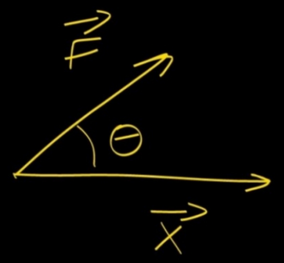
Έργο δύναμης.

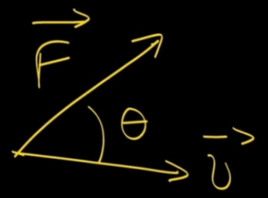
$$W_F = F \cdot x \cdot \sigma\upsilon\nu\theta$$



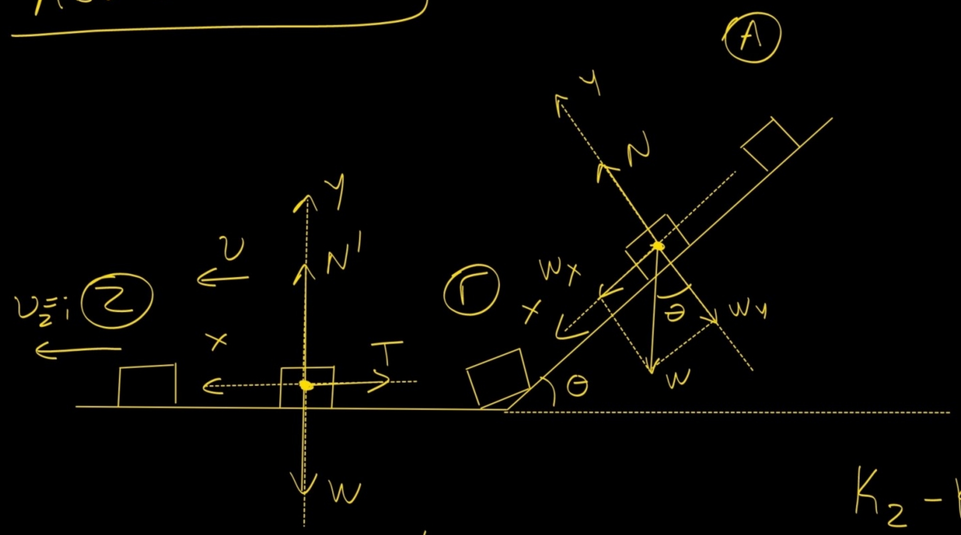
Ισχύς δύναμης.

$$P_F = \frac{W_F}{t} = \frac{F \cdot x \cdot \sigma\upsilon\nu\theta}{t} = F \cdot \frac{x}{t} \cdot \sigma\upsilon\nu\theta \Rightarrow$$

$$P_F = F \cdot \upsilon \cdot \sigma\upsilon\nu\theta$$



Ασκ. 6 σελ. 193.



$\Sigma F_y = 0 \Rightarrow N' = W$

$T = \mu N' = \mu W = \mu \cdot m \cdot g$

ΘΜΚΕ: Α → Γ :

$\Delta K = \Sigma W \Rightarrow K_\Gamma - K_A = W_{w_x} + \cancel{W_{w_y}^{\circ}} + \cancel{W_N^{\circ}} \Rightarrow$

$(\vec{w}_y, \vec{N} \perp \Delta\vec{x})$

$K_\Gamma - 0 = W_x \cdot A\Gamma \Rightarrow$

$K_\Gamma = m \cdot g \cdot \sigma\upsilon\nu\theta \cdot A\Gamma$

ΘΜΚΕ: Γ → Ζ : $\Delta K = \Sigma W \Rightarrow$

$K_Z - K_\Gamma = \cancel{W_{N'}^{\circ}} + \cancel{W_w^{\circ}} + W_T \Rightarrow$ $(\vec{N}', \vec{w} \perp \Delta\vec{x})$

$K_Z - m \cdot g \cdot \sigma\upsilon\nu\theta \cdot A\Gamma = W_T \Rightarrow$

$K_Z - m \cdot g \cdot A\Gamma \cdot \sigma\upsilon\nu\theta = -T \cdot \Gamma Z$

$$K_2 - m \cdot g \cdot \Delta\Gamma \cdot \eta\mu\theta = -\gamma \cdot m \cdot g \cdot \Gamma Z \Rightarrow$$

$$\frac{1}{2} \cdot m \cdot \upsilon_2^2 - m \cdot g \cdot \Delta\Gamma \cdot \eta\mu\theta = -\gamma \cdot m \cdot g \cdot \Gamma Z \Rightarrow$$

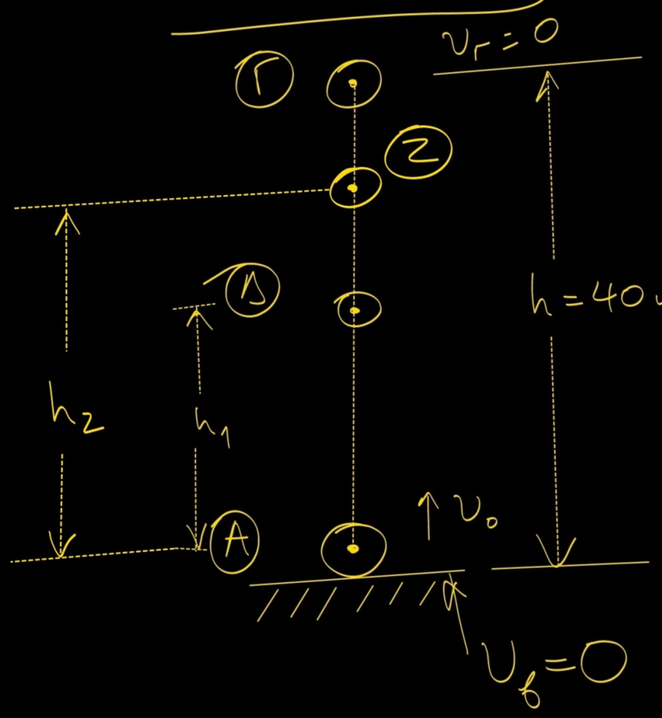
$$\frac{\upsilon_2^2}{2} - g \cdot \Delta\Gamma \cdot \eta\mu\theta = -\gamma \cdot g \cdot \Gamma Z \Rightarrow$$

$$\frac{\upsilon_2^2}{2} - 10 \cdot 6 \cdot \eta\mu 30^\circ = -0{,}2 \cdot 10 \cdot 6 \Rightarrow$$

$$\frac{\upsilon_2^2}{2} - 30 = -12 \Rightarrow \frac{\upsilon_2^2}{2} = 30 - 12 \Rightarrow$$

$$\frac{\upsilon_2^2}{2} = 18 \Rightarrow \upsilon_2^2 = 36 \Rightarrow \upsilon_2 = 6\,m/s$$

Αθ. 13 σελ. 194.)



α) $K_\Delta = \frac{K_A}{2}$ $\quad h_1 = ;$

ΑΔΜΕ: Α → Γ: $K_A + \cancel{U_A}^{\,0} = \cancel{K_r}^{\,0} + U_r \Rightarrow$

$K_A = m \cdot g \cdot h$

ΑΔΜΕ: Α → Δ: $K_A + \cancel{U_A}^{\,0} = K_\Delta + U_\Delta \Rightarrow$

$K_A = \frac{K_A}{2} + m \cdot g \cdot h_1 \Rightarrow \frac{K_A}{2} = m \cdot g \cdot h_1 \Rightarrow$

$\frac{\cancel{m}\cancel{g}h}{2} = \cancel{m}\cancel{g}h_1 \Rightarrow$

$h_1 = \frac{h}{2} \Rightarrow \boxed{h_1 = 20m}$

β) $P_2 = \frac{P_A}{2} \Rightarrow$

$m \cdot v_2 = \frac{m \cdot v_A}{2} \Rightarrow v_2 = \frac{v_A}{2}$

$K_2 = \frac{1}{2} m \cdot v_2^2 = \frac{1}{2} \cdot m \cdot \left(\frac{v_A}{2}\right)^2 \Rightarrow$

$K_2 = \frac{1}{4} \cdot \frac{1}{2} \cdot m \cdot v_A^2 \Rightarrow K_2 = \frac{1}{4} \cdot K_A$

ΑΔΜΕ: (Α) → (2) : $K_A + \cancel{U_A}^{0} = K_2 + U_2 \Rightarrow$

$mgh = \frac{1}{4} K_A + mg \cdot h_2 \Rightarrow$

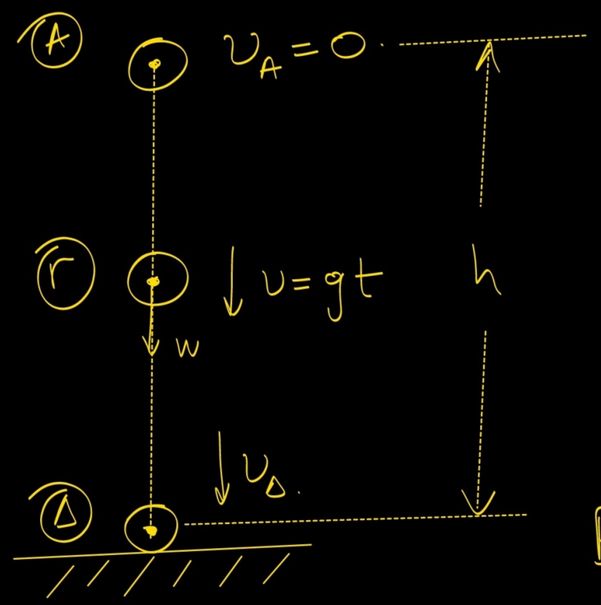
$\cancel{m} \cdot \cancel{g} \cdot h = \frac{1}{4} \cdot \cancel{m} \cdot \cancel{g} \cdot h + \cancel{m} \cdot \cancel{g} \cdot h_2 \Rightarrow$

$h = \frac{1}{4} h + h_2 \Rightarrow$

$40 = \frac{1}{4} \cdot 40 + h_2 \Rightarrow$

$40 = 10 + h_2 \Rightarrow h_2 = 30\,m$

Ασκ. 17 σελ. 194



Α. ΘΜΚΕ: Α → Δ:

$\Delta K = \Sigma W \Rightarrow K_\Delta - K_A = W_W \Rightarrow$

$\frac{1}{2} \cdot m \cdot \upsilon_\Delta^2 - 0 = m \cdot g \cdot H \Rightarrow$

$\frac{1}{2} m \cdot \upsilon_\Delta^2 = m \cdot g \cdot H \Rightarrow \upsilon_\Delta^2 = 2 \cdot g \cdot H \Rightarrow$

$\upsilon_\Delta^2 = 2 \cdot 10 \cdot 20 \Rightarrow \upsilon_\Delta^2 = 400 \Rightarrow \upsilon_\Delta = 20 \, m/s.$

Β. $H = \frac{1}{2} g \cdot t_{ολ}^2 \Rightarrow 20 = \frac{1}{2} \cdot 10 \cdot t_{ολ}^2 \Rightarrow t_{ολ}^2 = 4 \Rightarrow t_{ολ} = 2 sec.$

Η δυναμική ενέργεια χαλώνεται.

$$\frac{\Delta U}{\Delta t} = - \frac{\Delta W_w}{\Delta t} = - m \cdot g \cdot \upsilon = - m \cdot g \cdot g t \Rightarrow \frac{\Delta U}{\Delta t} = - m \cdot g^2 \cdot t \Rightarrow$$

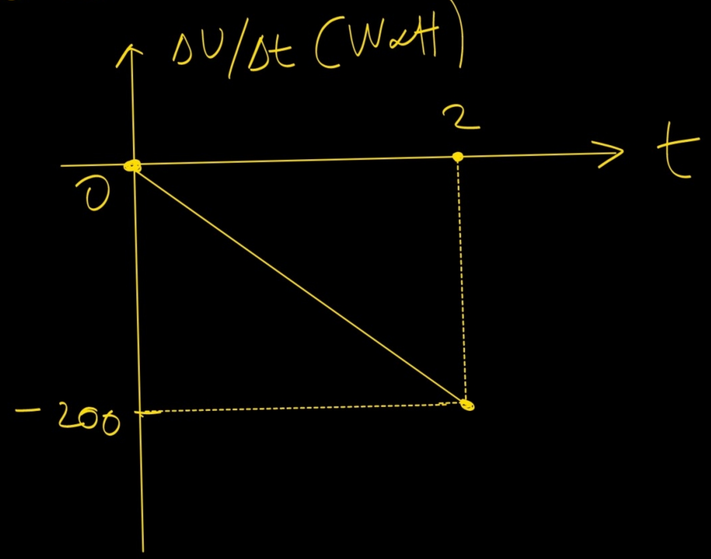
$$0 \le t \le 2 sec$$

$$\frac{\Delta U}{\Delta t} = -100 t \; (SI)$$

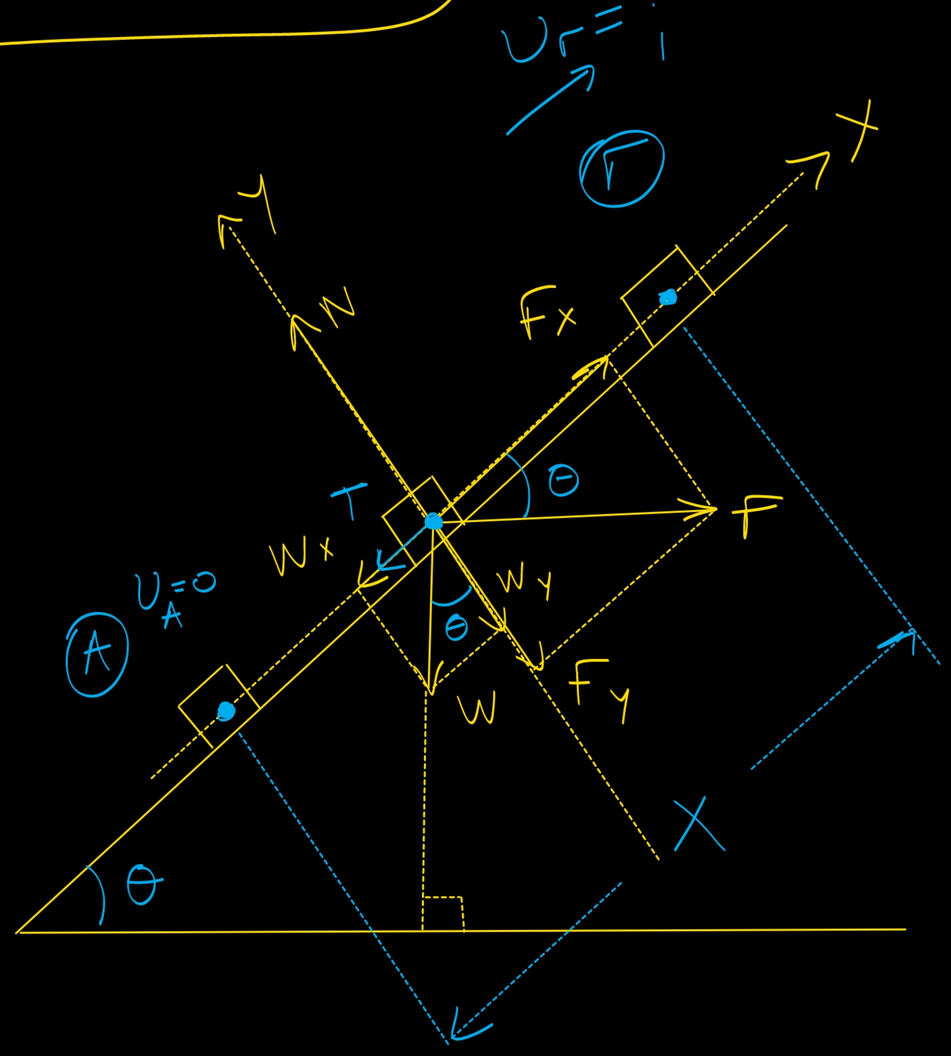
$$\frac{\Delta U}{\Delta t} = -100t \quad (SI) \text{ i } (J/s)$$

$0 \le t \le 2 \text{ sec.}$

1 Watt = 1 Joule/sec.



Ασκ. 16 σελ. 194.



$F_x = F \cdot \sigma\upsilon\nu\theta = 100 \cdot 0{,}8 = 80N$

$F_y = F \cdot \eta\mu\theta = 100 \cdot 0{,}6 = 60N$

$W_x = m \cdot g \cdot \eta\mu\theta = 5 \cdot 10 \cdot 0{,}6 = 30N$

$W_y = m \cdot g \cdot \sigma\upsilon\nu\theta = 5 \cdot 10 \cdot 0{,}8 = 40N$

$(\gamma_{\sigma\tau,max} = \gamma_{o\lambda i\sigma\theta\eta\sigma\eta\varsigma} = \gamma = 0{,}4)$

$\Sigma F_y = 0 \Rightarrow N - W_y - F_y = 0 \Rightarrow$

$N - 40 - 60 = 0 \Rightarrow N = 100N$

$T = \gamma \cdot N = 0{,}4 \cdot 100 \Rightarrow \boxed{T = 40N}$

ΘΜΚΕ : (A) → (Γ) :

$\Delta K = \Sigma W \Rightarrow$

$K_\Gamma - \cancel{K_A}^{0} = W_{F_x} + \cancel{W_{F_y}}^{0} + W_{w_x} + \cancel{W_{w_y}}^{0} + W_T + \cancel{W_N}^{0}$

$(\vec{F_y}, \vec{w_y}, \vec{N} \perp \Delta\vec{x})$

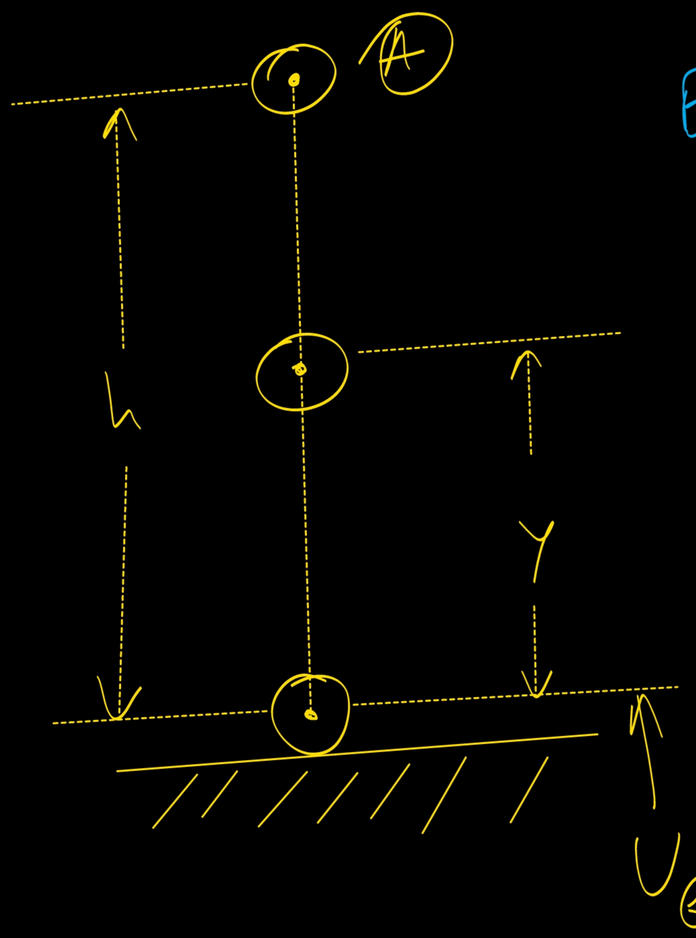
$\Rightarrow \frac{1}{2} \cdot m \cdot v_\Gamma^2 = F_x \cdot x - w_x \cdot x - T \cdot x \Rightarrow$

$\frac{1}{2} \cdot \cancel{8} \cdot v_\Gamma^2 = 80 \cdot \cancel{8} - 30 \cdot \cancel{8} - 40 \cdot \cancel{8} \Rightarrow$

$\frac{v_\Gamma^2}{2} = 10 \Rightarrow v_\Gamma^2 = 20 \Rightarrow v_\Gamma = \sqrt{20} = \sqrt{4 \cdot 5} \Rightarrow$

$v_\Gamma = 2\sqrt{5}\ m/s.$

Αθμ. 2 σελ. 193.



A. $U(h) = m \cdot g \cdot h = 10 \cdot 10 \cdot 20 = 2.000$ Joule

B. $U(y) = m \cdot g \cdot y = 100y \quad (0 \le y \le 20m)$

$K(y) + U(y) = E = U(h) = mgh \Rightarrow$

$K(y) + 100y = 2000 \Rightarrow$

$K(y) = 2000 - 100y$