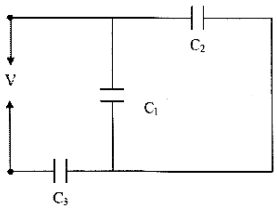
PHYS102.10
Quiz # 9-Chapter 25

Name: Key Id#:

In the figure, find the total energy stored by the three capacitors if the potential difference V is 10 V. Assume $C_1 = 10\ \mu F$, $C_2 = 5\ \mu F$ and $C_3 = 4\ \mu F$.



C_1 and C_2 are parallel

$$C_{12} = C_1 + C_2 = 15\ \mu F$$

C_{12} and C_3 are in serier

$$C_{123} = \frac{C_{12} C_3}{C_{12} + C_3} = 3.15\ \mu F$$

$$U = \frac{1}{2} C_{123} V^2 = \frac{1}{2} 3.15 \times 10^{-6} \times (10)^2$$

$$= \boxed{1.58 \times 10^{-4}\ J}$$

PHYS102.11
Quiz # 9 – Chapter 25

Name: Key Id#:

An air filled parallel plate capacitor has a capacitance of 2.5 nF. The plate area is doubled and paper is inserted between the plates. The new capacitance is 15 nF. Find the dielectric constant of the paper.

$C_0 = \varepsilon_0 \frac{A}{d} = 2.5\text{nF}$

double the area $\Rightarrow$ $C_1 = C_0 \frac{2\varepsilon_0 A}{d} = 2 \times 2.5\text{nF} = 5\text{nF}$

$C_2 = \kappa C_1$

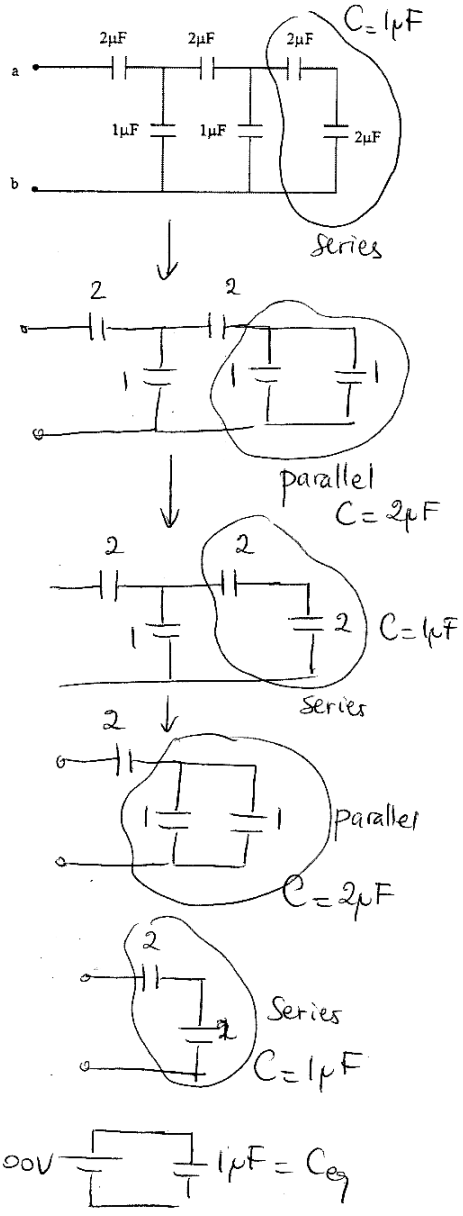
$15\text{nF} = \kappa\, 5\text{nF}$

$\kappa = \frac{15\text{nF}}{5\text{nF}} = 5$

PHYS102.12
Quiz # 9 – Chapter 25

Name: Key Id#:

(a) If the potential difference between points a and b is 100 V. Find the charge stored in the equivalent capacitor.



$q_{eq} = C_{eq} V$

$= 1\mu F \times 100\,V$

$\boxed{q_{eq} = 100\,\mu C}$