

# Διαγώνισμα Α Τάξης Ενιαίου Λυκείου

## Νόμοι Νεύτωνα / Βαρύτητα

Σύνολο Σελίδων: οκτώ (8) - Διάρκεια Εξέτασης: 2,5 ώρες

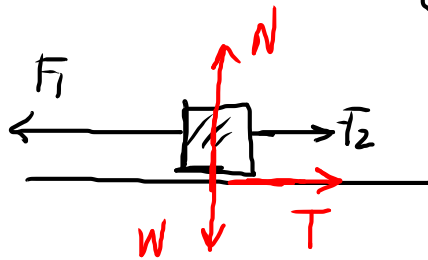
Κυριακή 12 Μαρτίου 2023

Θέμα Α : (δ), (γ), (γ), (β) | Λ, Σ, Λ, Λ, Σ

$$\begin{array}{l} \text{B.1} \\ \downarrow \\ \text{(β)} \end{array} \quad \frac{h_A}{h_B} = \frac{\frac{1}{2} g t_A^2}{\frac{1}{2} g t_B^2} = \left( \frac{t_A}{t_B} \right)^2 = 2^2 \Rightarrow \frac{h_A}{h_B} = 4 \Rightarrow \underline{\underline{h_A = 4 h_B}}$$

B2 | ΕΟΚ  $\Sigma F_x = 0, \Sigma F_y = 0 \rightarrow \underline{N = W = mg}$

(β)



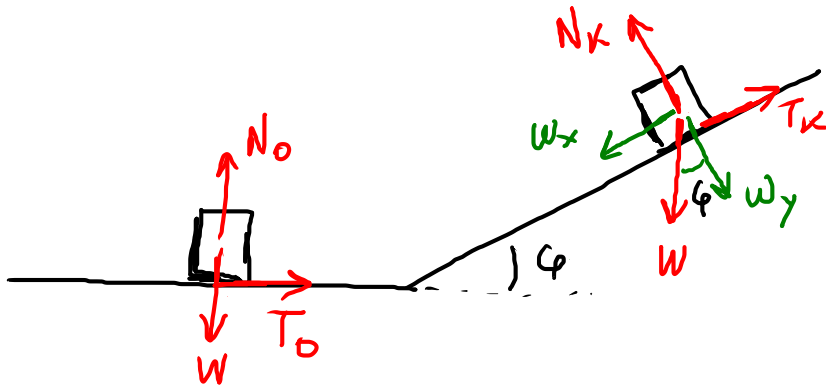
$$F_1 = F_2 + T$$

$$5F = F + T \Rightarrow \underline{T = 4F}$$

$$T = \mu N \Rightarrow \mu = \frac{4F}{mg}$$

B3 |

↓



$$\frac{T_o}{T_k} = \frac{\mu N_o}{\mu \cdot N_k} = \frac{N_o}{N_k}$$

$$\Sigma F_y = 0, \text{ ορι ζωνηιο: } N_o - W = 0 \Rightarrow \underline{N_o = W}$$

↓

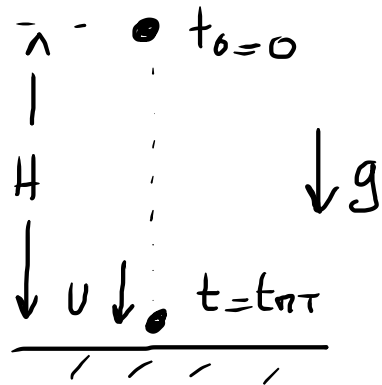
(β)

$$\text{Κεντριμένο: } N_k - W_y = 0 \Rightarrow \underline{\underline{N_k = W_y = W \cdot \cos \phi}}$$

$$\frac{T_o}{T_k} = \frac{W}{W \cos \phi} = \frac{1}{\cos \phi}$$

$$\underline{\underline{T_k = T_o \cdot \cos \phi}}$$

# Θέμα Γ



$$\Gamma.1] \frac{\Delta v}{\Delta t} = a = g = \underline{\underline{10 \text{ m/s}^2}}$$

$$\Gamma.2] \text{φτάνει την στιγμή που } y = H = \frac{1}{2} g t_{\pi\tau}^2$$
$$\Rightarrow 45 = \frac{1}{2} 10 \cdot t_{\pi\tau}^2 \Rightarrow t_{\pi\tau}^2 = 9 \Rightarrow \underline{\underline{t_{\pi\tau} = 3 \text{ s}}}$$

$$\Gamma.3] \text{ 9m } \underline{t_1 = 2 \text{ s}} \text{ έχει}$$

$$\text{Κανέβει } y_1 = \frac{1}{2} g t_1^2 = \frac{1}{2} 10 \cdot 2^2$$

$$\underline{y_1 = 20 \text{ m}}$$

$$\text{Άρα απέχει } H - y_1 = \underline{\underline{25 \text{ m}}}$$

$$\text{με ταχύτητα } v = g t_{\pi\tau} \Rightarrow \underline{\underline{v = 30 \text{ m/s}}}$$

$$\Gamma.4] \text{ Διάστημα του 2ου δευτερολέπτου}$$

$$t = 1 \text{ s} \rightarrow t = 2 \text{ s}$$

$$\Delta y = \underbrace{y(2)}_{20 \text{ m}} - \underbrace{y(1)}_{\frac{1}{2} 10 \cdot 1^2}_{5 \text{ m}} \longrightarrow \underline{\underline{\Delta y = 15 \text{ m}}}$$

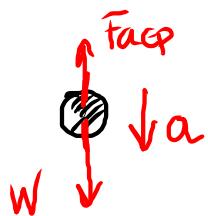
(Γ.3)

$$\Gamma.5] \text{ Δεχεται } F_{\text{αερ}}$$

2ος Νόμος Newton

$$\Sigma F = m a$$

$$W - F_{\text{αερ}} = m a \Rightarrow m g - F_{\text{αερ}} = m a \Rightarrow \underline{\underline{a = 6 \text{ m/s}^2}}$$

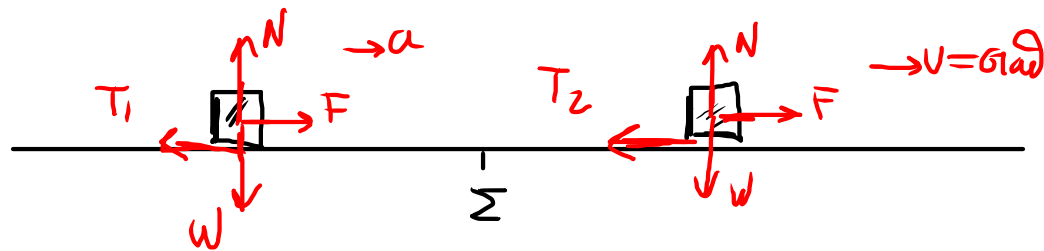


Θέμα Δ | Δ.1 | Διαγράμμα  $v-t \rightarrow κλίση = \frac{\Delta v}{\Delta t} = a$

$(0 \rightarrow 5) s: a = \frac{10-0}{5-0} = 2 m/s^2 \rightarrow \Sigma F = m \cdot a = 4 N \neq F$  (αρα υπάρχει τριβή)

$(5 \rightarrow 10) s: ΕΟΚ \rightarrow a = 0 \rightarrow \Sigma F = 0 \neq F$  (αρα υπάρχει τριβή)

Δ.2



$\Sigma F_y = 0 \Rightarrow N - W = 0 \Rightarrow N = mg = 20 N$

$T = \mu N$

$\Sigma F = F - T_1 = 4$

$\Sigma F = 0$

$T_1 = 2 N$

$F - T_2 = 0$

$T_2 = 6 N$

$\mu_1 = \frac{T_1}{N} \Rightarrow \underline{\mu_1 = 0,1}$

$\mu_2 = \frac{T_2}{N} \Rightarrow \underline{\mu_2 = 0,3}$

Δ.3 |  $\Delta X = \epsilon \mu \beta = \Delta X_1 + \Delta X_2 = \frac{5 \cdot 10}{2} + 5 \cdot 10 = \underline{\underline{75 m}}$

Δ.4  $t > 10s$  u  $F$   $\mu$   $\delta m$   $\Sigma$   $m$   $a'$



$$\Sigma F = ma' \Rightarrow T_2 = ma' \Rightarrow \underline{a' = 3m/s^2}$$

$$v = v_1 - a' \Delta t = 0 \Rightarrow a' \Delta t = v_1 \Rightarrow \Delta t = \frac{10}{3} s$$

→ Apa  $t_3 = 10 + \frac{10}{3} = \frac{40}{3} s$

$$\Delta x_3 = v_1 \Delta t - \frac{1}{2} a' \Delta t^2$$

$$\Delta x_3 = \frac{50}{3} m$$

$$x_3' = 7s + \frac{50}{3} = \frac{275}{3} m$$

Δ.5

