

Corso di Laurea in Ingegneria Edile
Prova scritta di Fisica II
Febbraio 2003

Problema 1

$$U = \sum_{i,j=1,4; i \neq j} Q_i Q_j / 4\pi\epsilon_0 r_{ij}$$

Problema 2

$$\begin{aligned} E_x = -\partial V / \partial x &= -5 + 6xy & E_x(P_0) &= -5 \text{ V/m} \\ E_y = -\partial V / \partial y &= 3x^2 - 2z^2 & E_y(P_0) &= -5 \text{ V/m} \\ E_z = -\partial V / \partial z &= -4yz & E_z(P_0) &= 0 \end{aligned}$$

$$E = 7.1 \text{ V/m}$$

Problema 3

$$\begin{aligned} j = I/pR^2 &= 2.55 \cdot 10^6 \text{ A/m}^2 & J &= nev_d & n &= J/ev_d = 5.3 \cdot 10^{16} \text{ m}^{-3} \\ Dt = DQ/I &= (N_A e)/I = 1.2 \cdot 10^{10} \end{aligned}$$

Problema 4

$$mv^2/R = qvB \quad m = qB/2pf \quad \text{con } f = 5/Dt \quad m = 3.8 \cdot 10^{-25} \text{ kg}$$

Problema 5

$$\begin{aligned} e &= -d/dt[BA] = -d/dt[0.5 \cdot m_0 n I A] = -0.5 \cdot m_0 n p r^2 dI/dt = -4.8 \cdot 10^{-4} \text{ V} \\ I &= e/R = 1.6 \text{ A} & B &= m_0 I / 2r = 2 \cdot 10^{-5} \text{ T} \end{aligned}$$

Problema 6

$$\begin{aligned} E_{2pr} &= -d/dt[m_0 n I p r^2] & E &= -9.87 \cos(100pt) \\ \text{Le linee del campo hanno verso orario} \end{aligned}$$