*26.1 (a) $Q = C(\Delta V) = (4.00 \times 10^{-6}\ \text{F})(12.0\ \text{V}) = 4.80 \times 10^{-5}\ \text{C} = \boxed{48.0\ \mu\text{C}}$

(b) $Q = C(\Delta V) = (4.00 \times 10^{-6}\ \text{F})(1.50\ \text{V}) = 6.00 \times 10^{-6}\ \text{C} = \boxed{6.00\ \mu\text{C}}$

26.4 (a) $C = 4\pi\epsilon_0 R$

$$R = \frac{C}{4\pi\epsilon_0} = k_e C = (8.99 \times 10^9\ \text{N} \cdot \text{m}^2/\text{C}^2)(1.00 \times 10^{-12}\ \text{F}) = \boxed{8.99\ \text{mm}}$$

(b) $$C = 4\pi\epsilon_0 R = \frac{4\pi(8.85 \times 10^{-12}\ \text{C}^2)(2.00 \times 10^{-3}\ \text{m})}{\text{N} \cdot \text{m}^2} = \boxed{0.222\ \text{pF}}$$

(c) $Q = CV = (2.22 \times 10^{-13}\ \text{F})(100\ \text{V}) = \boxed{2.22 \times 10^{-11}\ \text{C}}$

26.11 (a) $$C = \frac{\ell}{2k_e \ln\left(\frac{b}{a}\right)} = \frac{50.0}{2(8.99 \times 10^9)\ln\left(\frac{7.27}{2.58}\right)} = \boxed{2.68\ \text{nF}}$$

(b) Method 1: $\Delta V = 2k_e \lambda \ln\left(\frac{b}{a}\right)$

$$\lambda = q / \ell = \frac{8.10 \times 10^{-6}\ \text{C}}{50.0\ \text{m}} = 1.62 \times 10^{-7}\ \text{C/m}$$

$$\Delta V = 2(8.99 \times 10^9)(1.62 \times 10^{-7}) \ln\left(\frac{7.27}{2.58}\right) = \boxed{3.02\ \text{kV}}$$

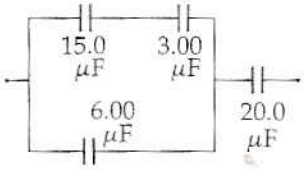
Method 2: $$\Delta V = \frac{Q}{C} = \frac{8.10 \times 10^{-6}}{2.68 \times 10^{-9}} = \boxed{3.02\ \text{kV}}$$

26.21 (a) $\frac{1}{C_s} = \frac{1}{15.0} + \frac{1}{3.00}$ $C_s = 2.50\ \mu\text{F}$

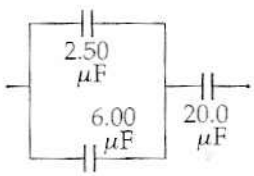
26.21

$C_p = 2.50 + 6.00 = 8.50\ \mu\text{F}$

$$C_{eq} = \left(\frac{1}{8.50\ \mu\text{F}} + \frac{1}{20.0\ \mu\text{F}}\right)^{-1} = \boxed{5.96\ \mu\text{F}}$$



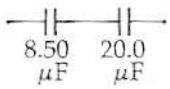
(b) $Q = (\Delta V)C = (15.0\ \text{V})(5.96\ \mu\text{F}) = \boxed{89.5\ \mu\text{C}}$ on 20.0 μF



$$\Delta V = \frac{Q}{C} = \frac{89.5\ \mu\text{C}}{20.0\ \mu\text{F}} = 4.47\ \text{V}$$

$15.0 - 4.47 = 10.53\ \text{V}$

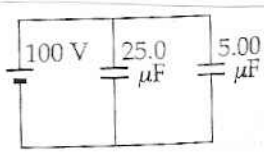
$Q = (\Delta V)C = (10.53)(6.00\ \mu\text{F}) = \boxed{63.2\ \mu\text{C}}$ on 6.00 μF



$89.5 - 63.2 = \boxed{26.3\ \mu\text{C}}$ on 15.0 μF and 3.00 μF

*26.32 $U = \frac{1}{2}C(\Delta V)^2$

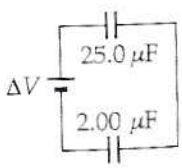
The circuit diagram is shown at the right.



(a) $C_p = C_1 + C_2 = 25.0\ \mu\text{F} + 5.00\ \mu\text{F} = 30.0\ \mu\text{F}$

$U = \frac{1}{2}(30.0 \times 10^{-6})(100)^2 = \boxed{0.150\ \text{J}}$

(b) $$C_s = \left(\frac{1}{C_1} + \frac{1}{C_2}\right)^{-1} = \left(\frac{1}{25.0\ \mu\text{F}} + \frac{1}{5.00\ \mu\text{F}}\right)^{-1} = 4.17\ \mu\text{F}$$



$U = \frac{1}{2}C(\Delta V)^2$

$$\Delta V = \sqrt{\frac{2U}{C}} = \sqrt{\frac{(0.150)(2)}{4.17 \times 10^{-6}}} = \boxed{268\ \text{V}}$$

26.43 $$C = \frac{\kappa\epsilon_0 A}{d} \quad \text{or} \quad 95.0 \times 10^{-9} = \frac{3.70(8.85 \times 10^{-12})(0.0700)\ell}{(0.0250 \times 10^{-3})}$$

$\boxed{\ell = 1.04\ \text{m}}$