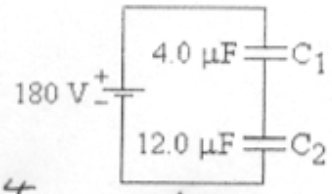
Name: KEY

PHYSICS 2220 - QUIZ #4 - SPRING 2009

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



a. Calculate the equivalent capacitance.

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

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

b. What is the charge on each capacitor?

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

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

c. What is the potential difference across each capacitor?

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

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