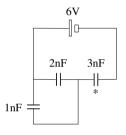
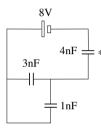


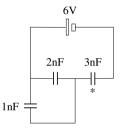
Consider the capacitor circuit shown at equilibrium. (a) Find the equivalent capacitance C_{eq} . (b) Find the total energy U stored in the three capacitors. (c) Find the voltage V_* across the capacitor marked by an asterisk. (d) Find the voltage V_1 across the 1nF-capacitor.

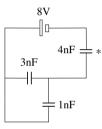






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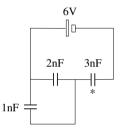


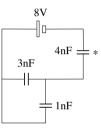


(a)
$$C_{eq} = \left(\frac{1}{1 \text{nF} + 2 \text{nF}} + \frac{1}{3 \text{nF}}\right)^{-1} = 1.5 \text{nF}$$



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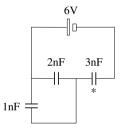


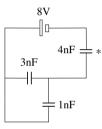
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(b)
$$U = \frac{1}{2}(1.5\text{nF})(6\text{V})^2 = 27\text{nJ}$$



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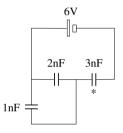
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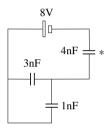
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$$U = \frac{1}{2}(1.5\text{nF})(6\text{V})^2 = 27\text{nJ}$$

(c)
$$V_* = \frac{1}{2}6V = 3V$$



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$$C_{eq} = \left(\frac{1}{1 \text{nF} + 2 \text{nF}} + \frac{1}{3 \text{nF}}\right)^{-1} = 1.5 \text{nF}$$

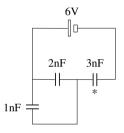
(b)
$$U = \frac{1}{2}(1.5\text{nF})(6\text{V})^2 = 27\text{nJ}$$

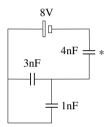
(c)
$$V_* = \frac{1}{2}6V = 3V$$

(d)
$$V_1 = 6V - 3V = 3V$$



Consider the capacitor circuit shown at equilibrium. (a) Find the equivalent capacitance C_{eq} . (b) Find the total energy U stored in the three capacitors. (c) Find the voltage V_* across the capacitor marked by an asterisk. (d) Find the voltage V_1 across the 1nF-capacitor.





(a)
$$C_{eq} = \left(\frac{1}{1nF + 2nF} + \frac{1}{3nF}\right)^{-1} = 1.5nF$$
 (a) $C_{eq} = \left(\frac{1}{3nF + 1nF} + \frac{1}{4nF}\right)^{-1} = 2nF$

(a)
$$C_{eq}=\left(rac{1}{3 ext{nF}+1 ext{nF}}+rac{1}{4 ext{nF}}
ight)=2 ext{nF}$$

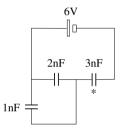
(b)
$$U = \frac{1}{2}(1.5 \text{nF})(6\text{V})^2 = 27 \text{nJ}$$

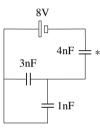
(c)
$$V_* = \frac{1}{2}6V = 3V$$

(d)
$$V_1 = 6V - 3V = 3V$$



Consider the capacitor circuit shown at equilibrium. (a) Find the equivalent capacitance C_{ea} . (b) Find the total energy U stored in the three capacitors. (c) Find the voltage V_* across the capacitor marked by an asterisk. (d) Find the voltage V_1 across the 1nF-capacitor.





(a)
$$C_{eq} = \left(\frac{1}{1 \text{nF} + 2 \text{nF}} + \frac{1}{3 \text{nF}}\right)^{-1} = 1.5 \text{nF}$$
 (a) $C_{eq} = \left(\frac{1}{3 \text{nF} + 1 \text{nF}} + \frac{1}{4 \text{nF}}\right)^{-1} = 2 \text{nF}$

(b)
$$U = \frac{1}{2}(1.5\text{nF})(6\text{V})^2 = 27\text{nJ}$$

(c)
$$V_* = \frac{1}{2}6V = 3V$$

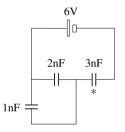
(d)
$$V_1 = 6V - 3V = 3V$$

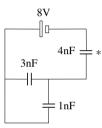
(a)
$$C_{eq} = \left(\frac{1}{3nF + 1nF} + \frac{1}{4nF}\right) = 2nF$$

(b)
$$U = \frac{1}{2}(2nF)(8V)^2 = 64nJ$$



Consider the capacitor circuit shown at equilibrium. (a) Find the equivalent capacitance C_{ea} . (b) Find the total energy U stored in the three capacitors. (c) Find the voltage V_* across the capacitor marked by an asterisk. (d) Find the voltage V_1 across the 1nF-capacitor.





Solution:

(a)
$$C_{eq} = \left(\frac{1}{1 \text{nF} + 2 \text{nF}} + \frac{1}{3 \text{nF}}\right)^{-1} = 1.5 \text{nF}$$

(b)
$$U = \frac{1}{2}(1.5 \text{nF})(6\text{V})^2 = 27 \text{nJ}$$

(c)
$$V_* = \frac{1}{2}6V = 3V$$

$$V_* = \frac{1}{2}6V = 3V$$
 (c) $V_* = \frac{1}{2}8V = 4V$

(d)
$$V_1 = 6V - 3V = 3V$$

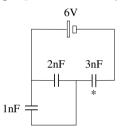
(b)
$$U = \frac{1}{2}(2nF)(8V)^2 = 64nJ$$

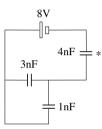
(a) $C_{eq} = \left(\frac{1}{3nF + 1nF} + \frac{1}{4nF}\right)^{-1} = 2nF$

(c)
$$V_* = \frac{1}{2}8V = 4V$$



Consider the capacitor circuit shown at equilibrium. (a) Find the equivalent capacitance C_{eq} . (b) Find the total energy U stored in the three capacitors. (c) Find the voltage V_* across the capacitor marked by an asterisk. (d) Find the voltage V_1 across the 1nF-capacitor.





(a)
$$C_{eq} = \left(\frac{1}{1\text{nF} + 2\text{nF}} + \frac{1}{3\text{nF}}\right)^{-1} = 1.5\text{nF}$$

(b)
$$U = \frac{1}{2}(1.5 \text{nF})(6\text{V})^2 = 27 \text{nJ}$$

(c)
$$V_* = \frac{1}{2}6V = 3V$$

(d)
$$V_1 = 6V - 3V = 3V$$

(a)
$$C_{eq} = \left(\frac{1}{3nF + 1nF} + \frac{1}{4nF}\right)^{-1} = 2nF$$

(b)
$$U = \frac{1}{2}(2nF)(8V)^2 = 64nJ$$

(c)
$$V_* = \frac{1}{2}8V = 4V$$

(d)
$$V_1 = 8V - 4V = 4V$$