

Answer on Question #65308-Physics - Electric Circuits

Let us denote the capacitance of the individual capacitors by C . The capacitance of battery

$$C_{total} = \frac{(C + C)C}{(C + C) + C} = \frac{2C}{3} = 4 \mu\text{F}.$$

Thus the capacitance of the individual capacitors

$$C = \frac{3 \times 4}{2} = 6 \mu\text{F}.$$

Since the capacitors 1 and 2 are parallel, we have

$$U_1 = U_2 = U_{12}.$$
$$C_{12} = C_1 + C_2 = C + C = 12 \mu\text{F}.$$

The capacitors 12 and 3 connected in series. Thus

$$q_{12} = q_3.$$

$$C_{12}U_{12} = C_3U_3 \Rightarrow 12U_{12} = 6U_3 \Rightarrow 2U_{12} = U_3$$

$$U_{12} + U_3 = U = 6 \text{ V}, \Rightarrow U_{12} + 2U_{12} = 6, \Rightarrow 3U_{12} = 6, \Rightarrow U_{12} = 2 \text{ V}.$$

Finally

$$U_1 = U_2 = 2 \text{ V}.$$
$$U_3 = 4 \text{ V}.$$

The charges

$$q_1 = C_1U_1 = 6\mu\text{F} \times 2 \text{ V} = 12 \mu\text{C},$$

$$q_2 = C_2U_2 = 6\mu\text{F} \times 2 \text{ V} = 12 \mu\text{C},$$

$$q_3 = C_3U_3 = 6\mu\text{F} \times 4 \text{ V} = 24 \mu\text{C}.$$

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