

Θέματα Β' γει. 2013

Θεμα 1^ο 1γ, 2γ, 3β, 4γ, 5 Σ, Σ, Λ, Λ, Λ

Θεμα 2^ο

1) i) (β) ii) $T_A = T_B \Rightarrow \frac{1}{f_A} = \frac{f_B}{2} \Rightarrow \frac{1}{f_A} = \frac{1}{2f_B} \Rightarrow f_A = 2f_B$

2) i) (β) ii) $F_L = B \cdot i \cdot l$

3) i) (γ) ii) $E_{\text{EM}} = -N \frac{\Delta \Phi}{\Delta t} \Rightarrow \vec{E}_{\text{EM}} = -\frac{N \cdot B \cdot S}{\Delta t} \Rightarrow \dots$

Θεμα 3^ο



α) $V_z = 0 \Rightarrow k \frac{q_A}{r_1} = k \frac{q_B}{r_2} \Rightarrow \frac{6 \cdot 10^{-6}}{r_1} = \frac{3 \cdot 10^{-6}}{3 - r_1} \Rightarrow r_1 = 2 \text{ m}$

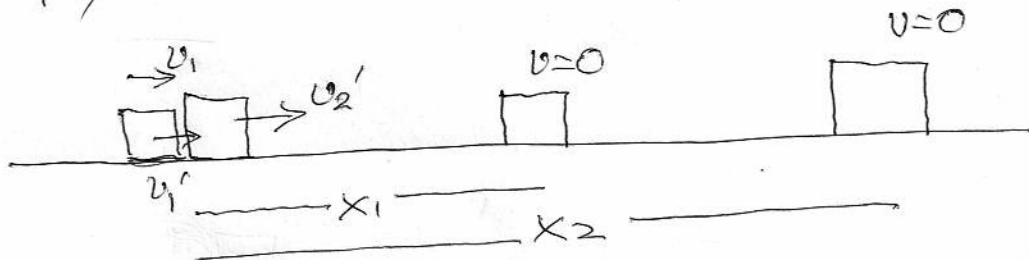
β) $E_z = E_1 + E_2 = k \frac{q_A}{r_1^2} + k \frac{q_B}{r_2^2} = 9 \cdot 10^9 \frac{6 \cdot 10^{-6}}{4} + 9 \cdot 10^9 \frac{3 \cdot 10^{-6}}{1} \Rightarrow$

$E_z = \left(\frac{27}{2} + 27\right) 10^3 = \frac{81}{2} \cdot 10^3 \text{ N/C}$

γ) $E = \frac{F}{q} \Rightarrow F = Eq \Rightarrow F = \frac{81}{2} \cdot 10^3 \cdot 10^{-6} \Rightarrow F = \frac{81}{2} \cdot 10^{-3} \text{ N}$

δ) $a = \frac{F}{m} = \frac{\frac{81}{2} \cdot 10^{-3}}{9 \cdot 10^{-3}} \Rightarrow a = 1,5 \text{ m/s}^2$

Θεμα 4^ο



α) $P_{\text{preV}} = P_{\text{postV}} \Rightarrow m_1 v_1 = m_1 v_1' + m_2 v_2' \Rightarrow v_1' = 2 \text{ m/s}$

β) $\Delta P_1 = P_1' - P_1 = m_1 v_1' - m_1 v_1 = -8 \text{ kg m/s}$

γ) $\Sigma F = \frac{\Delta P}{\Delta t} = \frac{m_2 v_2'}{\Delta t} = 80 \text{ N}$

δ) (m_1): $\Delta K = W_T \Rightarrow -\frac{1}{2} m_1 v_1'^2 = -\mu m_1 g x_2 \Rightarrow x_2 = 2 \text{ m}$

(m_2): $\Delta K = W_T \Rightarrow -\frac{1}{2} m_2 v_2'^2 = -\mu m_2 g x_2 \Rightarrow x_2 = 8 \text{ m}$

$\Delta x = 6 \text{ m}$