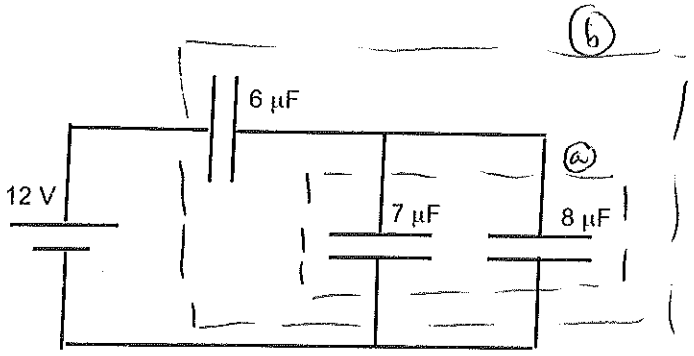
Nachum

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Solutions ID



(4 points) For the circuit above, find the equivalent capacitance.

(a) $7\mu F \parallel 8\mu F \rightarrow 15\mu F$

(b) $15\mu F$ ser. $6\mu F \rightarrow \frac{15\times 6}{15+6}\mu = \frac{90}{21}\mu = \boxed{\frac{30}{7}\mu F}$

(2 points) What is the charge stored on the 6 μF capacitor?

Total charge will appear on the ± plates of the series capacitor, so

$$Q = CV = \frac{30}{7}\mu F \times 12V = \boxed{\frac{360}{7}\mu C}$$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

The voltage drop across each of these is the same. So using $Q=CV$, whatever V is (and it's not 12V!)

$$Q_7 = 7_\mu \times V \qquad Q_8 = 8_\mu \times V \rightarrow \frac{Q_7}{Q_8} = \frac{7}{8}$$ so these 15ths

$$Q_7 = \frac{7}{15}\times\frac{360}{7}\mu C = \frac{360}{15}\mu C = \boxed{24\mu C}$$

$$Q_8 = \frac{8}{15}\times\frac{360}{7} = \frac{8}{7}\times 24\mu C = \boxed{\frac{192}{7}\mu C}$$

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Name Ratul Islam ID 0443707

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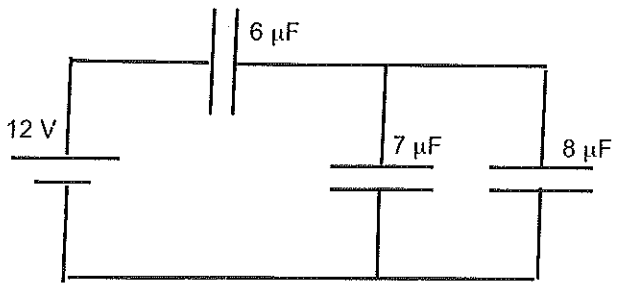

(4 points) For the circuit above, find the equivalent capacitance.

$C_{eq} = \frac{C_1(C_2+C_3)}{C_1+C_2+C_3}$

$Q = CV$

C_{eq} for 11

$C_{11} = 7\,\mu F + 8\,\mu F = 15\,\mu F$

C_{eq} for series

$\frac{1}{C_{eq}} = \frac{1}{6\,\mu F} + \frac{1}{15\,\mu F}$

$C_{eq} = \frac{(6\times10^{-6}\,F)(15\times10^{-6}\,F)}{(13\times10^{-6}\,F)}$

$C_{eq} = 6.9\times10^{-6}\,F$

(2 points) What is the charge stored on the 6 μF capacitor?

Q on 6 μF → V_1

$Q = (C)(V)$ $(6.9\times10^{-6}\,F)(12\,V) = 8.28\times10^{-5}\,F\cdot V$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

Charge on 7 μF and 8 μF.

Q: 7 μF || 8 μF → $V = V_1$

→ $Q_2 + Q_3$

$Q = CV$

for parallel V is same

$Q = V(C_1+C_2)$

$= 12\,V(15\times10^{-6}\,F)$

$= 1.8\times10^{-4}\,V\cdot F$

7 μF $Q = (12\,V)(7\times10^{-6}\,F)$

$= 8.4\times10^{-5}$ — 4

8 μF $Q = (12\,V)(8\times10^{-6}\,F)$

$= 9.6\times10^{-5}$

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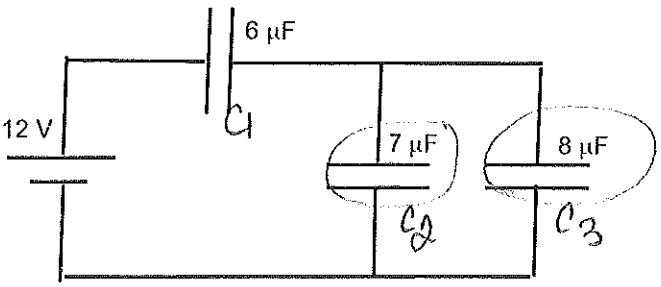
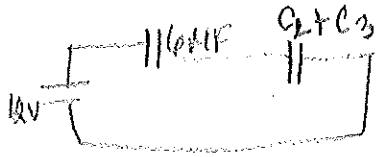
Name Reshu Sharma ID _____

3/10



(4 points) For the circuit above, find the equivalent capacitance. Ceq



$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_{2+3}}$

$C_{eq} = \frac{C_1 (C_2 + C_3)}{C_1 + C_2 + C_3} = \frac{9 \times 10^{-11}}{2.1 \times 10^{-4}}$

$C_{eq} = 4.2 \times 10^{-7}$ F

/1

(2 points) What is the charge stored on the 6 μF capacitor? C.

$Q = C_1 V$ $Q = (6 \times 10^{-6} F) \cdot (12 V) =$

7.2×10^{-5}

/2

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = CV$

C.

Q on $C_2 \| C_2 \rightarrow V_2 = V_1$

$Q = C_1 +$

$Q_{tot} = Q_1 + Q_2$

$Q_{tot} = C_1V_1 + C_2V_2 + C_3V_3$

$Q_1 = C_1V_1$

/3

/4

$12 - \frac{(7.2 \times 10^{-5})}{(7 \times 10^{-6})} =$

$12 - \frac{(7.2 \times 10^{-5})}{(8 \times 10^{-6}} =$

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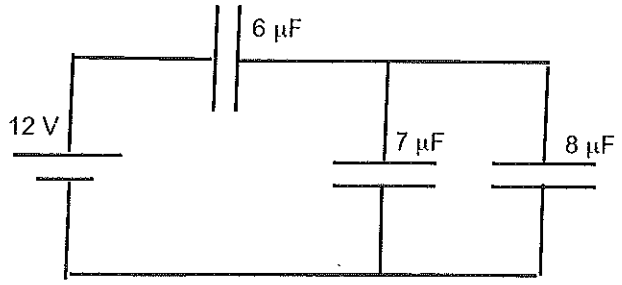
Name Aaron Chin ID

6/10



(4 points) For the circuit above, find the equivalent capacitance.

$C_2+C_3=15\mu F$

$\frac{1}{C_{eq}}=\frac{1}{6\mu F}+\frac{1}{15\mu F}=\frac{21}{90}\mu F$ $C_{eq}=\frac{90}{21}\mu F=4.28$

$C_{eq}=4.28\ \mu F$

(2 points) What is the charge stored on the 6 μF capacitor?

$Q=CV$ $V_1=\frac{Q}{C_1}$ $12V=V_1+(V_2+V_3)$ $Q_1=51.4\mu C$

$Q=51.4$

$V_1=\frac{51.4\mu C}{6\mu F}=8.57\ V$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$V_2+V_3=3.42$ $V_{Tot}=\frac{Q_{tot}}{C_{tot}}$

$(Q_2+Q_3)=(V_2+V_3)(C_2+C_3)$

$Q=VC$ $Q_2=(1.86)(\ )=11.172\mu C$

$Q_3=(1.871)(8\ )=14.552\mu C$

$Q_2=11.172\mu C$

$Q_3=14.552\mu C$

$Q=VC$

$Q_2=CV_2$

$Q_3=C_3V_3$

$V_2=\frac{Q}{C}$

$V_3=\frac{Q}{C}$

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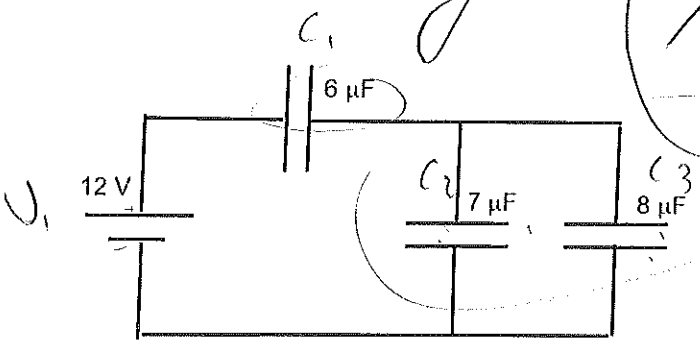
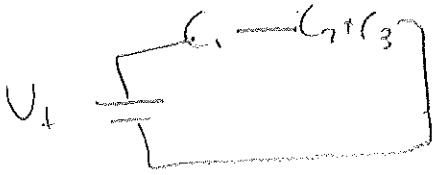
Name Nicole Forney ID N15918363

10/10





(4 points) For the circuit above, find the equivalent capacitance.

$C_{eq} = \left(\frac{1}{C_1} + \frac{1}{C_2+C_3}\right)^{-1} = \left(\frac{1}{6\times10^{-6}\,F} + \frac{1}{(7\times10^{-6})+(8\times10^{-6})}\right)^{-1}$

$4.3\,\mu F$

$Q = CV$

$V = \frac{Q}{C}$

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = C_1 V_1$ → ?

$V_1 + V_2 = V_t$

$Q_{tot} = C_{eq} V_t$

$V_1 = V_t - V_2$

$Q_{tot} = 5.16 \times 10^{-5}\,C$

$V_1 = \frac{Q_{tot}}{C_{eq}} - \frac{Q_2}{C_2+C_3}$

$\frac{5.16\times10^{-5}}{6\times10^{-6}} = 8.6$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$V_2 = V - V_1 = 12 - 8.6 = 3.4$

$Q_2 = (7\times10^{-6})(3.4) = 2.4\times10^{-5}\,C$

$Q_3 = (8\times10^{-6})(3.4) = 2.7\times10^{-5}\,C$

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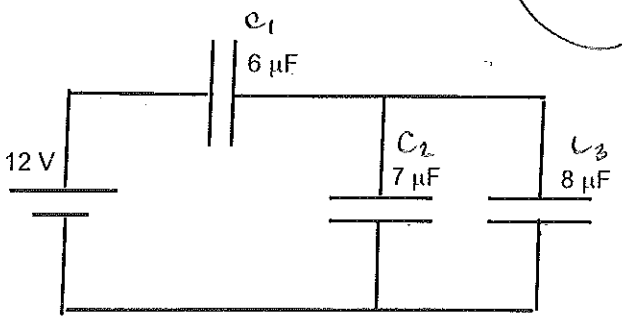
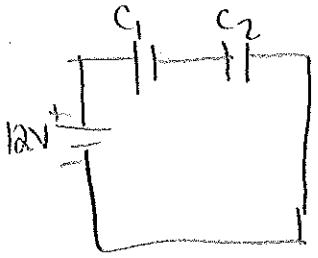
Name FRANK ALLEN ID

8/10





(4 points) For the circuit above, find the equivalent capacitance.

$C_2 || C_3 = 15\mu F$

$C_{eq} = C_1 + C_2 || C_3 = \frac{1}{6\mu F} + \frac{1}{15\mu F} = 4.286\mu F$

$Q = CV$.

(2 points) What is the charge stored on the 6 μF capacitor?

$V_1 = \frac{Q}{C_1} = \frac{51.432}{6} = 8.572$

$Q_{TOTAL} = (C_{eq})(V) = 51.432$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$V - V_1$

$V_1 = \frac{Q_{TOTAL}}{15\mu F} = 3.4288V$

$Q_{7\mu F} = (7\mu F)(V - V_1) = (7\mu F)(12 - 3.4288) = 60$

$Q_{8\mu F} = (8\mu F)(V - V_1) = (8\mu F)(12 - 3.4288) = 68.56$

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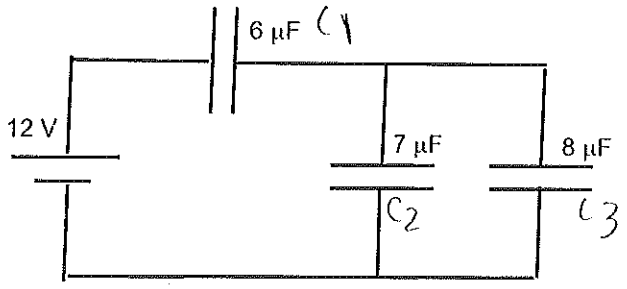
Name Mori Kubashidze ID

1/10



(4 points) For the circuit above, find the equivalent capacitance.

$C_{(23)eq} = C_1 + C_2 = (7+8)\times10^{-6} = 15\times10^{-6}$

$C_{eq} = \frac{1}{C_1} + \frac{1}{C_{(23)}} \quad \frac{1}{6\times10^{-6}} \quad \frac{1}{15\times10^{-6}} = 0.167\times10^{6} + 0.067\times10^{6} =$

$= 0.234\times10^{6} = 2.34\times10^{5}$

-3

(2 points) What is the charge stored on the 6 μF capacitor?

$Q = C_1V_1 = 6\times10^{-6}\times12 = 72\times10^{-6} = 7.2\times10^{-7}$

-2

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q_2 = 12\times7\times10^{-6} = 84\times10^{-6}$ $\quad Q_3 = 12\times8\times10^{-6} = 96\times10^{-6}$

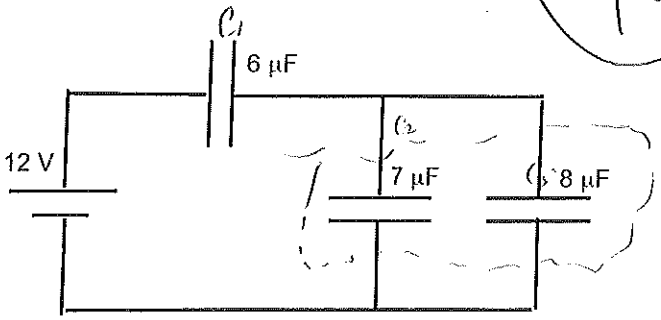
$Q_1 = Q_3 = V(C_2+C_3) = 12(7\times10^{-6} + 8\times10^{-6}) = 180\times10^{-6}$

-4

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Timothy Parahoosingh ID 0456235

4/10



$C_{eq} = 7\mu F + 8\mu F$
$C_2 \to C_3$

$C_{eq} = 15\times10^{-6} F$
$C_2 \to C_3$

(4 points) For the circuit above, find the equivalent capacitance.

$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2+C_3}$

$\frac{1}{C_{eq}} = \left(\frac{1}{6\times10^{-6} F} + \frac{1}{15\times10^{-6} F}\right)$

$\frac{1}{C_{eq}} = 23333.33 F$

$C_{eq} = \frac{C_1(C_2+C_3)}{C_1+C_2+C_3} = \frac{9\times10^{-11}}{.000021} = 4.286 \times 10^{-6}$ F

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = C_1 V$

$Q_1 = 6\times10^{-6}(12V)$ ✓

$Q_1 = 7.2\times10^{-5} C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = V(C_2+C_3)$ "Parallel rule"

$Q = V(C_1+C_2)$

$Q = CV$

$Q = 12V\left((7\times10^{-6} F)+(8\times10^{-6} F)\right)$

$Q = 12\times(15\times10^{-6})$

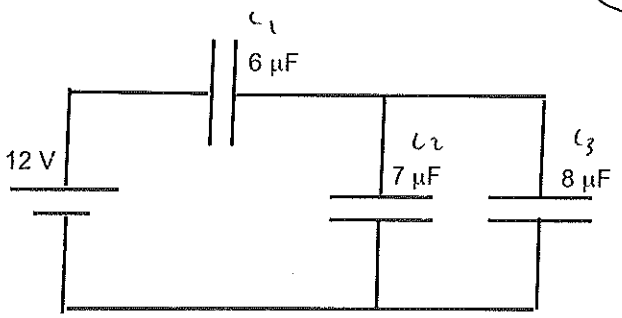
$Q = 1.8\times10^{-4} C$

Q_{eq}

$V = V_1$ ✓ 4

PH2023 C Sections Quiz 7 4/10 Oct. 24, 2014

Name Vincent Fung ID



(4 points) For the circuit above, find the equivalent capacitance.

$C_{eq} = \frac{C_1(C_2+C_3)}{C_1+C_2+C_3}$ $C_{eq} = C_2 + C_3$

$= \frac{6(7+8)}{6+7+8} = \frac{90}{21}\,\mu F$ $7+8 = 15\,\mu F$

$= 4.29\,\mu F$ 2

$C_{eq} = 4.29 + 15 = 19.29\,\mu F$

(2 points) What is the charge stored on the 6 μF capacitor?

$Q = CV$ $Q = C_{eq}V$

$Q = (4.29)(12) = 51.48\,C$

$(4.29\times10^{-6})(12) = 51.48\,\mu C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = CV$ $Q = C_{eq}V$ $Q_2 = Q_3 = 180\,\mu C$

$(C_2+C_3)(V)$

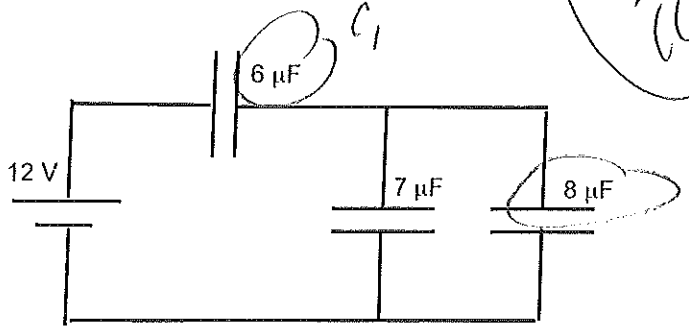
$(15)(12) = 180\,\mu C$

4

PH2023 C Sections | Quiz 7 | Oct. 24, 2014

Name Theo Monroe | ID N

9/10



(4 points) For the circuit above, find the equivalent capacitance.

$$C_{eq} = \left(\frac{1}{C_1} + \frac{1}{C_2 + C_3}\right)^{-1} = \left(\frac{1}{6\times10^{-6}\,F} + \frac{1}{7\times10^{-6}\,F + 8\times10^{-6}\,F}\right)^{-1}$$

$C_{eq} = 4.3\,\mu F$ ✓

(2 points) What is the charge stored on the 6 μF capacitor?

Q on C_1 → V_1 $\quad Q = C_1 V_1$

$(6\,\mu F)(12) =$

$7.2\times10^{-5}\,F$

$\left(\frac{30}{7}\right)(12)$

$5.1\times10^{-5}\,C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

"II" ∴ same voltage.

$Q = CV$

Q on $C_2 \| C_3$ → $V - V_1$

Q_2, Q_3

$V - V_1$

$= 12 - 8.575 = 3.425$

3.425

$Q = CV$

$\downarrow 15\,\mu F\,(V)$

5.14

8.57 V

$Q_2 = C_2 V_2$

$(7\times10^{-6})(3)$ $\quad 2.1\times10^{-5}\,C$

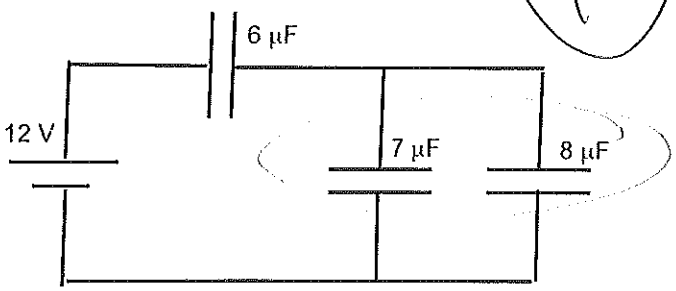
$Q_3 = C_3 V_3$

$(8\times10^{-6})(3) = 2.4\times10^{-5}\,C$

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Luming Jummy Fan ID 12998229

10/10



(4 points) For the circuit above, find the equivalent capacitance.

7118 $7+8 \Rightarrow 15\mu F$

$15\mu F$ series $6\mu F \Rightarrow \frac{15\cdot 6}{15+6} = \frac{90}{21} = \frac{30}{7} \approx 4.3\mu F$ ✓

(2 points) What is the charge stored on the 6 μF capacitor?

$Q = C_{total} V$ $\therefore Q = (6\mu F)(4.3)$

~~$Q = (6\mu F)(12V) = 7.2\times10^{-5} F$~~

$Q = \left(\frac{30}{7}\mu F\right)(12V) \approx 5.1\times10^{-5} C$ ✓

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = CV$

$Q_{total} \frac{30}{7}\cdot 12V = \frac{360}{7} \approx 51.43C$

7118 = $15\mu F$

$V - V_1 \Rightarrow 12V - 8.57V = 3.43V$

$Q = CV$ 3.43V ✓

$V_1 = \frac{Q}{C}$ $\frac{5.1\times10^{-5} F}{6\mu F} = 8.57V$

$Q = 15\mu F(V) = 5.14\times10^{-5} C$

$Q_{7\mu F} = 7\mu F(3.43V) = 2.4\times10^{-5} C$

$Q_{8\mu F} = 8\mu F(3.43V) = 2.7\times10^{-5} C$

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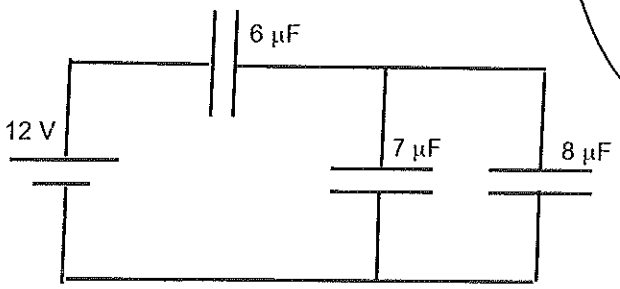
Name Jakinkhan ID

4/10



(4 points) For the circuit above, find the equivalent capacitance.

6uF

12V ① ② 7uF ③ 8uF

$\frac{1}{C_{eq}} = \frac{1}{7uF} + \frac{1}{8uF} = 0.267$

$C_{eq_{23}} = 3.733\ uF$

$C_{eq} = 6uF + 3.733\ uF = 9.733\ uF$

6uF

12V 3.733uF

4

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = (6uF)(12V) = 72$

$Q = C_1 V_1$

✓

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

6uF

12V 7uF 8uF

$Q = CV$ $Q_{TOT} = Q_1 + Q_{23}$

$Q_2 = Q_3 = Q_{23}$ $Q_{TOT} - Q_1 = Q_{23}$

$Q_{TOT} = C_{eq} V = (9.733\ uF)(12V) = 116.7996$

$Q_1 = C_1 V_1 = 72$

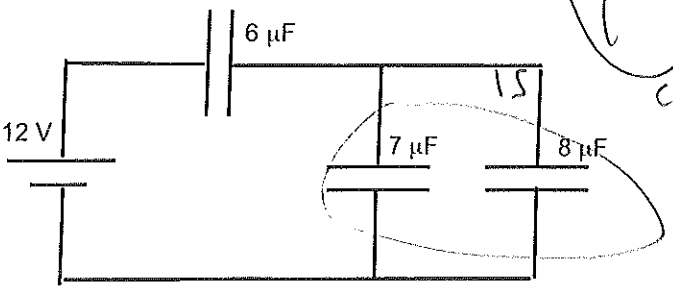
$Q_{23} = Q_{TOT} - Q_1 = 116.7996 - 72 = 44.7996$

$Q_2 : Q_3$ $Q_{23} =$ $Q_{23} = 44.7996 = Q_2 = Q_3$

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Mahmoud Dolah ID 15363925

10/10



$C_p = 15\,\mu F$

(4 points) For the circuit above, find the equivalent capacitance.

$C_{eq} = \frac{(6\,\mu F)(15\,\mu F)}{6\,\mu F + 15\,\mu F}$

$C_{eq} = \frac{90}{21}$

$C_{eq} = 4.286\,\mu F$ ✓

(2 points) What is the charge stored on the 6 μF capacitor?

$Q = CV$

$Q = (4.286\,\mu F)(12)$

$Q = 5.1429 \times 10^{-5}$ ✓

charge is conserved in series!

$Q_{6\mu F} = 5.1429 \times 10^{-5}\,C$

$Q = CV$

$V = Q/C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

V_p: voltage on parallel part

$12 - \frac{Q_{6\mu}}{6\,\mu F} = V_p$

$12 - \frac{5.1429 \times 10^{-5}}{6 \times 10^{-6}} = \frac{24}{7} = V_p$ ✓

Voltage is conserved in parallel

$Q = CV$

$Q_{7\mu} = (7\,\mu F)\left(\frac{24}{7}\right)$

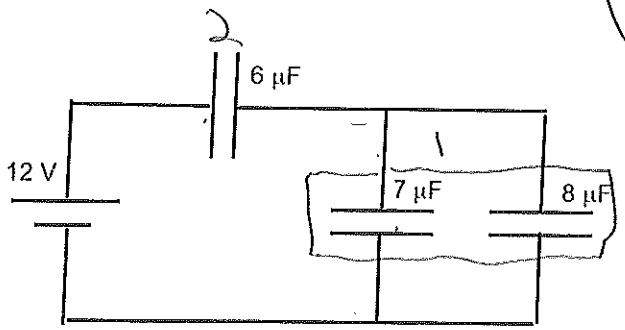
$Q_{7\mu} = 2.4 \times 10^{-5}\,C$

$Q_{8\mu} = (8\,\mu F)\left(\frac{24}{7}\,V\right)$

$Q_{8\mu} = 2.7429 \times 10^{-5}\,C$

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Ryan Kubik ID N10636708



(4 points) For the circuit above, find the equivalent capacitance.

$C_1 = 15$

$C_2 = 6$

$C_{eq} = \frac{1}{\frac{1}{15} + \frac{1}{6}}$

Capacitence $= \frac{30}{7}$ or 4.3 μF

(2 points) What is the charge stored on the 6 μF capacitor?

$Q = CV$

$Q = 4.3 \times 12$

$Q_{total} = 51.6$

$V = \frac{51.6}{6}$

$V = 8.6$ volts

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$V_1 = 8.6$ volts

$V_2 = V - V_1 = 3.4$

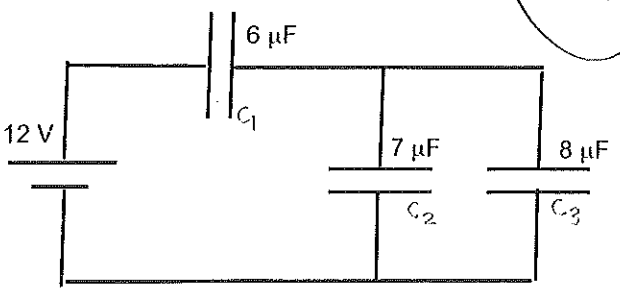
7 μF $Q = 23.8 = (3.4 \times 7)$

8 μF $Q = 27.2 = (3.4 \times 8)$

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Naman Mody ID NII227932

10/10



(4 points) For the circuit above, find the equivalent capacitance.

$C_2 + C_3 = 7 + 8 = 15\ \mu F$

$C_{eq} = \left(\frac{1}{C_1} + \frac{1}{C_2+C_3}\right)^{-1}$

$= \left(\frac{1}{6\times10^{-6}} + \frac{1}{15\times10^{-6}}\right)^{-1}$

$C_{eq} = 4.3\times10^{-6}\ F = 4.3\ \mu F$ ✓

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = CV$

$= 4.3\times10^{-6}\times 12$

$= 51.4\times10^{-6}\ C$ ✓ $51.4\ \mu C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = CV$

$V = \frac{Q}{C}$

$= \frac{51.4\times10^{-6}}{6\times10^{-6}}$

$= 8.57\ V$

$12 - 8.57 = 3.43\ V$

$Q_2 = 7\times10^{-6}\times 3.43$

$= 24\ \mu C$

$Q_3 = 8\times10^{-6}\times 3.43$

$= 27\ \mu C$

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Name Saha Salim ID

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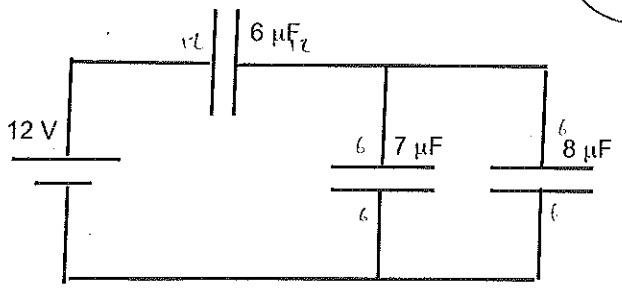

(4 points) For the circuit above, find the equivalent capacitance.

$C_{eq} = \left[\frac{1}{C_1} + \frac{1}{C_2 + C_3}\right]^{-1}$

$= \left[\frac{1}{6\mu F} + \frac{1}{15\mu F}\right]^{-1}$

$C_{eq} = 4.29\,\mu F$ ✓

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = C_1 V$ C_{eq}

$= (6\mu F)(12V)$

$Q = 72\mu C$

-2

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q_2 = C_2 V$

$= (7\mu F)(12V)$

$Q_2 = 84\,\mu C$

$Q_3 = C_3 V$

$= (8\mu F)(12V)$

$Q_3 = 96\mu C$

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