

20.48 The electrostatic energy stored in the electrostatic field of a charged capacitor is:

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

Here we know U and C, so we use the last equation and get:

$$\Delta V = \sqrt{\frac{2U}{C}} = \sqrt{\frac{2 \times 300J}{30 \times 10^{-6}F}} = 4472.1V$$

20.50(a)

$$Q = C \times \Delta V = 150 \times 10^{-12}F \times 10.0 \times 10^3V = 1.5 \times 10^{-6}C$$

(b) We have

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

So

$$\Delta V = \sqrt{\frac{2U}{C}} = \sqrt{\frac{2 \times 250 \times 10^{-6}J}{150 \times 10^{-12}F}} = 1825.7V$$