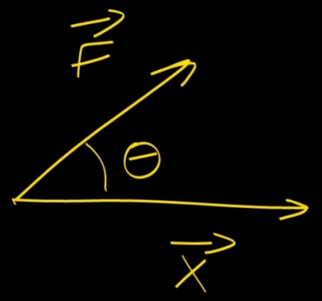
## Έργο δύναμης.

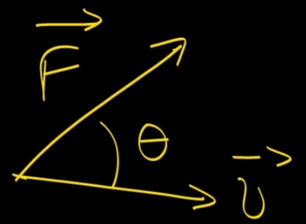
$$W_F = F \cdot x \cdot \sigma\upsilon\nu\theta .$$



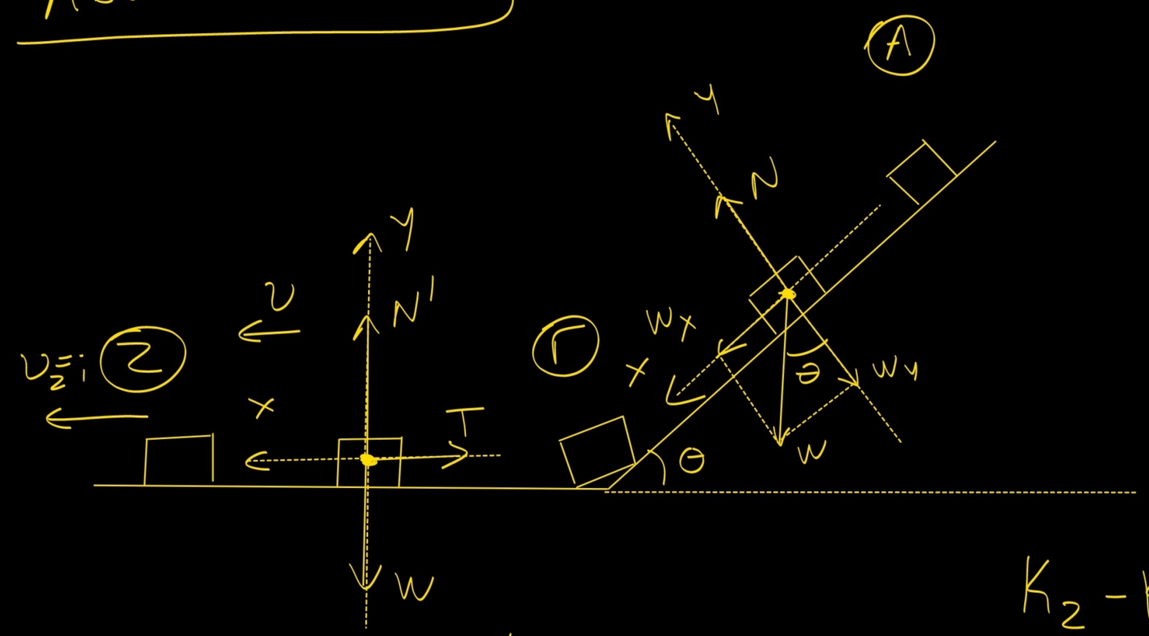

## Ισχύς δύναμης.

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

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



Ασκ. 6 σελ. 193.




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

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

ΘΜΚΕ: Α → Γ :

$\Delta K = \Sigma W \Rightarrow K_\Gamma - K_A = W_{w_x} + \cancel{W_{w_y}}^{\,0} + \cancel{W_N}^{\,0} \Rightarrow$

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

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

$K_\Gamma = m \cdot g \cdot \eta\mu\theta \cdot A\Gamma$

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

$K_Z - K_\Gamma = \cancel{W_{N'}}^{\,0} + \cancel{W_w}^{\,0} + W_T \Rightarrow$ $(\vec{N'}, \vec{w} \perp \Delta\vec{x})$

$K_Z - m \cdot g \cdot \eta\mu\theta \cdot A\Gamma = W_T \Rightarrow$

$K_Z - m \cdot g \cdot A\Gamma \cdot \eta\mu\theta = -T \cdot \Gamma Z$

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

$$\frac{1}{2} \cdot m \cdot v_2^2 - m \cdot g \cdot \Delta\Gamma \cdot \eta\mu\theta = -\gamma \cdot m \cdot g \cdot \Gamma Z \Rightarrow$$

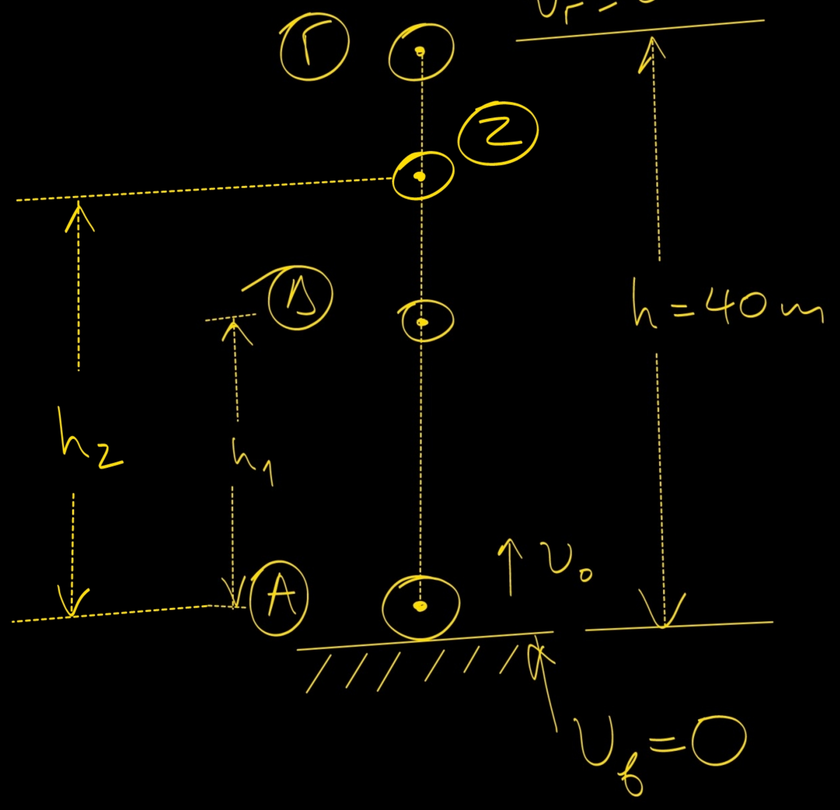
$$\frac{v_2^2}{2} - g \cdot \Delta\Gamma \cdot \eta\mu\theta = -\gamma \cdot g \cdot \Gamma Z \Rightarrow$$

$$\frac{v_2^2}{2} - 10 \cdot 6 \cdot \eta\mu 30^\circ = -0{,}2 \cdot 10 \cdot 6 \Rightarrow$$

$$\frac{v_2^2}{2} - 30 = -12 \Rightarrow \frac{v_2^2}{2} = 30 - 12 \Rightarrow$$

$$\frac{v_2^2}{2} = 18 \Rightarrow v_2^2 = 36 \Rightarrow \boxed{v_2 = 6\ m/s}$$

Ασκ. 13 σελ. 194.)




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

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

$K_A = m \cdot g \cdot h$

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

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

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

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

β) $P_2 = \frac{P_A}{2} \Rightarrow$

$m \cdot U_2 = \frac{m \cdot U_A}{2} \Rightarrow U_2 = \frac{U_A}{2}$

$K_2 = \frac{1}{2} m \cdot U_2^2 = \frac{1}{2} \cdot m \cdot \left(\frac{U_A}{2}\right)^2 \Rightarrow$

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

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

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

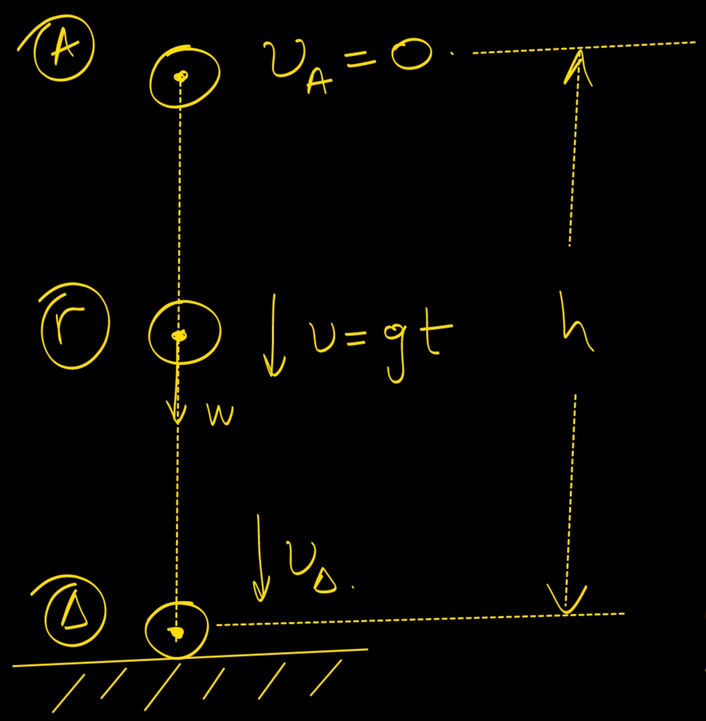
$\cancel{m} \cdot \cancel{g} \cdot h = \frac{1}{4} \cdot \cancel{m} \cdot \cancel{g} \cdot h + \cancel{m} \cdot \cancel{g} \cdot h_2 \Rightarrow$

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

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

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

Άσκ. 17 §2.194




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

# δυναμική ενέργεια μειώνεται.

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

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

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

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

$0 \le t \le 2 sec.$

1 Watt = 1 Joule/sec.