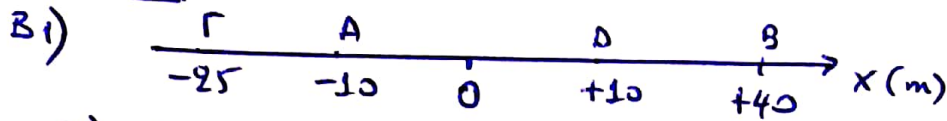


ΘΕΜΑ Α

- A1) γ A2) β A3) δ A4) γ A5) λ, σ, ζ, ι, η

ΘΕΜΑ Β



α) $\Delta x = x_{\text{τελ}} - x_{\text{αρχ}} = x_{\Delta} - x_{\text{Α}} = +10\text{m} - (-10\text{m}) \Rightarrow \boxed{\Delta x = +20\text{m}}$

β) $A \rightarrow B: s_1 = 50\text{m}$ $B \rightarrow \Gamma: s_2 = 65\text{m}$ $\Gamma \rightarrow \Delta: s_3 = 35\text{m}$

$s_{\text{ολ}} = s_1 + s_2 + s_3 = 50\text{m} + 65\text{m} + 35\text{m} \Rightarrow \boxed{s_{\text{ολ}} = 150\text{m}}$

B2) $x = 50 - 10t \text{ (SI)}$

Από σύστημα με $x = x_0 + vt$ προκύπτει: $x_0 = 50\text{m}$ + $v = -10\text{m/s}$

I) Σωστό το (δ)

II) Για $t_1 = 25$: $x_1 = 50 - 10 \cdot 1 = 30\text{m}$

Για $t_2 = 45$: $x_2 = 50 - 10 \cdot 4 = 10\text{m}$

$\Delta x = x_2 - x_1 = 10\text{m} - (+30\text{m}) \Rightarrow \boxed{\Delta x = -20\text{m}}$, Σωστό το (δ).

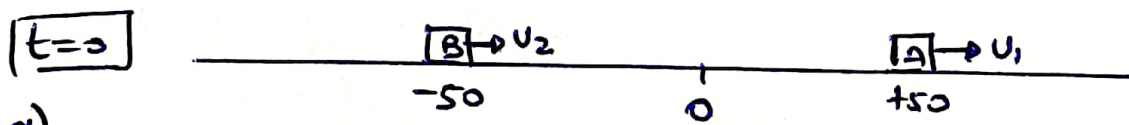
B3) $v_A = \frac{\Delta x_A}{\Delta t} = \frac{5-0}{1-0} \text{ m/s} \Rightarrow v_A = 5\text{m/s}$

$v_B = \frac{\Delta x_B}{\Delta t} = \frac{4-0}{1-0} \text{ m/s} \Rightarrow v_B = 4\text{m/s}$

Αρα $v_A > v_B$, Σωστό το (α).

B4) $x_1 = 50 + 15t \text{ (SI)}: x_{01} = 50\text{m}, v_1 = 15\text{m/s}$

$x_2 = -50 + 25t \text{ (SI)}: x_{02} = -50\text{m}, v_2 = 25\text{m/s}$



α) Όταν συναντηθούν τότε: $x_1 = x_2 \Rightarrow 50 + 15t = -50 + 25t \Rightarrow 100 = 10t \Rightarrow \boxed{t = 10\text{s}}$, αρα Σωστό

β) Για $t = 10\text{s}$: $x_1 = 50 + 15 \cdot 10 = 200\text{m}$

Αρα δι' την αρχική ταρ θέση θα απέχει:

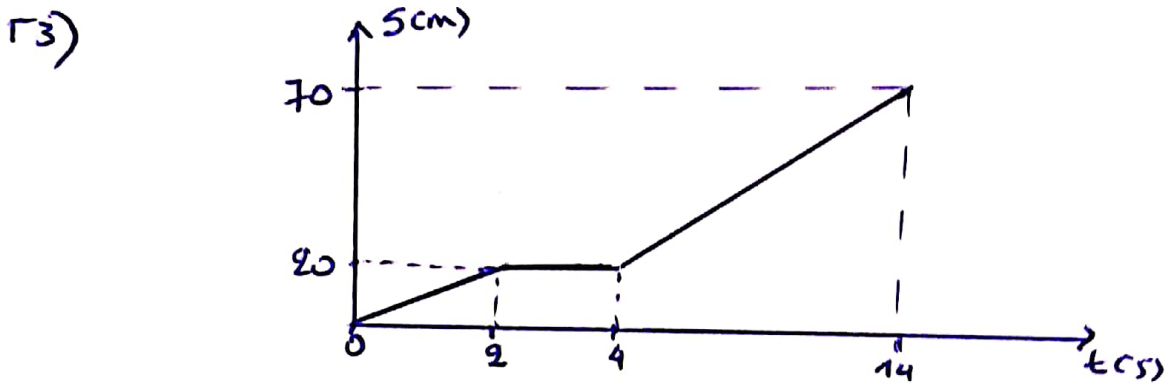
$d = x_1 - x_{01} = 200\text{m} - 50\text{m} \Rightarrow \boxed{d = 150\text{m}}$, αρα 1ΑΘΟΣ

ΘΕΜΑ Γ

- Γ1) 0-2s: ΕΟΚ με $u_1 = 10 \text{ m/s}$, προς την θετική κατεύθυνση της x'
2s-4s: Ακίνητο
4s-14s ΕΟΚ με $u_2 = -5 \text{ m/s}$, προς την αρνητική κατεύθυνση της x'

- 0-2s: $\Delta x_1 = E_1 = 2s \cdot 10 \text{ m/s} = 20 \text{ m}$, $S_1 = |\Delta x_1| = 20 \text{ m}$
 - 2s-4s: $\Delta x_2 = 0$, $S_2 = 0$
 - 4s-14s: $\Delta x_3 = E_3 = 10s \cdot (-5 \text{ m/s}) = -50 \text{ m}$, $S_3 = |\Delta x_3| = 50 \text{ m}$
- $S_{\text{ολ}} = S_1 + S_2 + S_3 = 70 \text{ m}$

Γ2) $u_{\mu} = \frac{S_{\text{ολ}}}{t_{\text{ολ}}} = \frac{70 \text{ m}}{14 \text{ s}} \Rightarrow u_{\mu} = 5 \text{ m/s}$



Γ4)

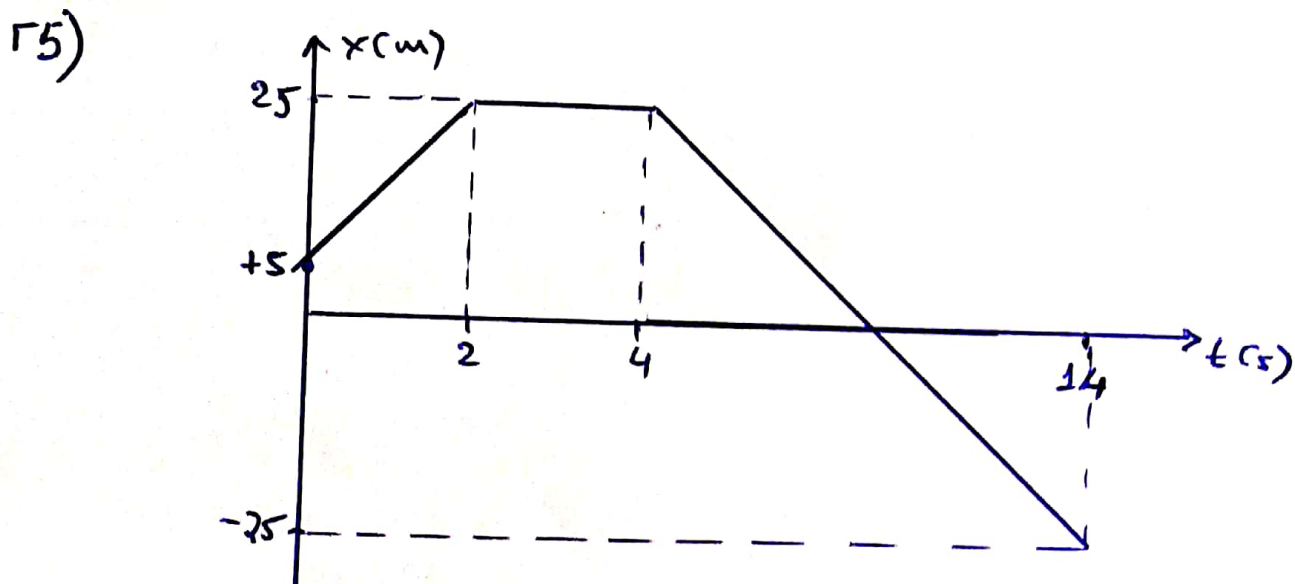
$$x_0 = +5 \text{ m}$$

$$x_1 = x_0 + \Delta x_1 = 25 \text{ m}$$

$$x_2 = x_1 + \Delta x_2 = 25 \text{ m}$$

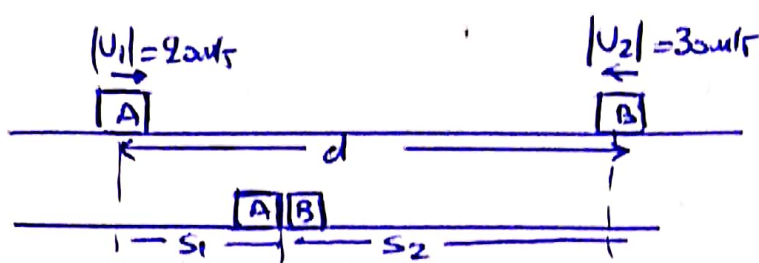
$$x_3 = x_2 + \Delta x_3 = -25 \text{ m}$$

Δt	$t_{\text{αρχ}}$	$x_{\text{αρχ}}$	$t_{\text{τελ}}$	$x_{\text{τελ}}$	Δx
0-2s	0	5m	2s	25m	20m
2s-4s	2s	25m	4s	25m	0
4s-14s	4s	25m	14s	-25m	-50m



ΘΕΜΑ Δ

$t_0 = 0$

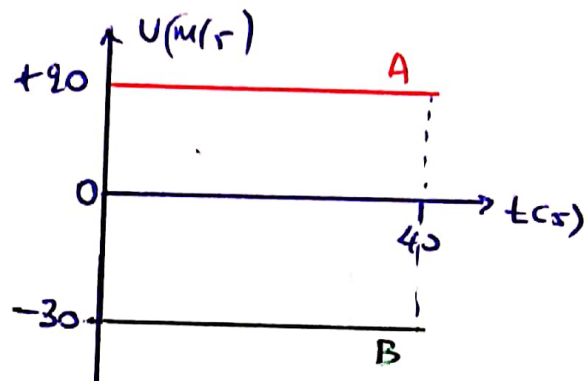
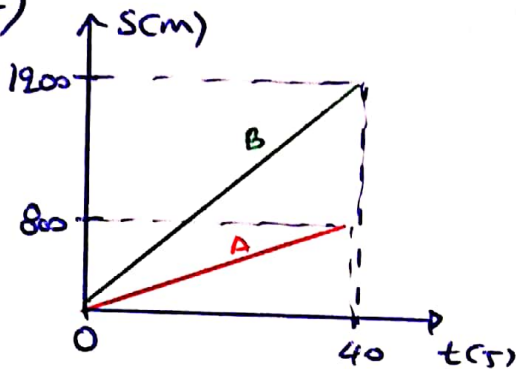


t_1

Δ1) Οταν συναντηθούν: $s_1 + s_2 = d \Rightarrow |U_1| \Delta t + |U_2| \Delta t = d \Rightarrow$
 $|U_1| (t_1 - 0) + |U_2| (t_1 - 0) = d \Rightarrow 20t_1 + 30t_1 = 2000 \Rightarrow 50t_1 = 2000$
 $\Rightarrow \boxed{t_1 = 40s}$

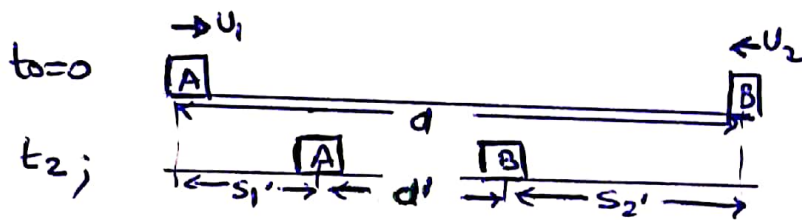
$s_1 = |U_1| \Delta t_1 = 20 \cdot 40 \Rightarrow \boxed{s_1 = 800m}$ και $s_2 = |U_2| \Delta t_1 = 30 \cdot 40 \Rightarrow$
 $\boxed{s_2 = 1200m}$

Δ2)



Δ3)

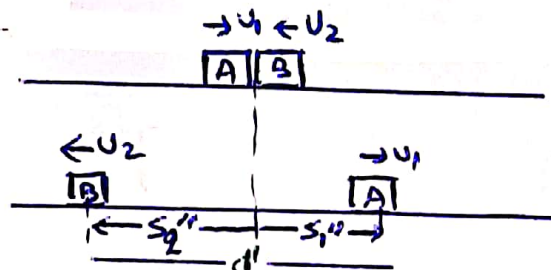
ΓΙΑ ΤΗΝ
2η ΦΑΣΗ



$d = s_1' + d' + s_2' \Rightarrow 2000 = |U_1| \cdot \Delta t + 500 + |U_2| \Delta t \Rightarrow$
 $1500 = 20(t_2 - 0) + 30(t_2 - 0) \Rightarrow 1500 = 50t_2 \Rightarrow \boxed{t_2 = 30s}$

ΕΥΝΑΝΤΗΣΗ
 $t_3 = 40s$

2η ΦΑΣΗ
 $d' = 500m$ t_3



$d' = s_1'' + s_2'' \Rightarrow 500 = |U_1| \cdot \Delta t + |U_2| \Delta t \Rightarrow 500 = 20 \Delta t + 30 \Delta t \Rightarrow$
 $\Rightarrow 500 = 50 \Delta t \Rightarrow \Delta t = 10s$

Οπως $\Delta t = t_3 - t_1 \Rightarrow t_3 = \Delta t + t_1 = 10s + 40s \Rightarrow \boxed{t_3 = 50s}$

$$\Delta 4) \quad X_B = X_{0B} + v_{2B} t \Rightarrow \boxed{X_B = 2000 - 30 t \text{ (S.I.)}}$$

$$\Gamma \vee t_i = 0: \quad X_B = 2000 \text{ m}$$

$$\Gamma \vee t = t_3 = 50 \text{ s}: \quad X_B = 2000 - 30 \cdot 50 \Rightarrow X_B = 500 \text{ m}$$

