

Problema 1

- 1) $W = \frac{3q^2}{8\pi\epsilon_0 a}$
- 2) $\vec{E}(z < a\sqrt{3}) = \left(\frac{2qz}{4\pi\epsilon_0 (z^2 + a^2)^{3/2}} - \frac{q}{4\pi\epsilon_0 (a\sqrt{3} - z)^2} \right) \vec{u}_z$
 $\vec{E}(z > a\sqrt{3}) = \left(\frac{2qz}{4\pi\epsilon_0 (z^2 + a^2)^{3/2}} + \frac{q}{4\pi\epsilon_0 (z - a\sqrt{3})^2} \right) \vec{u}_z$
- 3) $\vec{\tau} = \frac{bq}{12\pi\epsilon_0 a^2} (2\vec{u}_x + \vec{u}_y)$

Problema 2

- 1) $W = -\frac{q^2}{120\pi\epsilon_0 a}$
- 2) $E_p = -\frac{91p_0 q}{250\pi\epsilon_0 a^2}$

Problema 3

- 1) $q_2 = -\frac{9}{2}q_0$
- 2) Equilibrio inestable.
- 3) $W = -\frac{q_0 p_0 \sqrt{3}}{32\pi\epsilon_0 a^2} (2 - \sqrt{3})$

Problema 4

$$\sigma = -\frac{9\lambda}{40\pi a}$$

Problema 5

- 1) $\rho = 8\frac{\sigma}{a}$
- 2) $V_B - V_A = -\frac{4\sigma a}{\epsilon_0} \left(\frac{3}{8} + \ln 2 \right)$

Problema 6

$$E_p = \frac{3pq}{8\pi\epsilon_0 a^2}$$

Problema 7

$$Q = \frac{64\lambda a}{5}. \text{ El equilibrio es estable. } E_p = -\frac{39p\lambda}{1250\pi\epsilon_0 a}$$

Problema 8

$$V_B - V_A = \frac{3\lambda}{2\pi\epsilon_0} \left[(\ln 2) - \frac{9}{20} \right]$$

Problema 9

$$1) \quad \vec{E}(x<0) = \frac{\lambda}{2\pi\epsilon_0(x-b)} \vec{u}_x = \vec{E}(x>2b); \quad \vec{E}(0<x<b) = \frac{\lambda}{2\pi\epsilon_0(x-b)} \vec{u}_x + \frac{\sigma}{\epsilon_0} \vec{u}_x = \vec{E}(b<x<2b)$$

$$2) \quad \frac{\sigma}{\lambda} = -\frac{3 \ln 2}{2\pi b}$$

Problema 10

$$W = -\frac{q p_0}{\pi\epsilon_0 R^2}$$

Problema 11

$$1) \quad \vec{p}_i = 4b \left(\frac{\sqrt{3}}{2} \vec{u}_x + \frac{1}{2} \vec{u}_y \right)$$

$$2) \quad \vec{E}_A = \frac{1}{2\pi\epsilon_0 a} \left(\lambda - \frac{2b}{3a^2\sqrt{3}} \right) \vec{u}_x$$

$$3) \quad V_A - V_B = \frac{1}{2\pi\epsilon_0} \left[(\lambda \ln 2) - \frac{b}{4a^2} \right]$$

Problema 12

$$1) \quad \vec{E}(0,0) = -\frac{\lambda}{80\pi\epsilon_0 a} (3\vec{u}_x + \vec{u}_y)$$

$$2) \quad \vec{p} = \frac{80p_0}{\sqrt{20}} (\vec{u}_x - 2\vec{u}_z)$$