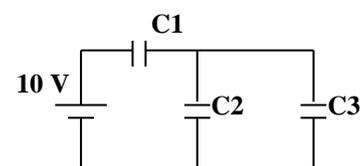


## Chapter 25 (Capacitance)



1- Consider the circuit shown in the figure. If  $C_1 = 1$  micro F,  $C_2 = 6$  micro F and  $C_3 = 3$  micro F, what is the charge on  $C_3$ ? (A : 3 micro C)

2- A 2.5 micro F capacitor,  $C_1$ , is charged to a potential difference  $V_1 = 10$  V, using a 10 V battery. The battery is then removed and the capacitor is connected to an uncharged capacitor,  $C_2$ , with capacitance of 10 micro F. What is the potential difference across  $C_1$  and  $C_2$ , respectively? (A: 2 V, 2 V)

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

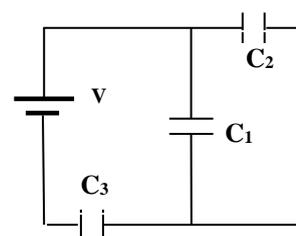
4- A 2 micro-F and a 1 micro-F capacitor are connected in series and a potential difference is applied across the combination. What is the ratio of the potential difference across each of them? (A: The 2 micro-F capacitor has half the potential difference of the 1 micro-F capacitor)

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: (A: 2 Joules)

6- Find the equivalent capacitance of three capacitors connected in series. Assume the three capacitors are:  $C_1 = 2.00$  micro-F,  $C_2 = 4.00$  micro-F and  $C_3 = 8.00$  micro-F. (A: 1.14 micro-F)

7- An air filled parallel-plate capacitor has a capacitance of  $1.00 \times 10^{-12}$  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  $2.00 \times 10^{-12}$  F. The dielectric constant of the wax is: (A: 4.00)

8- In figure, find the charge stored by the capacitor  $C_3$  if the potential difference across the battery is 10.0 V. Use the values  $C_1 = C_2 = 2.0$  micro-F and  $C_3 = 4.00$  micro-F. (A: 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? (A:  $2.2 \times 10^{-9}$  J)

10- A parallel-plate air-filled capacitor, of area  $25 \text{ cm}^2$  and plate separation of 1.0 mm, is charged to a potential difference of 600 V. Find the energy density between the plates. (A:  $1.6 \text{ J/m}^3$ )

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. [ $C_0$  is the capacitance of the air-filled parallel-plate capacitor.  $K_1 = 3$  and  $K_2 = 1.5$  are the dielectric constants]. (A:  $2 \times C_0$ )