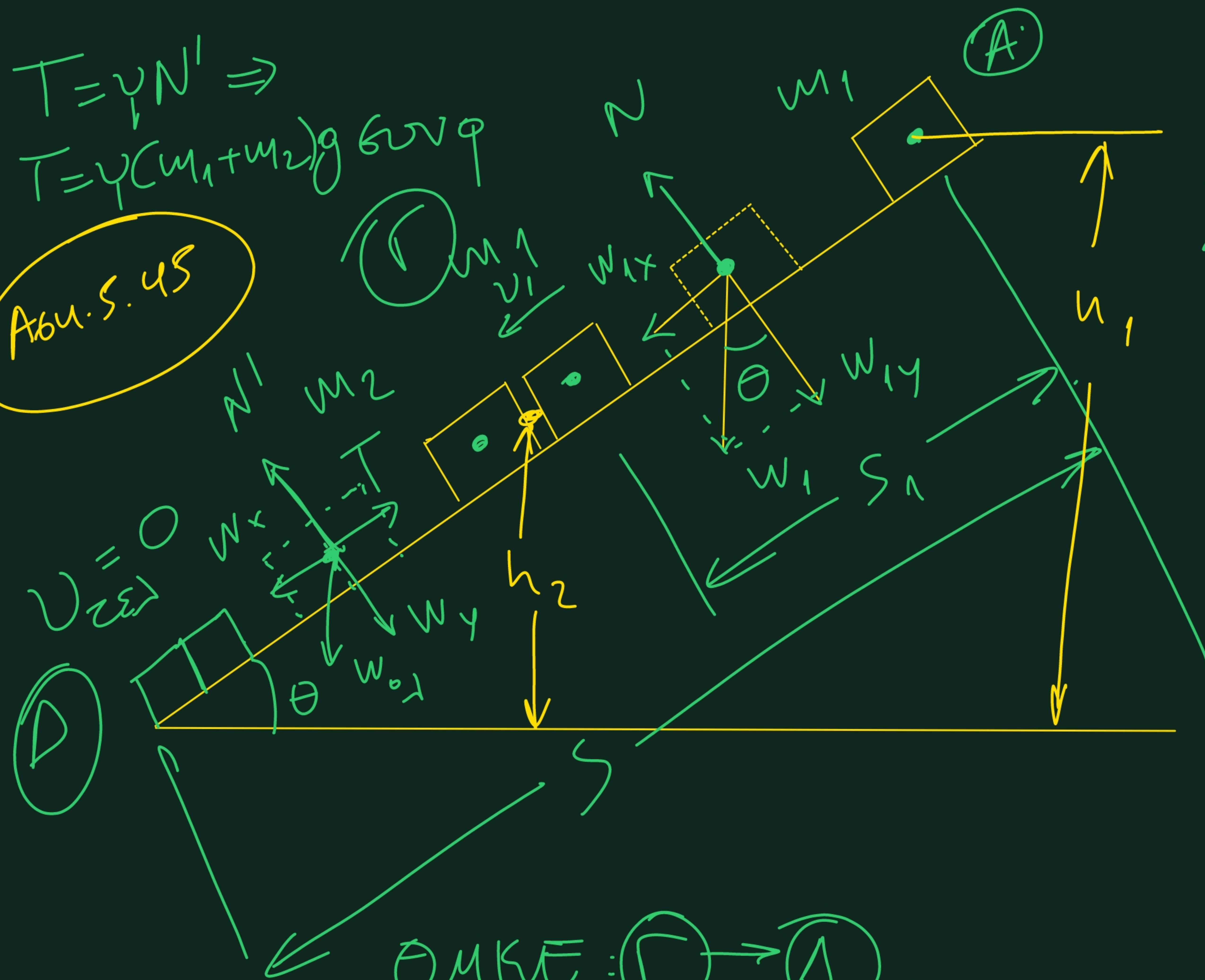


$$T = \psi N' \Rightarrow$$

$$T = \psi (m_1 + m_2) g \sin \varphi$$

Abu. 5. 45



$$\text{OMKE: } \textcircled{A} \rightarrow \textcircled{\Gamma}$$

$$\frac{1}{2} m_1 v_1^2 = W_{1x} \cdot s_1 \Rightarrow$$

$$\frac{1}{2} m_1 v_1^2 = m_1 g \sin \varphi \cdot s_1 \Rightarrow$$

$$v_1^2 = 2 g s_1 \sin \varphi = 2 \cdot 10 \cdot 1.6 \cdot \frac{1}{2} = 16 \Rightarrow$$

$$v_1 = 4 \text{ m/s}.$$

$$p_{npi v} = p_{v \pi \gamma \alpha} \Rightarrow$$

$$m_1 v_1 = (m_1 + m_2) V \Rightarrow$$

$$1 \cdot 4 = 2 \cdot V \Rightarrow V = 2 \text{ m/s}.$$

$$\text{OMKE: } \textcircled{\Gamma} \rightarrow \textcircled{\Delta}_2$$

$$0 - \frac{1}{2} (m_1 + m_2) V^2 = (m_1 + m_2) g \sin \varphi \cdot (s - s_1) - \psi (m_1 + m_2) g \sin \varphi (s - s_1) \Rightarrow$$

$$-\frac{1}{2}V^2 = g \sin \varphi (S - S_1) - \gamma g \sin \varphi (S - S_1) \Rightarrow$$

$$\gamma g \sin \varphi (S - S_1) = \frac{V^2}{2} + g \sin \varphi (S - S_1)$$

$$\gamma \cdot 10 \cdot \frac{\sqrt{3}}{2} \cdot 2,6 = 2 + 10 \cdot \frac{1}{2} \cdot 2,6 \Rightarrow$$

$$\gamma \cdot 13\sqrt{3} = 15 \Rightarrow$$

$$\gamma = \frac{15}{13\sqrt{3}} = \frac{15\sqrt{3}}{13 \cdot 3} = \frac{5\sqrt{3}}{13}$$

$$ADE: U_{apx} + \cancel{K_{apx}} = U_{\tau \varepsilon \lambda} + \cancel{K_{\tau \varepsilon \lambda}} + Q$$

$$\Rightarrow U_{apx} = Q \Rightarrow Q = 34 \text{ Joule}$$

$$b) U_{apx} = m_1 g S \sin \varphi + m_2 g (S - S_1) \sin \varphi =$$

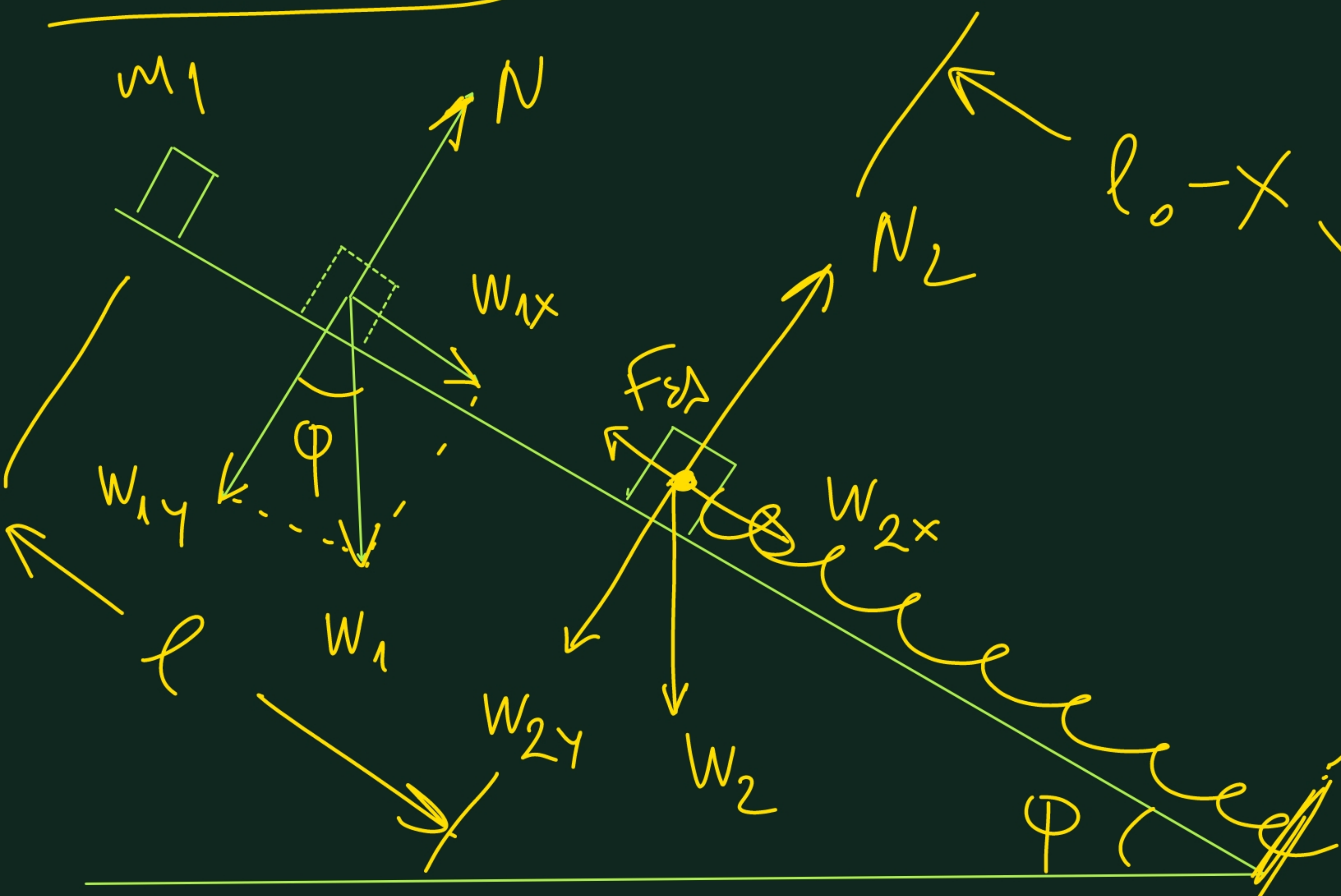
$$= 1 \cdot 10 \cdot 4,2 \cdot \frac{1}{2} +$$

$$+ 1 \cdot 10 \cdot 2,6 \cdot \frac{1}{2} =$$

$$= 21 + 13 = 34 \text{ Joule}$$

$$\left(\begin{array}{l} h_1 = S \sin \varphi \\ h_2 = (S - S_1) \sin \varphi \end{array} \right)$$

Αδμ. 5.48



Από την προϋπόθεση:

$$v_1' = \frac{m_1 - m_2}{m_1 + m_2} v_1 = \frac{\frac{m_2}{3} - m_2}{\frac{m_2}{3} + m_2} \cdot v_1 = \frac{-\frac{2}{3}}{\frac{4}{3}} v_1 =$$

$$= -\frac{v_1}{2} = -\sqrt{10} \text{ m/s.}$$



Για το m_1 : $\frac{1}{2} m_1 v_1^2 = m_1 g \sin \phi \cdot l \Rightarrow$

$$v_1^2 = 2 g l \sin \phi \Rightarrow$$

$$v_1^2 = 2 \cdot 10 \cdot 4 \cdot \frac{1}{2} \Rightarrow v_1 = 2\sqrt{10} \text{ m/s}$$



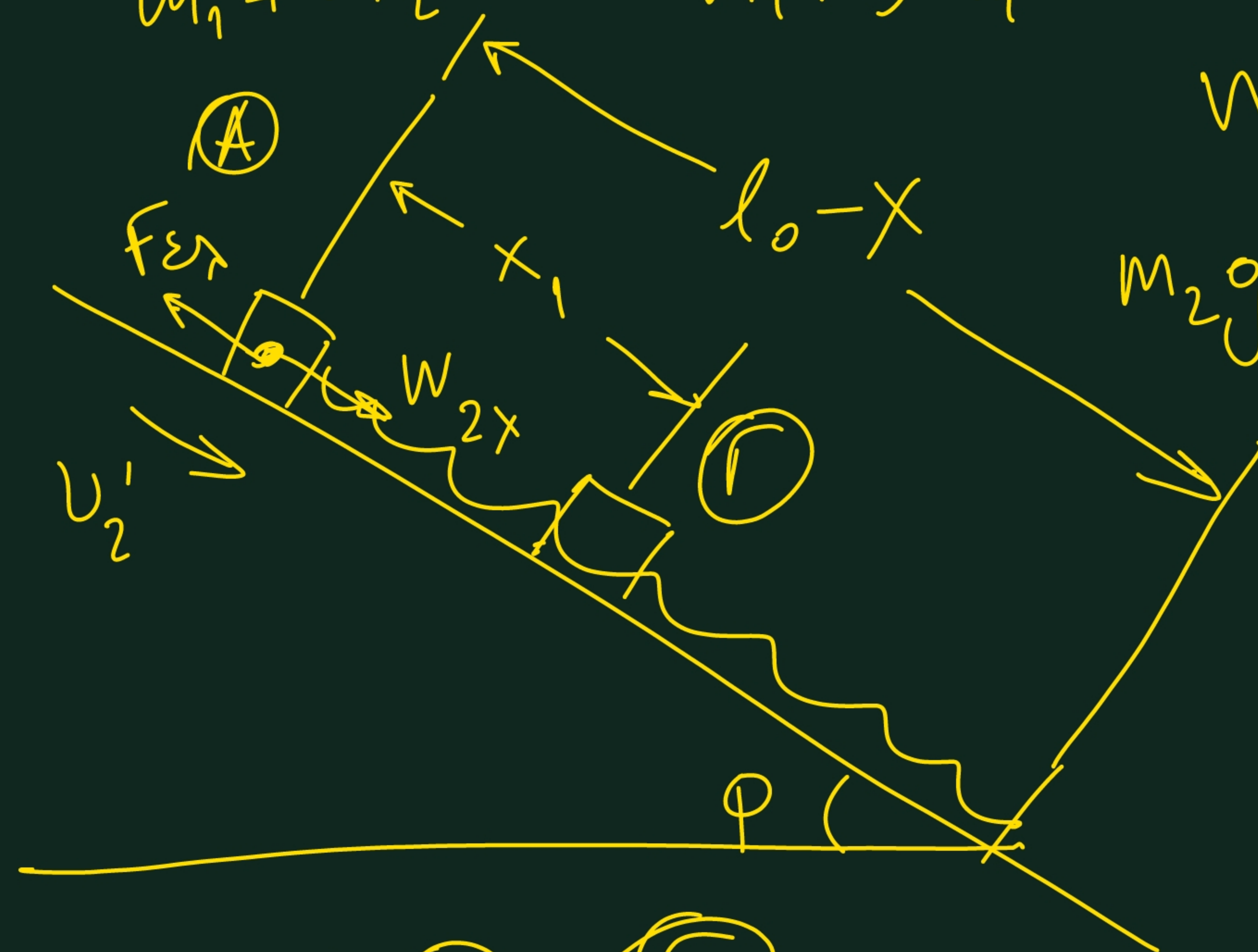
Θ ΜΚΕ για το m_1 :

$$0 - \frac{1}{2} m_1 v_1'^2 = -W_{1x} S_1 \Rightarrow$$

$$-\frac{1}{2} m_1 v_1'^2 = -m_1 g \sin \phi \cdot S_1 \Rightarrow$$

$$S_1 = \frac{v_1'^2}{2g \sin \phi} = \frac{10}{2 \cdot 10 \cdot \frac{1}{2}} = 1 \text{ m}$$

$$v_2' = \frac{2m_1}{m_1 + m_2} v_1 = \frac{2m_1}{m_1 + 3m_1} \cdot 2\sqrt{10} = \sqrt{10} \text{ m/s.}$$



$$W_{2x} = F_{\varepsilon\lambda} \Rightarrow$$

$$m_2 g \sin \phi = kx \Rightarrow$$

$$1 \cdot 10 \cdot \frac{1}{2} = 200x \Rightarrow$$

$$x = \frac{5}{200} =$$

$$x = \frac{1}{40} \text{ m.}$$

Θ ΜΚΕ: (A) → (Γ)

$$0 - \frac{1}{2} m_2 v_2'^2 = W_{2x} \cdot x_1 + \frac{1}{2} kx^2 - \frac{1}{2} k(x + x_1)^2$$

$$W_{F_{\varepsilon\lambda}} = U_{\varepsilon\lambda, \text{αφρ}} - U_{\varepsilon\lambda, \text{τελ}} = U_{\varepsilon\lambda, A} - U_{\varepsilon\lambda, \Gamma}$$

$$-\frac{1}{2}m_2 v_1'^2 = W_{2x} \cdot X_1 + \frac{1}{2}kx^2 - \frac{1}{2}k(x+x_1)^2$$

$$-\frac{1}{2}m_2 v_1'^2 = m_2 g \sin \varphi X_1 + \frac{1}{2}k \left(x^2 - (x+x_1)^2 \right) \Rightarrow$$

$$-\frac{1}{2}m_2 v_1'^2 = m_2 g \sin \varphi X_1 + \frac{1}{2}k \left(\cancel{x^2} - \cancel{x^2} - 2xx_1 - x_1^2 \right) \Rightarrow$$

$$-\frac{1}{2}m_2 v_1'^2 = m_2 g \sin \varphi X_1 - kxx_1 - \frac{1}{2}kx_1^2 \Rightarrow$$

$$-\frac{1}{2}m_2 v_1'^2 = \cancel{m_2 g \sin \varphi \cdot X_1} - \cancel{m_2 g \sin \varphi X_1} - \frac{1}{2}kx_1^2 \Rightarrow$$

$$\frac{1}{2}kx_1^2 = \frac{1}{2}m_2 v_1'^2 \Rightarrow 100x_1^2 = \frac{1}{2} \cdot 1 \cdot 10 \Rightarrow x_1^2 = \frac{5}{100} \Rightarrow x_1 = \frac{\sqrt{5}}{10} \text{ m}$$

$$\boxed{W_{2x} = kx} \Rightarrow$$

$$k \cdot x = m_2 g \sin \varphi$$

Ασκ. 5.47)

