

4-49

$$E = -\hat{r} \frac{\rho_l}{2\pi\epsilon r}; a \leq r \leq b$$

a) max E at $r = a$

b) $a = 1\text{cm}$, $b = 2\text{cm}$, $\epsilon_r = 6$

$$\text{From Table 4-2, } E_{ds} = 200 \frac{\text{MV}}{\text{m}} = \frac{\rho_l}{2\pi\epsilon_r\epsilon_0 r} = \frac{\rho_l}{2\pi(6)\epsilon_0(0.01)}$$

$$\text{breakdown voltage } V = \frac{\rho_l}{2\pi\epsilon} \ln \frac{a}{b} = \frac{667 \times 10^{-6}}{2\pi(6)\epsilon_0} \ln \frac{2}{1} = 1.39\text{MV}$$