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Cool! I'am really happy

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so many fake sites. this is the first one which worked! Many thanks

E27-21 The problem has cylindrical symmetry, so use a Gaussian surface which is a cylindrical shell. The \mathbf{E} field will be perpendicular to the curved surface and parallel to the end surfaces, so Gauss' law will simplify to

$$\oint_{\text{shell}} \mathbf{E} \cdot d\mathbf{A} = \int E dA = E \int dA = 2\pi r L \epsilon_0 E$$

where L is the length of the cylinder. Note that $\epsilon = q/\epsilon_0 L$ represents a surface charge density.

(a) $r = 0.0400 \text{ m}$ is between the two cylinders. Then

$$E = \frac{(21.1 \times 10^{-9} \text{ C/m}^2)(\pi)(0.0400 \text{ m})}{(8.85 \times 10^{-12} \text{ C}^2/\text{N}\cdot\text{m}^2)(2\pi)(0.0400 \text{ m})} = 2.34 \times 10^5 \text{ N/C}$$

(b) $r = 0.0800 \text{ m}$ is outside the two cylinders. Then

$$E = \frac{(21.1 \times 10^{-9} \text{ C/m}^2)(\pi)(0.0400 \text{ m}) + (-18.0 \times 10^{-9} \text{ C/m}^2)(\pi)(0.0600 \text{ m})}{(8.85 \times 10^{-12} \text{ C}^2/\text{N}\cdot\text{m}^2)(2\pi)(0.0800 \text{ m})} = -1.61 \times 10^5 \text{ N/C}$$

The negative sign indicates \mathbf{E} is pointing inward.

E27-22 The problem has cylindrical symmetry, so use a Gaussian surface which is a cylindrical shell. The \mathbf{E} field will be perpendicular to the curved surface and parallel to the end surfaces, so Gauss' law will simplify to

$$\oint_{\text{shell}} \mathbf{E} \cdot d\mathbf{A} = \int E dA = E \int dA = 2\pi r L \epsilon_0 E$$

where L is the length of the cylinder. The charge enclosed is

$$q_{\text{enc}} = \int \rho V = \rho \pi (r^2 - R^2)L$$

The electric field is given by

$$E = \frac{\rho \pi (r^2 - R^2)L}{2\pi r L \epsilon_0} = \frac{\rho (r^2 - R^2)}{2\epsilon_0 r}$$

At the surface,

$$E_s = \frac{\rho (2R^2 - R^2)}{2\epsilon_0 (2R)} = \frac{\rho R}{4\epsilon_0}$$

Solve for r when E is half of this:

$$\frac{E}{2} = \frac{\rho (r^2 - R^2)}{2\epsilon_0 r}$$

$$2R = \frac{\rho (r^2 - R^2)}{\epsilon_0 r}$$

$$0 = r^2 - 2Rr - 4R^2$$

The solution is $r = 1.414R$. That's $(2R - 1.414R) = 0.586R$ beneath the surface.

E27-23 The electric field must do work on the electron to stop it. The electric field is given by

$$E = \frac{\rho r}{2\epsilon_0}$$

The work done is $W = Fd = Eqd$, if d is the distance in question, so

$$d = \frac{2\epsilon_0 W}{\rho q} = \frac{(2)(8.85 \times 10^{-12} \text{ C}^2/\text{N}\cdot\text{m}^2)(1.12 \times 10^{-17} \text{ J})}{(2.00 \times 10^{-4} \text{ C/m}^2)(-1.60 \times 10^{-19} \text{ C})} = 0.617 \text{ m}$$

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