

Answer on question #52604, Physics, Electric Circuits

Question A 3 micro coloumb capacitor is charged to a potential of 300V and 2 micro coloumb capacitor us charged to 200V.The capacitor are then connected in parallel with plates of opposite polarity joined together.What amount of charge will flow,when the plates are so connected?

Solution The difference is $q_n = q_1 - q_2 = 1 \mu C$. So, this charge will distribute on two parallel capacitors. How much on each? Total capacity after connection is

$$C_n = C_1 + C_2 = \frac{q_1}{U_1} + \frac{q_2}{U_2} = \frac{3 \cdot 10^{-6}}{300} + \frac{2 \cdot 10^{-6}}{200} = 2 \cdot 10^{-8} F$$

So, new potential on each is

$$U_{n1} = U_{n2} = \frac{q_n}{C_n} = \frac{1 \cdot 10^{-6}}{2 \cdot 10^{-8}} = 50 V$$

Charge on first capacitor after connection became

$$q_{1n} = U_{n1} \cdot C_1 = 50 \cdot 1 \cdot 10^{-8} = 0.5 \mu C$$

Hence, charge flow is $3 - 0.5 = 2.5 \mu C$.