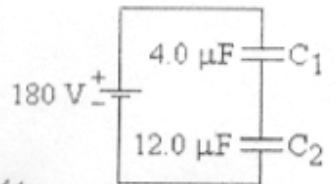


Name: KEY

PHYSICS 2220 - QUIZ #4 - SPRING 2009

1. A capacitance $C_1 = 4.0 \mu\text{F}$ is connected in series with a capacitance $C_2 = 12.0 \mu\text{F}$, and a potential difference of 180 V is applied across the pair.



- a. Calculate the equivalent capacitance.

$$\frac{1}{C_{eq}} = \frac{1}{4\mu\text{F}} + \frac{1}{12\mu\text{F}} = \frac{3}{12\mu\text{F}} + \frac{1}{12\mu\text{F}} = \frac{4}{12\mu\text{F}} = \frac{1}{3\mu\text{F}}$$

So $C_{eq} = 3\mu\text{F}$

- b. What is the charge on each capacitor?

$$Q = C_{eq}\Delta V = (3\mu\text{F} \times 180\text{V}) = 540\mu\text{C}$$

So $Q_1 = Q_2 = 540\mu\text{C}$

- c. What is the potential difference across each capacitor?

$$\Delta V_1 = \frac{Q_1}{C_1} = \frac{540\mu\text{C}}{4\mu\text{F}} = 135\text{V}$$

$$\Delta V_2 = \frac{Q_2}{C_2} = \frac{540\mu\text{C}}{12\mu\text{F}} = 45\text{V}$$