ΠΕΔΙΑ B 23/09/2008

$\Theta\epsilon\mu\alpha$ 1

(α)

$$\Phi(z) = \frac{\lambda a}{2\epsilon_0}\Big[\frac{1}{[(z-h)^2+a^2]^{1/2}} - \frac{1}{[(z+h)^2+a^2]^{1/2}}\Big] \qquad (z \geq 0)$$

$$\Phi(z) = 0 \qquad (z \leq 0)$$

(β)

$$\vec{E} = \hat{i}_z\frac{\lambda a}{2\epsilon_0}\Big[\frac{z-h}{[(z-h)^2+a^2]^{3/2}} - \frac{z+h}{[(z+h)^2+a^2]^{3/2}}\Big] \qquad (z \geq 0)$$

$$\vec{E} = 0 \qquad (z \leq 0)$$

(γ)

$$\sigma(0,0,0) = -\lambda a\frac{h}{(h^2+a^2)^{3/2}}$$

(δ)

$$\Phi(x,y,z) = \Phi_+(x,y,z) + \Phi_-(x,y,z) \qquad (z \geq 0)$$

$$\Phi_+(x,y,z) = +\frac{\lambda a}{4\pi\epsilon_0}\int_0^{2\pi}\frac{d\phi}{[(x-a\cos\phi)^2+(y-a\sin\phi)^2+(z-h)^2]^{1/2}}$$

$$\Phi_-(x,y,z) = -\frac{\lambda a}{4\pi\epsilon_0}\int_0^{2\pi}\frac{d\phi}{[(x-a\cos\phi)^2+(y-a\sin\phi)^2+(z+h)^2]^{1/2}}$$

$$\Phi(x,y,z) = 0 \qquad (z \leq 0)$$

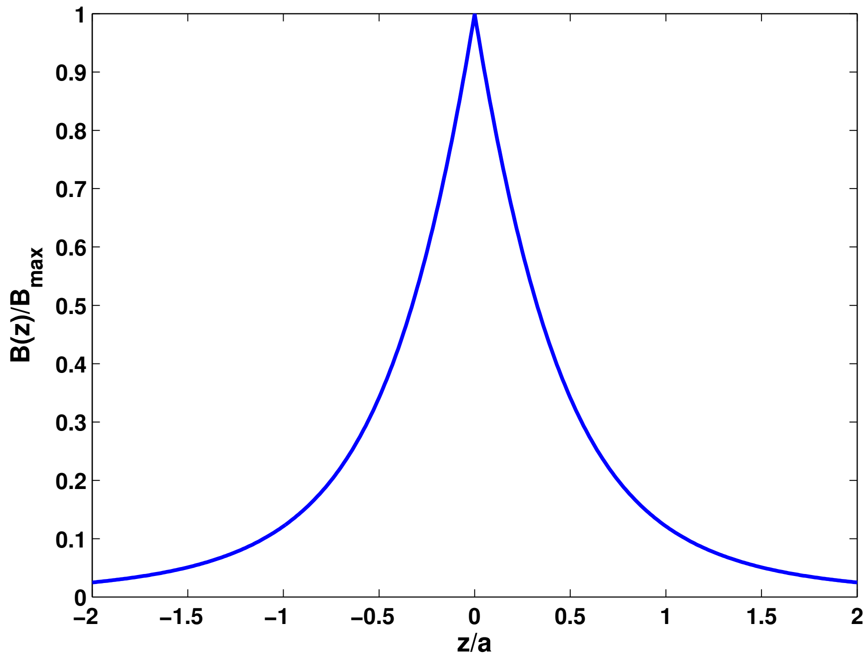
$\Theta\epsilon\mu\alpha$ 2

(α)

$$\vec{B} = \hat{i}_z\frac{\mu_0 K_0}{2}\Big[\frac{a^2+2z^2}{(a^2+z^2)^{1/2}} - 2|z|\Big]$$

(β)

$$B_{max} = B(z=0) = \hat{i}_z\frac{\mu_0 K_0 a}{2}$$



(γ)

$$\vec{A} = \frac{\mu_0}{4\pi} \int_{r'_T=0}^{a} \int_{\phi'=0}^{2\pi} \frac{K_0[-\sin\phi' \hat{i}_x + \cos\phi' \hat{i}_y] r'^2_T dr'_T d\phi'}{[r^2 + r'^2_T - 2rr'_T \sin\theta \cos(\phi - \phi')]^{1/2}}$$

(δ)

$$\vec{A}(r, \theta = 0, \phi) = 0$$

$\Theta\epsilon\mu\alpha$ 3

(α)

$$\Phi(x,y) = \begin{cases} V_0 \cos(ky) e^{kx} & -\infty < x \le 0 \text{ and } \forall y, \\ -V_0 \cos(ky) \dfrac{\sinh[k(x-d)]}{\sinh(kd)} & 0 \le x \le d \text{ and } \forall y, \\ 0 & d \le x < +\infty \text{ and } \forall y. \end{cases}$$

(β)

$$\vec{E}(x,y) = \begin{cases} kV_0 e^{kx}[-\cos(ky)\hat{i}_x + \sin(ky)\hat{i}_y] & -\infty < x \le 0 \text{ and } \forall y, \\ kV_0 \Big[\cos(ky)\dfrac{\cosh[k(x-d)]}{\sinh(kd)}\hat{i}_x - \sin(ky)\dfrac{\sinh[k(x-d)]}{\sinh(kd)}\hat{i}_y\Big] & 0 \le x \le d \text{ and } \forall y, \\ 0 & d \le x < +\infty \text{ and } \forall y. \end{cases}$$

(γ)

$$\sigma(x=0,y) = \epsilon k V_0 \cos(ky) \frac{\cosh(kd)}{\sinh(kd)} + \epsilon_0 k V_0 \cos(ky)$$

$$\sigma(x=d,y) = -\epsilon k V_0 \cos(ky) \frac{1}{\sinh(kd)}$$

$\Theta\epsilon\mu\alpha$ 4

(α)

$$\Phi(r_T) = -V \frac{\ln(r_T/b)}{\ln(b/a)}$$

$$\vec{E} = \frac{V}{\ln(b/a)} \frac{1}{r_T} \hat{i}_{r_T}$$

(β)

$$\frac{C}{\ell} = \frac{\pi(\epsilon + \epsilon_0)}{\ln(b/a)}$$