Ch 8 Prob. 20

$V = 5.50\,V$

$C = 8.00\,pF$

$C = \frac{Q}{V} \rightarrow Q = V \cdot C$

$= (5.50V)(8.00 \times 10^{-12} F$

$= 4.4 \times 10^{-11} C$

$\boxed{Q = 44\,pC}$

Ch.8 Prob 29

Find the ratio of the radii of the 2 cylinders?

$\frac{C}{\ell} = \frac{20\,pF}{m}$

From the Textbook $C = \frac{2\pi\varepsilon_0 \ell}{\ln(R_2/R_1)}$

with algebra

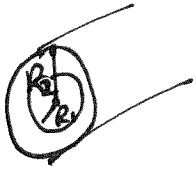
$$\ln(R_2/R_1) = \frac{2\pi\varepsilon_0 \ell}{C} = \frac{2\pi\varepsilon_0}{C/\ell}$$

exponentiate both sides

$$\frac{R_2}{R_1} = e^{\frac{2\pi\varepsilon_0}{C/\ell}}$$

$$\frac{R_2}{R_1} = e^{\left(\frac{2\pi(8.85\times10^{-12}\,C^2/Nm^2)}{20\times10^{-12}\,F/m}\right)} = e^{2.78}$$

$$\frac{R_2}{R_1} = \cancel{1.0226}\ 16.1$$



The outer shell's radius is 2.26% larger than the inner shell.

2nd radius is 16x that of the inner shell's radius.