

30. (a) The charge in the Figure is

$$q_3 = C_3 V = (4.00 \mu\text{F})(100 \text{ V}) = 4.00 \times 10^{-4} \text{ mC} ,$$

$$q_1 = q_2 = \frac{C_1 C_2 V}{C_1 + C_2} = \frac{(10.0 \mu\text{F})(5.00 \mu\text{F})(100 \text{ V})}{10.0 \mu\text{F} + 5.00 \mu\text{F}} = 3.33 \times 10^{-4} \text{ C} .$$

(b) $V_1 = q_1/C_1 = 3.33 \times 10^{-4} \text{ C}/10.0 \mu\text{F} = 33.3 \text{ V}$, $V_2 = V - V_1 = 100 \text{ V} - 33.3 \text{ V} = 66.7 \text{ V}$, and $V_3 = V = 100 \text{ V}$.

(c) We use $U_i = \frac{1}{2} C_i V_i^2$, where $i = 1, 2, 3$. The answers are $U_1 = 5.6 \text{ mJ}$, $U_1 = 11 \text{ mJ}$, and $U_1 = 20 \text{ mJ}$.