54. (a) The potential across capacitor 1 is 10 V, so the charge on it is

$$q_1 = C_1 V_1 = (10\ \mu\text{F})(10\ \text{V}) \ = \ 100\ \mu\text{C}\ .$$

(b) Reducing the right portion of the circuit produces an equivalence equal to $6.0\,\mu$F, with 10 V across it. Thus, a charge of $60\,\mu$C is on it – and consequently also on the bottom right capacitor. The bottom right capacitor has, as a result, a potential across it equal to

$$V = \frac{q}{C} = \frac{60\,\mu\text{C}}{10\,\mu\text{F}} \ = \ 6.0\ \text{V}\ ,$$

which leaves $10 - 6 = 4.0$ V across the group of capacitors in the upper right portion of the circuit. Inspection of the arrangement (and capacitance values) of that group reveals that this 4.0 V must be equally divided by C_2 and the capacitor directly below it (in series with it). Therefore, with 2.0 V across capacitor 2, we find

$$q_2 = C_2 V_2 = (10\,\mu\text{F})(2.0\ \text{V}) = 20\,\mu\text{C}\ .$$