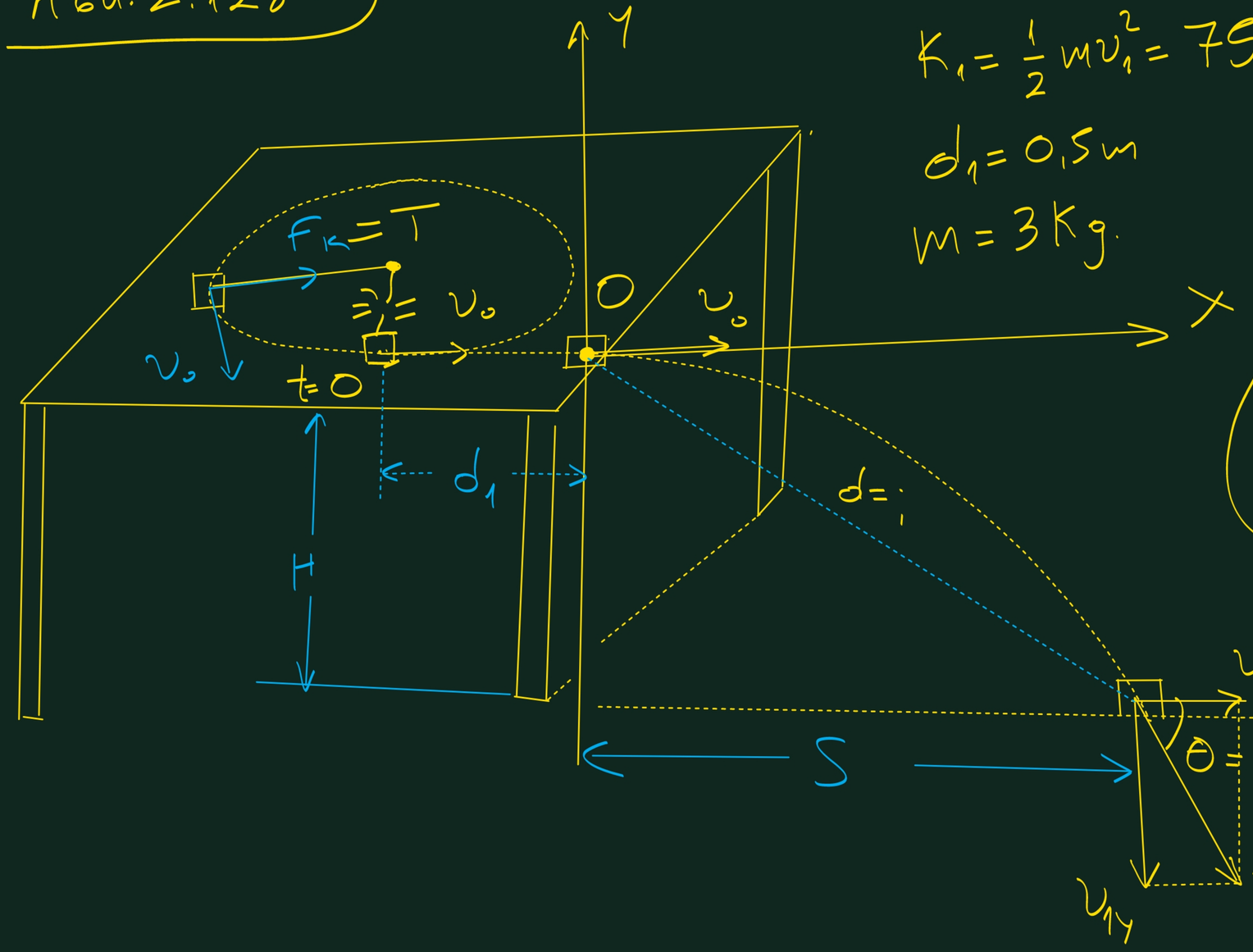
Ασκ. 2.128.)



$T = 150N$

$K_1 = \frac{1}{2} m v_1^2 = 75J$.

$d_1 = 0,5m$

$m = 3Kg$.

α) $T = \frac{m v_0^2}{R} = F_K$

$K_1 = \frac{1}{2} m v_1^2 \Rightarrow$

$75 = \frac{1}{2} \cdot 3 v_1^2 \Rightarrow$

$v_1^2 = 25 \cdot 2 \Rightarrow v_1 = 5\sqrt{2} m/s$.

$\sigma\upsilon\nu\theta = \frac{v_{1x}}{v_1} \Rightarrow \sigma\upsilon\nu 45^\circ = \frac{v_0}{v_1} \Rightarrow$

$\frac{\sqrt{2}}{2} = \frac{v_0}{5\sqrt{2}} \Rightarrow$

$v_0 = \frac{5 \cdot 2}{2} \Rightarrow v_0 = 5 m/s$.

$$T = \frac{mv_0^2}{R} \Rightarrow$$

$$150 = \frac{3 \cdot 5^2}{R} \Rightarrow$$

$$R = \frac{3 \cdot 25}{150} \Rightarrow$$

$$R = \frac{75}{150} \Rightarrow$$

$$R = 0{,}5\,m$$

β) $v_{1y} = v_0 \cdot \eta\mu\theta \Rightarrow$

γ) $v_{1y} = 5\sqrt{2} \cdot \frac{\sqrt{2}}{2} \Rightarrow$

$$v_{1y} = 5\,m/s.$$

$$v_{1y} = g t_1 \Rightarrow$$

$$5 = 10 t_1 \Rightarrow$$

$t_1 = 0{,}5\,sec$ (γ) → πρέπει να προσθέσουμε το $\frac{d_1}{v_0}$ (χ)

$$t_1' = t_1 + \frac{d}{v_0} = (\gamma)$$

$$= 0{,}5 + \frac{0{,}5}{5} \Rightarrow t_1' = 0{,}6\,sec$$

Άρα: $H = \frac{1}{2} g t_1^2 = \frac{1}{2} \cdot 10 \cdot 0{,}25 \Rightarrow$

$H = 1{,}25\,m.$ (β)

β) $\frac{1}{2} m v_0^2 + mgH = K_1 \Rightarrow$

$$\frac{1}{2} \cdot 3 \cdot 25 + 30 \cdot H = 75 \Rightarrow$$

$$\frac{75}{2} + 30H = 75 \Rightarrow$$

$$75 + 60H = 150 \Rightarrow$$

$$60H = 75 \Rightarrow$$

$$H = \frac{75}{60} = \frac{5 \cdot 15}{4 \cdot 15} = 1{,}25\,m$$

δ) $S = v_0 t_1 = 5 \cdot 0{,}5 = 2{,}5\,m$

ε) $d^2 = S^2 + H^2 = 2{,}5^2 + 1{,}25^2 =$

$= 4 \cdot 1{,}25^2 + 1{,}25^2 \Rightarrow d = 1{,}25\sqrt{5}\,m.$