Soluzioni Esercizi Fisica 4F

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Problema n. 1

a)

$$I_s = \frac{1}{c^2\mu_0}\frac{\partial \Phi_E}{\partial t} = \epsilon_0 \frac{\partial \Phi_E}{\partial t}$$

$$C = \frac{\epsilon_0 \pi r^2}{d} = 5\ nF$$

$$j_s = \epsilon_0 \frac{\Delta V v}{(d+vt)^2} = 1.06 \cdot 10^{-6}\ A/m^2 (t = 0\ s) \quad ; \quad 2.19 \cdot 10^{-7}\ A/m^2 (t = 2\ s)$$

b)

$$\Gamma_B = \mu_0 j_s \Sigma = 7.78 \cdot 10^{12}\ Tm$$

c)

$$B(r) = \frac{\mu_0 r j_s}{2} = 4.13 \cdot 10^{13}\ T$$

d) Risposta a 1 e 2 non cambia, mentra a 3 si'.

Problema n. 2

a)

$$B(r) = \frac{r}{2c^2}\frac{\partial E}{\partial t}$$

$$q = \frac{\Delta \Phi_B}{R}$$

$$\frac{\partial E(t)}{\partial t} = \frac{V_0}{hR_0C} e^{-\frac{t}{R_0 C}}$$

$$q = \frac{Nabr_2}{2c^2 R}\frac{V_0}{R_0 C h}$$

$$Q = V_0/C$$

$$q/Q = 11.5$$

b)

$$\epsilon_0 \to \epsilon = \kappa\epsilon$$

$$j_s \to \kappa j_s \quad , \quad C \to \kappa C$$

$$q'/Q' = 1/\kappa \cdot q/Q = 2.3$$