44. The field is zero for $0 \leq r \leq a$ as a result of Eq. 24-16. Since q_{enc} (for $a \leq r \leq b$) is related to the volume by

$$q_{\text{enc}} = \rho\left(\frac{4\pi r^3}{3} - \frac{4\pi a^3}{3}\right)$$

then

$$E = \frac{1}{4\pi\varepsilon_0}\frac{q_{\text{enc}}}{r^2} = \frac{\rho}{4\pi\varepsilon_0 r^2}\left(\frac{4\pi r^3}{3} - \frac{4\pi a^3}{3}\right) = \frac{\rho}{3\varepsilon_0}\frac{r^3 - a^3}{r^2}$$

for $a \leq r \leq b$. And for $r \geq b$ we have $E = q_{\text{total}}/4\pi\varepsilon_0 r^2$ or

$$E = \frac{\rho}{3\varepsilon_0}\frac{b^3 - a^3}{r^2} \qquad\qquad r \geq b\ .$$

This is plotted below for r in meters from 0 to 0.30 m. The peak value of the electric field, reached at $r = b = 0.20$ m, is 6.6×10^3 N/C.