$\underline{\Theta\epsilon\mu\alpha \;\; 1}$

(α)

$$\Phi(x_0, z_0) = \frac{p}{4\pi\epsilon_0 R^3}[x_0 \sin\theta + (z_0 - h)\cos\theta] + \frac{p}{4\pi\epsilon_0 R'^3}[-x_0 \sin\theta + (z_0 + h)\cos\theta]$$

$o\pi o\upsilon$

$$R = [x_0^2 + (z_0 - h)^2]^{1/2}, \qquad\qquad R' = [x_0^2 + (z_0 + h)^2]^{1/2}$$

(β)

$$\sigma(x) = \frac{3ph(-x_0 \sin\theta + h\cos\theta) - (x_0^2 + h^2)p\cos\theta}{2\pi(x_0^2 + h^2)^{5/2}}$$

(γ)

$$T = -\hat{i}_y \frac{p^2 \sin 2\theta}{64\pi\epsilon_0 h^3}$$

$\underline{\Theta\epsilon\mu\alpha \;\; 2}$

(α)

$$\Phi_1(\phi) = A_1\phi + B_1 \qquad (0 \le \phi < \phi_1)$$
$$\Phi_2(\phi) = A_2\phi + B_2 \qquad (\phi_1 \le \phi < \phi_0)$$

$o\pi o\upsilon$

$$A_1 = \frac{\epsilon_2 U}{(\epsilon_2 - \epsilon_1)\phi_1 + \epsilon_1\phi_0}, \quad B_1 = 0, \qquad A_2 = \frac{\epsilon_1 U}{(\epsilon_2 - \epsilon_1)\phi_1 + \epsilon_1\phi_0}, \qquad B_2 = \frac{(\epsilon_2 - \epsilon_1)U}{(\epsilon_2 - \epsilon_1)\phi_1 + \epsilon_1\phi_0}.$$

(β)

$$\vec{E}_1 = -\frac{1}{r_T}A_1\hat{i}_\phi, \qquad \vec{E}_2 = -\frac{1}{r_T}A_2\hat{i}_\phi.$$

(γ)

$$\rho_{b1} = 0, \quad \rho_{b2} = 0, \quad \sigma_b(\phi_1) = \frac{(A_1 - A_2)\epsilon_0}{r_T}, \quad \sigma_b(\phi = 0^+) = \frac{(\epsilon_1 - \epsilon_0)A_1}{r_T}, \quad \sigma_b(\phi_0^-) = -\frac{(\epsilon_2 - \epsilon_0)A_2}{r_T},$$

(δ)

$$\sigma(\phi = 0^+) = -\frac{A_1\epsilon_1}{r_T}, \qquad \sigma(\phi = \phi_0^-) = +\frac{A_2\epsilon_2}{r_T}.$$

$\underline{\Theta\epsilon\mu\alpha \;\; 3}$

(α)

$$\Phi_1(x,y) = \frac{\sigma_0}{a(\epsilon_1+\epsilon_2)} e^{ax}\sin(ay) \qquad (-\infty < x \leq 0)$$
$$\Phi_2(x,y) = \frac{\sigma_0}{a(\epsilon_1+\epsilon_2)} e^{-ax}\sin(ay) \qquad (0 \leq x < +\infty)$$

(β)

$$\vec{E}_1(x,y) = -\frac{\sigma_0}{(\epsilon_1+\epsilon_2)} e^{ax}[\sin(ay)\hat{i}_x + \cos(ay)\hat{i}_y] \qquad (-\infty < x \leq 0)$$
$$\vec{E}_2(x,y) = -\frac{\sigma_0}{(\epsilon_1+\epsilon_2)} e^{-ax}[-\sin(ay)\hat{i}_x + \cos(ay)\hat{i}_y] \qquad (0 \leq x < +\infty)$$

(γ)

$$\vec{E}(x,y) = -\hat{i}_y \frac{\sigma_0}{(\epsilon_1+\epsilon_2)} e^{-a|x|} \qquad (-\infty < x < +\infty)$$

$\underline{\Theta\epsilon\mu\alpha \;\; 4}$

(α)

$$\vec{H} = \frac{1}{4\pi}\int_{\phi'=0}^{2\pi}\int_{r'_T=b}^{a} \frac{\vec{K}(\phi')\times\hat{i}_R(r'_T,\phi')}{R^2} r'_T d\phi' dr'_T$$

$o\pi o\upsilon$

$$\hat{i}_R = \frac{1}{R}[(r_{T0}\cos\phi_0 - r'_T\cos\phi')\hat{i}_x + (r_{T0}\sin\phi_0 - r'_T\sin\phi')\hat{i}_y + z_0\hat{i}_z] = a_x\hat{i}_x + a_y\hat{i}_y + a_z\hat{i}_z,$$

$$R = [r_{T0}^2 + r_T'^2 - 2r_{T0}r'_T\cos(\phi_0-\phi') + z_0^2]^{1/2},$$

$$\vec{K}\times\hat{i}_R = \hat{i}_x(a_zK_0\cos\phi') + \hat{i}_y(a_zK_0\sin\phi') + \hat{i}_z(-K_0\sin\phi' a_y - a_xK_0\cos\phi').$$

(β)

$$\vec{H}(0,0,z) = \hat{i}_z\frac{K_0}{2}\Big[-\frac{a}{\sqrt{a^2+z^2}} + \frac{b}{\sqrt{b^2+z^2}} + \ln\Big(\frac{a+\sqrt{a^2+z^2}}{b+\sqrt{b^2+z^2}}\Big)\Big]$$