EeO Teste C 2005/2006 : Solução

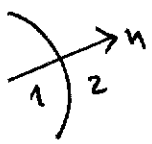
a) $$\phi(r) = \phi_2 \frac{r_3}{r} \quad ; \quad r > r_3$$

$$\vec{E}(r) = \phi_2 \frac{r_3}{r^2} \vec{e}_r \quad ; \quad r > r_3$$

b) $$\vec{E}(r) = \frac{q_1}{4\pi\varepsilon} \frac{1}{r^2} \vec{e}_r \quad ; \quad r_1 < r < r_2$$

$$\phi(r) = \phi_2 + \frac{q_1}{4\pi\varepsilon} \left(\frac{1}{r} - \frac{1}{r_2} \right) \quad ; \quad r_1 < r < r_2$$

c) $$\begin{cases} \sigma'_1 = -\frac{q_1}{4\pi} \frac{1}{r_1^2} \frac{\varepsilon - \varepsilon_0}{\varepsilon} \\ \sigma_1 = \frac{q_1}{4\pi} \frac{1}{r_1^2} \end{cases} \Rightarrow \frac{1}{\varepsilon_0}(\sigma_1 + \sigma'_1) = \frac{q_1}{4\pi r_1^2} \frac{1}{\varepsilon}$$



$$E_{n_2} = \frac{q_1}{4\pi\varepsilon} \frac{1}{r_1^2} \quad ; \quad E_{n_1} = 0 \text{ (um dielétrico)}$$

$$E_{n_2} - E_{n_1} = \frac{q_1}{4\pi\varepsilon} \frac{1}{r_1^2} = \frac{1}{\varepsilon_0}(\sigma_1 + \sigma'_1) \quad \checkmark$$

d)