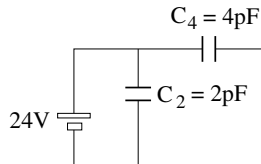
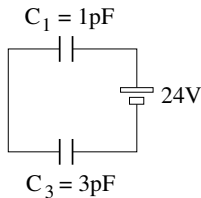


Unit Exam II: Problem #1 (Spring '11)



Both capacitor circuits are at equilibrium.

- (a) Find the charge Q_1 on capacitor 1.
- (b) Find the voltage V_3 across capacitor 3.
- (c) Find the charge Q_2 on capacitor 2.
- (d) Find the energy U_4 stored on capacitor 4.

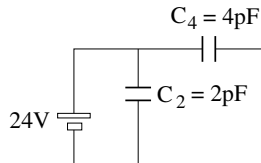
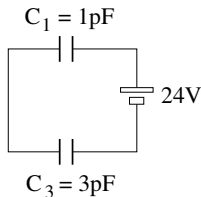


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Solution:

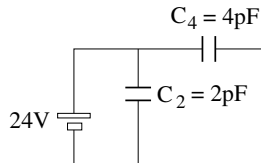
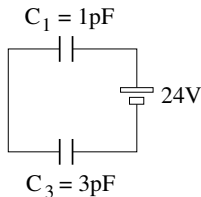
$$(a) \quad C_{13} = \left(\frac{1}{C_1} + \frac{1}{C_3} \right)^{-1} = 0.75\text{pF}, \quad Q_1 = Q_3 = Q_{13} = (24\text{V})(0.75\text{pF}) = 18\text{pC}.$$

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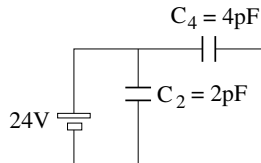
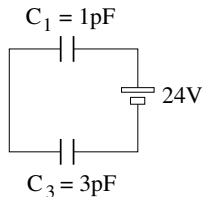
$$(b) \quad V_3 = \frac{Q_3}{C_3} = \frac{18\text{pC}}{3\text{pF}} = 6\text{V}.$$

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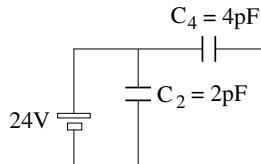
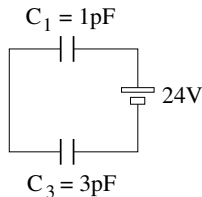
$$(c) \quad Q_2 = (24\text{V})(2\text{pF}) = 48\text{pC}.$$

Unit Exam II: Problem #1 (Spring '11)



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$$(c) \quad Q_2 = (24\text{V})(2\text{pF}) = 48\text{pC}.$$

$$(d) \quad U_4 = \frac{1}{2}C_4V_4^2 = \frac{1}{2}(4\text{pF})(24\text{V})^2 = 1152\text{pJ}.$$