 micro-F and C3 = 8.00 micro-F. [1.14 micro-F].

7- An air filled parallel-plate capacitor has a capacitance of $1.00*10^{-12}$ F. The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As a result the, capacitance becomes $2.00*10^{-12}$ F. The dielectric constant of the wax is: [4.00]

8- In figure (2), find the charge stored by the capacitor C3 if the potential difference across the battery is 10.0 V. Use the values C1 = C2 = 2.0 micro-F and C3 = 4.00 micro-F. [20 micro-C]



9- Two concentric spherical shells of radii 10 cm and 5.0 cm are charged to a potential difference of 20 V. How much energy is stored in this spherical capacitor? [$2.2*10^{-9}$ J]

10- A parallel-plate air-filled capacitor, of area 25 cm**2 and plate separation of 1.0 mm, is charged to a potential difference of 600 V. Find the energy density between the plates. [1.6 J/m^3]

11- A parallel-plate capacitor has an area A and a separation d. Find its capacitance if it is filled with two dielectrics as shown in figure 3. [Co is the capacitance of the air-filled parallel-plate capacitor. K1 = 3 and K2 = 1.5 are the dielectric constants] [2*Co]