

ΛΥΣΕΙΣ ΦΥΣΙΚΗΣ Α' ΛΥΚΕΙΟΥ 9/2/2020

**ΘΕΜΑ Α**

- A1) δ A2) β A3) β A4) δ  
A5) Σ, Σ, Σ, Σ, Σ

**ΘΕΜΑ Β**

1)  $F_1 > F_2$  ορα  $\Sigma F = F_1 - F_2 \Rightarrow \Sigma F = 3F_2 - F_2 \Rightarrow \Sigma F = 2F_2 \Rightarrow F_2 = \frac{\Sigma F}{2} \Rightarrow \boxed{F_2 = 6N}$   
 και  $F_1 = 3F_2 = 3 \cdot 6N \Rightarrow \boxed{F_1 = 18N}$ . Αρα  $\Sigma \epsilon \sigma \tau \alpha \tau \alpha$  (β)

2)  $\Delta x = 2t^2$  ορα  $a = 4m/s^2$ .  $\Sigma F = ma \Rightarrow F_1 - F_2 = ma \Rightarrow 10 - F_2 = 2 \cdot 4 \Rightarrow F_2 = 10 - 8 \Rightarrow \boxed{F_2 = 2N}$   
 $\Delta x = \frac{1}{2}at^2$

3)  $\alpha_1 = \frac{F_1}{m} = \frac{10}{1} \Rightarrow \alpha_1 = 10m/s^2$  Σε στο τ(α)

- $u_1 = \alpha_1 \Delta t_1 = 10 \cdot 2 \Rightarrow u_1 = 20m/s$  a) Σ  
 $\alpha_2 = 0$ ,  $u_2 = u_1 = 20m/s$  β) Λ  
 $\alpha_3 = \frac{F_3}{m} = \frac{-5}{1} \Rightarrow \alpha_3 = -5m/s^2$  γ) Λ  
 $u_3 = u_0 - |\alpha_3| \Delta t_3 = 20 - 5 \cdot 2 \Rightarrow u_3 = 10m/s$

4)  $t_1 = 2t_2 \Rightarrow \sqrt{\frac{2h_1}{g}} = 2\sqrt{\frac{2h_2}{g}} \Rightarrow \frac{2h_1}{g} = 4 \cdot \frac{2h_2}{g} \Rightarrow h_1 = 4h_2 \Rightarrow \boxed{\frac{h_1}{h_2} = 4}$   $\Sigma \epsilon \sigma \tau \alpha \tau \alpha$

**ΘΕΜΑ Γ**

- 1) α)  $F_1 > F_2$  προς τ'αριστερά.  
 β)  $\Sigma F = ma \Rightarrow F_1 - F_2 = ma \Rightarrow 30 - 10 = m \cdot 2 \Rightarrow 20 = 2m \Rightarrow \boxed{m = 10kg}$

2) α)  $\alpha_1 = \frac{F_1}{m} = \frac{30}{10} \Rightarrow \boxed{\alpha_1 = 3m/s^2}$  β)  $\alpha_2 = \frac{F_2}{m} = \frac{10}{10} \Rightarrow \boxed{\alpha_2 = 1m/s^2}$

3) α)  $0 - t_1$   $a = 2m/s^2$ ,  $s_1 = \frac{1}{2}a \cdot \Delta t_1^2 \Rightarrow \Delta t_1 = \sqrt{\frac{2s_1}{a}} = \sqrt{\frac{2 \cdot 25}{2}} \Rightarrow \Delta t_1 = 5sec \Rightarrow t_1 - 0 = 5sec \Rightarrow \boxed{t_1 = 5sec}$   
 $u_1 = a \Delta t_1 \Rightarrow \boxed{u_1 = 10m/s}$

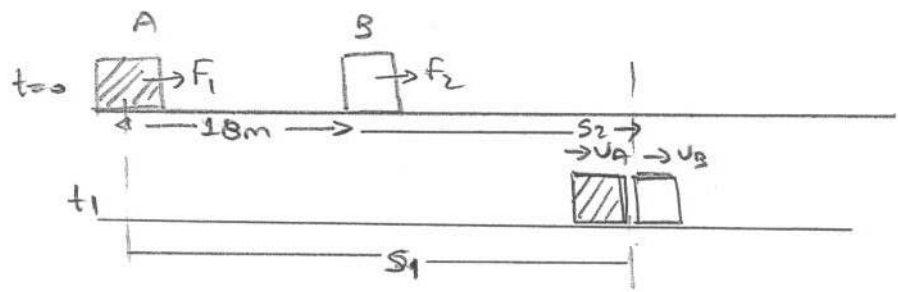
β)  $\alpha' = \frac{F_2}{m} = \frac{10}{10} \Rightarrow \boxed{\alpha' = 1m/s^2}$

γ)  $\Delta t_2 = \frac{u_0}{|\alpha'|} = \frac{10}{1} = 10s \Rightarrow \boxed{\Delta t_2 = 10s} \Rightarrow t_2 - t_1 = 10s \Rightarrow t_2 - 5s = 10s \Rightarrow \boxed{t_2 = 15sec}$

δ)  $s_2 = \frac{u_0^2}{2|\alpha'|} = \frac{10^2}{2 \cdot 1} \Rightarrow s_2 = 50m$   
 $s_{\text{ολ}} = s_1 + s_2 = 25m + 50m \Rightarrow \boxed{s_{\text{ολ}} = 75m}$

**ΘΕΜΑ Δ**

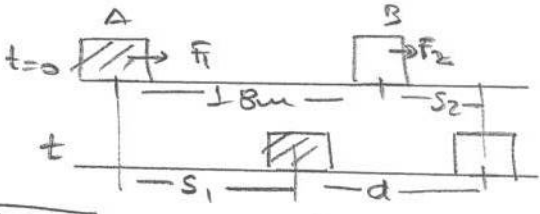
$\alpha_1 = \frac{F_1}{m} = \frac{6}{1} \Rightarrow \alpha_1 = 6 \text{ m/s}^2$   
 $\alpha_2 = \frac{F_2}{m} = \frac{4}{2} \Rightarrow \alpha_2 = 2 \text{ m/s}^2$



$s_1 = s_2 + 18 \Rightarrow \frac{1}{2} \alpha_1 t_1^2 = \frac{1}{2} \alpha_2 t_1^2 + 18 \Rightarrow 3 t_1^2 = t_1^2 + 18 \Rightarrow 2 t_1^2 = 18 \Rightarrow t_1^2 = 9 \Rightarrow$   
 $t_1 = 3 \text{ s}$

$v_1 = \alpha_1 t_1 = 6 \cdot 3 \Rightarrow v_1 = 18 \text{ m/s}$ ,  $s_1 = \frac{1}{2} \alpha_1 t_1^2 \Rightarrow s_1 = \frac{1}{2} \cdot 6 \cdot 3^2 \Rightarrow s_1 = 27 \text{ m}$   
 $v_2 = \alpha_2 t_1 = 2 \cdot 3 \Rightarrow v_2 = 6 \text{ m/s}$ ,  $s_2 = \frac{1}{2} \alpha_2 t_1^2 \Rightarrow s_2 = \frac{1}{2} \cdot 2 \cdot 3^2 \Rightarrow s_2 = 9 \text{ m}$

$s_1 = \frac{1}{2} \alpha_1 t_1^2 = \frac{1}{2} \cdot 6 \cdot 9^2 \Rightarrow s_1 = 12 \text{ m}$   
 $s_2 = \frac{1}{2} \alpha_2 t_1^2 = \frac{1}{2} \cdot 2 \cdot 9^2 \Rightarrow s_2 = 4 \text{ m}$



$18 + s_2 = s_1 + d \Rightarrow 18 + 4 = 12 + d \Rightarrow d = 10 \text{ m}$

Δ4) Το στήριγμα B στο  $t_1$  και  $t_2$  είναι ευθεία. Επειδή  $\alpha_2 = 2 \text{ m/s}^2$   
 $v_2 = 6 \text{ m/s}$ ,  $s_2 = 24 \text{ m}$ :  $s_2 = v_2 \Delta t_2 \Rightarrow \Delta t_2 = \frac{s_2}{v_2} = \frac{24}{6} \Rightarrow \Delta t_2 = 4 \text{ s}$   
 Στο ίδιο χρονικό σημείο A έχει  $v_1 = 18 \text{ m/s}$   
 $v_1' = v_1 + \alpha_1 \Delta t_2 = 18 + 6 \cdot 4 \Rightarrow v_1' = 42 \text{ m/s}$   
 $s_1' = v_1 \Delta t_2 + \frac{1}{2} \alpha_1 \Delta t_2^2 = 18 \cdot 4 + \frac{1}{2} \cdot 6 \cdot 4^2 = 72 + 48 \Rightarrow s_1' = 120 \text{ m}$

Δ5)

