$$C = \frac{Q}{V} = \frac{2.0 \text{ x } 10^{-10} \text{ C}}{139 \text{ V}} = 1.44 \text{ x } 10^{-12} \text{ F}$$

(d) The dielectric displacement may be computed by combining Equations 18.31, 18.32 and 18.6, as

$$D = \varepsilon_0 E + P = \varepsilon_0 E + \varepsilon_0(\varepsilon_r - 1)E = \varepsilon_0 \varepsilon_r E = \frac{\varepsilon_0 \varepsilon_r V}{l}$$

And incorporating values for ε_r and l provided in the problem statement, as well as the value of V computed in part (a)

$$D = \frac{(8.85 \text{ x } 10^{-12} \text{ F/m})(3.5)(39.7 \text{ V})}{4.0 \text{ x } 10^{-3} \text{ m}}$$

$$= 3.07 \text{ x } 10^{-7} \text{ C/m}^2$$

(e) The polarization is determined using Equations 18.32 and 18.6 as

$$P = \varepsilon_0(\varepsilon_r - 1)E = \varepsilon_0(\varepsilon_r - 1)\frac{V}{l}$$

$$= \frac{(8.85 \text{ x } 10^{-12} \text{ F/m})(3.5 - 1)(39.7 \text{ V})}{4.0 \text{ x } 10^{-3} \text{ m}}$$

$$= 2.20 \text{ x } 10^{-7} \text{ C/m}^2$$