ΛΥΣΕΙΣ ΔΙΑΓΩΝΙΣΜΑΤΟΣ ΦΥΣΙΚΗΣ Α΄ ΛΥΚΕΙΟΥ 14-12-2025

ΘΕΜΑ Α

Α1) γ Α2) γ Α3) δ Α4) β Α5) Σ,Λ,Λ,Λ,Σ

ΘΕΜΑ Β

Β1) $x = 20t - 2t^2$ (S.I.)

$x = v_0 t - \frac{1}{2} a t^2$

Από εξίσωση: $v_0 = 20\,m/s$, $2 = \frac{1}{2}a \Rightarrow a = 4\,m/s^2$

$v = v_0 - |a| \cdot t = 20 - 4 \cdot 4 = 20 - 16 \Rightarrow v = 4\,m/s$

Σωστό το (α)

Β2) Για $t_1 = 1s$: $v_1 = a t_1 \Rightarrow 8 = a \cdot 1 \Rightarrow a = 8\,m/s^2$

$S_1 = \frac{1}{2} a t_1^2 = \frac{1}{2} \cdot 8 \cdot 1^2 = 4\,m$

Για $t_2 = 3s$: $v_2 = a t_2 \Rightarrow v_2 = 8 \cdot 3 \Rightarrow v_3 = 24\,m/s$

$S_3 = \frac{1}{2} a t_3^2 = \frac{1}{2} \cdot 8 \cdot 3^2 \Rightarrow S_3 = 36\,m$

Για $S_3 = 256\,m \Rightarrow \frac{1}{2} a t_3^2 = 256 \Rightarrow \frac{1}{2} \cdot 8 \cdot t_3^2 = 256 \Rightarrow t_3^2 = 64 \Rightarrow$

$\Rightarrow t_3 = \sqrt{64} \Rightarrow t_3 = 8s$

$v_3 = a t_3 = 8 \cdot 8 \Rightarrow v_3 = 64\,m/s$

Χρονική στιγμή t(s)	Ταχύτητα υ (m/s)	Διάστημα s (m)
0	0	0
1	8	4
3	24	36
8	64	256

Β3. Α. Απόδειξη βλέπε σελίδα 28 ΦΕΔ . **Σωστό το γ.**

Β . Σωστό το β.

Β3) Β) $\upsilon^2 = \upsilon_0^2 + 2as \xrightarrow{\upsilon=3\upsilon_0} (3\upsilon_0)^2 = \upsilon_0^2 + 2as \Rightarrow$

$\Rightarrow 9\upsilon_0^2 - \upsilon_0^2 = 2as \Rightarrow 8\upsilon_0^2 = 2as \Rightarrow s = \frac{4\upsilon_0^2}{a}$

Β4. Σωστό το γ.

Β4) $s_1 + s_2 = 100 \Rightarrow \frac{1}{2}a\Delta t_1^2 + \upsilon \cdot \Delta t_2 = 100 \Rightarrow$

$\Rightarrow \frac{1}{2}a \cdot 4^2 + \upsilon \cdot 6 = 100 \xrightarrow{\upsilon = a\Delta t_1} 8a + a \cdot \Delta t_1 \cdot 6 = 100 \Rightarrow$

$\Rightarrow 8a + a \cdot 4 \cdot 6 = 100 \Rightarrow 8a + 24a = 100 \Rightarrow 32a = 100 \Rightarrow$

$a = \frac{100}{32} \Rightarrow a = \frac{25}{8}\, m/s^2$

ΘΕΜΑ Γ

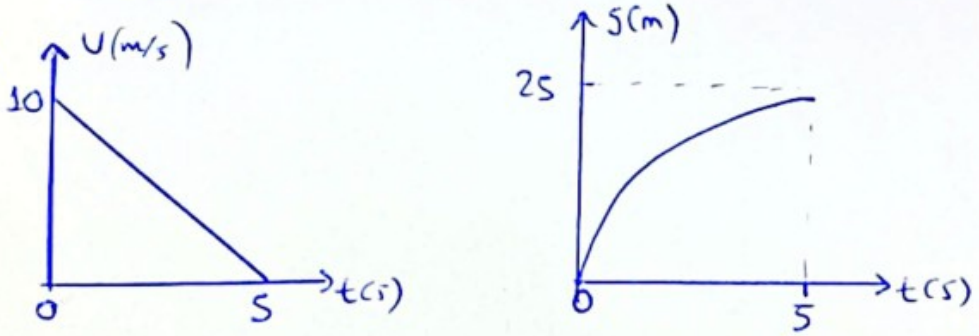
Γ1) $\upsilon_1 = \upsilon_0 - |a| \cdot t_1 \Rightarrow 8 = 10 - 2 \cdot t_1 \Rightarrow 2t_1 = 2 \Rightarrow t_1 = 1s$

$x_1 = \upsilon_0 t_1 - \frac{1}{2}at_1^2 = 10 \cdot 1 - \frac{1}{2} \cdot 2 \cdot 1^2 = 9m \Rightarrow x_1 = 9m$

Γ2) $\Delta t_{s_{top}} = t_2 = \frac{\upsilon_0}{|a|} = \frac{10}{2} = 5s$

$s_{s_{top}} = s_2 = \frac{\upsilon_0^2}{2|a|} = \frac{10^2}{2 \cdot 2} = \frac{100}{4} = 25m$

Γ3)



Γ4) Το τελευταίο δευτερόλεπτο είναι το 5ο sec.

Ισχύει $\Delta x = \frac{1}{2}at^2 - \frac{1}{2}at'^2 = \frac{1}{2} \cdot 2 \cdot 5^2 - \frac{1}{2} \cdot 2 \cdot 4^2 \Rightarrow$

$\Delta x = 25 - 16 \Rightarrow \Delta x = 9m$, στη διάρκεια του 5ου sec.

ΘΕΜΑ Δ

Δ1.

α) 0-2s Ε.Ο.Κ, $\Delta x_1 = E_1 = 40m$, $S_1 = |\Delta x_1| = 40m$, $a_1 = 0$

2s-4s Ε.Ο.Επιταχ.Κ, $\Delta x_2 = E_2 = \frac{(40+20)\cdot 2}{2} = 60m$, $S_2 = |\Delta x_2| = 60m$

$a_2 = \frac{40-20}{4-2}\ m/s^2 \Rightarrow a_2 = 10\ m/s^2$

4s-8s Ε.Ο Επιβρασ.Κ, $\Delta x_3 = E_3 = \frac{40\cdot 4}{2} = 80m$, $S_3 = |\Delta x_3| = 80m$

$a_3 = \frac{0-40}{8-4}\ m/s^2 \Rightarrow a_3 = -10\ m/s^2$

8s-10s Ε.Ο. Επιταχυνόμενη Κ με ΑΝΤΙΘΕΤΗ φορά.

$\Delta x_4 = E_4 = \frac{2\cdot(-20)}{2} \Rightarrow \Delta x_4 = -20m$, $S_4 = |\Delta x_4| = 20m$

$a_4 = -\frac{20-0}{10-8} \Rightarrow a_4 = -10\ m/s^2$

β) $S_{ολ} = S_1 + S_2 + S_3 + S_4 = 200\ m$

$\Delta x_{ολ} = \Delta x_1 + \Delta x_2 + \Delta x_3 + \Delta x_4 = 40m + 60m + 80m + (-20m) = 160m$

γ) $u_μ = \frac{S_{ολ}}{t_{ολ}} = \frac{200}{10}\frac{m}{s} \Rightarrow u_μ = 20\ m/s$

Δ2.

$x_0 = 20m$

$x_1 = \Delta x_1 + x_0 = 40m + 20m = 60m$

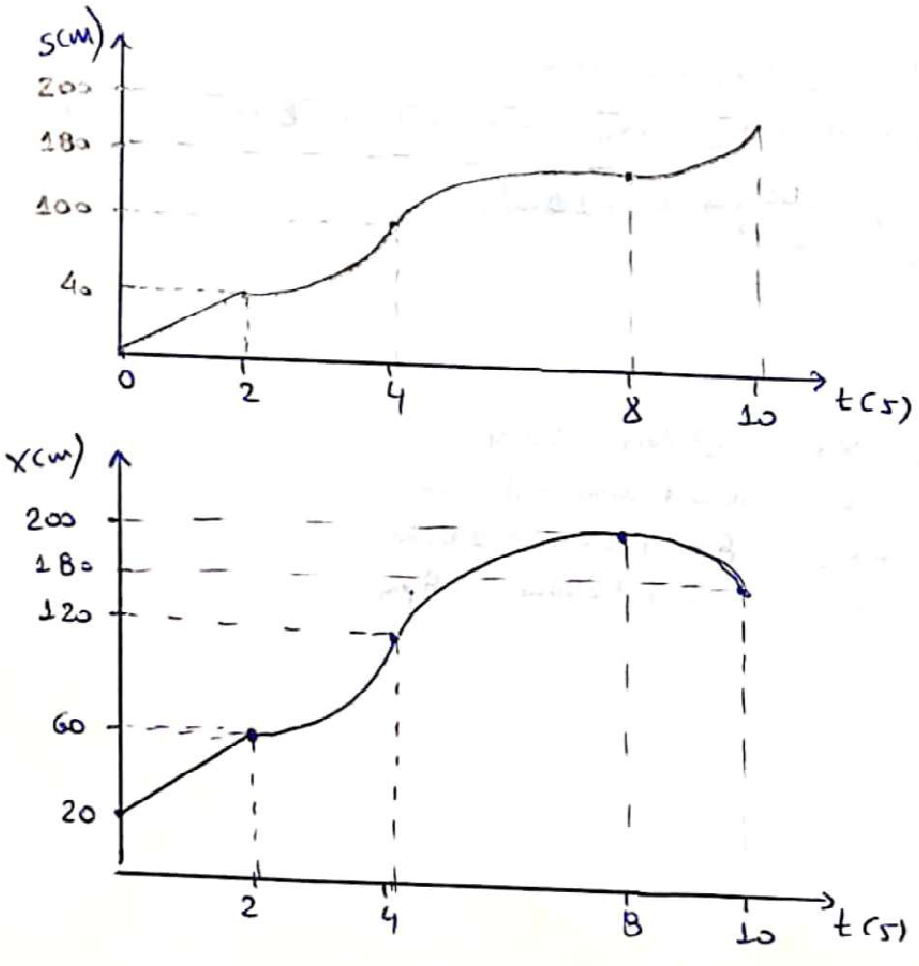
$x_2 = \Delta x_2 + x_1 = 60m + 60m = 120m$

$x_3 = \Delta x_3 + x_2 = 80m + 120m = 200m$

$x_4 = \Delta x_4 + x_3 = -20m + 200m = 180m$

Χρονικό διάστημα	$t_{αρχ}$	$x_{αρχ}$	$t_{τελ}$	$x_{τελ}$	α (m/s²)
0-2s	0s	20m	2s	60m	0
2s-4 s	2s	60m	4s	140m	10
4s-8 s	4s	140m	8s	200m	-10
8s-10s	8s	200m	10s	180m	-10

Δ3.



Δ4.

Για t_1= 5s: $\upsilon_1 = \upsilon_{αρχ} - |\alpha_3| \Delta t = 40-10(5-4) = 30$ m/s

Για t_2= 9s: $\upsilon_4 = \alpha_4 \Delta t = -10(9-8) = -10$ m/s