

Respostas da Lista de Exercícios I

1. (a)

$$\vec{E} = \frac{-2q}{4\pi\epsilon_0} \left[\frac{x^2 + a^2}{(x^2 - a^2)^2} \right] \hat{x} \quad (1)$$

(b)

$$\vec{E} = \frac{q}{4\pi\epsilon_0} \left[\frac{4ax}{(x^2 - a^2)^2} \right] \hat{x} \quad (2)$$

(c)

$$\vec{E} = \frac{-q}{4\pi\epsilon_0} \left[\frac{4ax}{(x^2 - a^2)^2} \right] \hat{x} \quad (3)$$

(d)

$$\vec{E} = \frac{2qa}{4\pi\epsilon_0} \left[\frac{1}{(a^2 + y^2)^{-3/2}} \right] \hat{x} \quad (4)$$

2.

$$\vec{E} = -\frac{2qa}{4\pi\epsilon_0 y^3} \hat{x} \quad (5)$$

3. (a)

$$Q = 2\pi\rho\lambda \quad (6)$$

(b)

$$\vec{E} = \frac{Q}{4\pi\epsilon_0} \left[\frac{z}{(z^2 + \rho^2)^{3/2}} \right] \hat{z} \quad (7)$$

(c)

$$\vec{E} = \frac{Q}{4\pi\epsilon_0 z^2} \hat{z} \quad (8)$$

4.

$$x = \pm \frac{b}{2\sqrt{2}} \quad (9)$$

5.

$$\vec{F} = \frac{\lambda q}{2\pi\epsilon_0 \rho^2} \hat{\rho} \quad (10)$$

☛ Carga total na esfera: Q

$$r < R$$

$$\vec{E} = 0 \quad (11)$$

$$r > R$$

$$\vec{E} = \frac{Q}{4\pi\epsilon_0} \left[\frac{1}{r^2} \right] \hat{r} \quad (12)$$

Note que os valores do campo elétrico na superfície é o mesmo para as duas equações.