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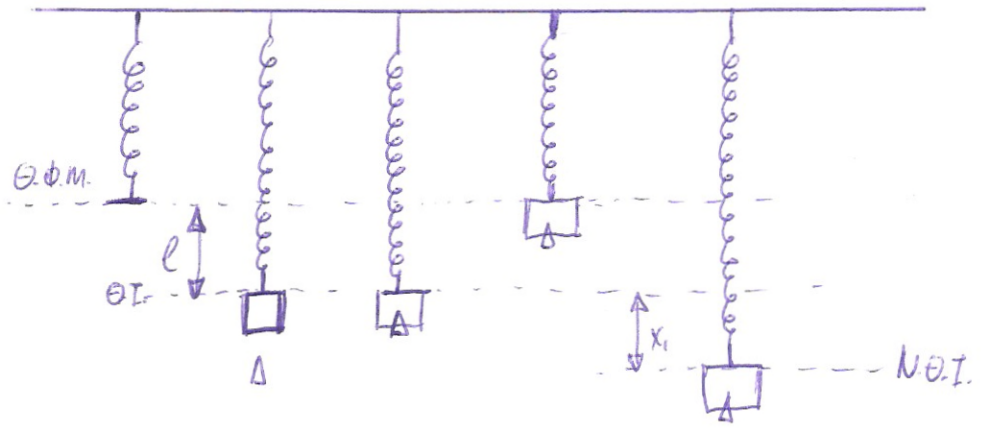

$\Sigma_{\text{ΠΝΥ}}$ Θ.Ι. : $\Sigma F = 0 \Rightarrow \boxed{mg = k\ell}$ (1) $\Rightarrow k = \frac{mg}{\ell} = \frac{0,3 \cdot 10}{\frac{1}{4}} = 3 \cdot 4 = 12$ N/m

$\boxed{k = 12 \text{ N/m}}$

$\Sigma_{\text{ΠΝΥ}}$ Ν.Θ.Ι. : $\Sigma F' = 0 \Rightarrow m_1 g + m_2 g = k\ell + kx_1 \overset{(1)}{\Rightarrow} x_1 = \frac{m_2 g}{k} = \frac{0,45 \cdot 10}{12} = \frac{4,5}{12}$

$\boxed{x_1 = \frac{3}{8} \text{ m}}$

$A = x_1 + \ell = \frac{3}{8} + \frac{1}{4} = \frac{3+2}{8} = \frac{5}{8} \Rightarrow \boxed{A = \frac{5}{8} \text{ m}}$

i) $E_T = K + U \Rightarrow \frac{1}{2} DA^2 = \frac{1}{2} m_{ολ} \cdot v^2 + \frac{1}{2} Dx_1^2 \Rightarrow kA^2 = (m_1 + m_2) v^2 + Dx_1^2 \Rightarrow$

$\Rightarrow 12 \left(\frac{5}{8}\right)^2 = (m_1 + m_2) v^2 + 12 \left(\frac{3}{8}\right)^2 \Rightarrow v^2 = \frac{12 \left[\left(\frac{5}{8}\right)^2 - \left(\frac{3}{8}\right)^2\right]}{m_1 + m_2}$

$\Rightarrow v^2 = \frac{12 \left(\frac{25}{64} - \frac{9}{64}\right)}{0,75} = \frac{12 \cdot \frac{16}{64}}{\frac{3}{4}} = \frac{3}{\frac{3}{4}} = 4 \Rightarrow \boxed{v = 2 \text{ m/sec}}$

ii) $V_{max} = A \cdot w$

$w = \frac{2\pi}{T} = \frac{2\pi}{2\pi\sqrt{\frac{m_1+m_2}{k}}} = \sqrt{\frac{k}{m_1+m_2}} = \sqrt{\frac{12}{0,75}} = \sqrt{\frac{12}{3/4}} = \sqrt{\frac{12 \cdot 4}{3}} = 4$ rad/sec $\Rightarrow$

$\Rightarrow V_{max} = \frac{5}{8} \cdot 4 = \boxed{2,5 \text{ m/sec}}$

iii) $t = \frac{T}{4} = \frac{2\pi}{4} \sqrt{\frac{m_1+m_2}{k}} = \frac{\pi}{2} \sqrt{\frac{0,75}{12}} = \frac{\pi}{2} \sqrt{\frac{3}{4 \cdot 12}} = \frac{\pi}{8} = \boxed{0,4 \text{ sec}}$