

**Concursul Național de Matematică și Fizică
Vrânceanu – Procopiu
Bacău, 26 noiembrie, 2016**

Clasa a IX-a

PROBLEMA 1

Barem de notare	Parțial	Punctaj
Problema 1		10
a)	3,00	
- mașina poliției; $0 \leq t \leq \tau_0; \quad 0 \leq t \leq 3s;$ $a_1 = 0; \quad v_1 = 0;$ $\tau_0 \leq t \leq \tau_0 + \tau_1; \quad 3s \leq t \leq 23s;$ $a_1 = 2,78\text{m/s}^2;$ $v_1 = a_1(t - \tau_0);$ $0 \leq v_1 \leq v_{1,\max}; \quad 0 \leq v_1 \leq 55,56\text{m/s};$ $t \geq \tau_0 + \tau_1; \quad t \geq 23s;$ $a_1 = 0; \quad v_1 = v_{1,\max} = 55,56\text{m/s};$ - mașina infractorului; $0 \leq t \leq \tau_0 + \tau_2; \quad 0 \leq t \leq 8s;$ $a_2 = 0; \quad v_2 = v_0 = 33,33\text{m/s};$ $\tau_0 + \tau_2 \leq t \leq \tau_0 + \tau_2 + \tau; \quad 8s \leq t \leq 18s;$ $a_2 = 0,83\text{m/s}^2;$ $v_2 = v_0 + a_2[t - (\tau_0 + \tau_2)];$ $33,33\text{m/s} \leq v_2 \leq 41,67\text{m/s};$ $t \geq \tau_0 + \tau_2 + \tau; \quad t \geq 18s;$ $a_2 = 0; \quad v_2 = v_{2,\max} = 41,67\text{m/s}.$		
b)	1,00	
Fig. 1		
c)	3,00	
- mașina poliției; $0 \leq t \leq \tau_0; \quad 0 \leq t \leq 3s;$ $x_1 = 0;$ $\tau_0 \leq t \leq \tau_0 + \tau_1; \quad 3s \leq t \leq 23s;$ $x_1 = \frac{1}{2}a_1(t - \tau_0)^2;$ $0 \leq x_1 \leq x_{1,\max}; \quad 0 \leq x_1 \leq \frac{5000}{9}\text{m} = 555,56\text{m};$ $t \geq \tau_0 + \tau_1; \quad t \geq 23s;$		

$X_1 = x_{1,\max} + v_{1,\max} [t - (\tau_0 + \tau_1)];$ - mașina infractorului; $0 \leq t \leq \tau_0 + \tau_2; \quad 0 \leq t \leq 8s;$ $x_2 = v_0 t;$ $0 \leq x_2 \leq x_{2,\max}; \quad 0 \leq x_2 \leq \frac{800}{3} \text{ m};$ $\tau_0 + \tau_2 \leq t \leq \tau_0 + \tau_2 + \tau; \quad 8s \leq t \leq 18s;$ $X_2 = x_{2,\max} + v_0 [t - (\tau_0 + \tau_2)] + \frac{1}{2} a_2 [t - (\tau_0 + \tau_2)]^2;$ $x_{2,\max} \leq X_2 \leq X_{2,\max}; \quad \frac{800}{3} \text{ m} \leq X_2 \leq \frac{1925}{3} \text{ m};$ $t \geq \tau_0 + \tau_2 + \tau; \quad t \geq 18s;$ $X_2' = X_{2,\max} + v_{2,\max} [t - (\tau_0 + \tau_2 + \tau)];$		
d)	1,00	
Fig. 2		
e)	1,00	
$t = \frac{X_{2,\max} - x_{1,\max} + v_{1,\max} (\tau_0 + \tau_1) - v_{2,\max} (\tau_0 + \tau_2 + \tau)}{v_{1,\max} - v_{2,\max}};$ $t = 44,2 \text{ s}; \quad X_1 = X_2' = \frac{5200}{3} \text{ m} = 1733,3 \text{ m}.$		
Oficiu		1,00

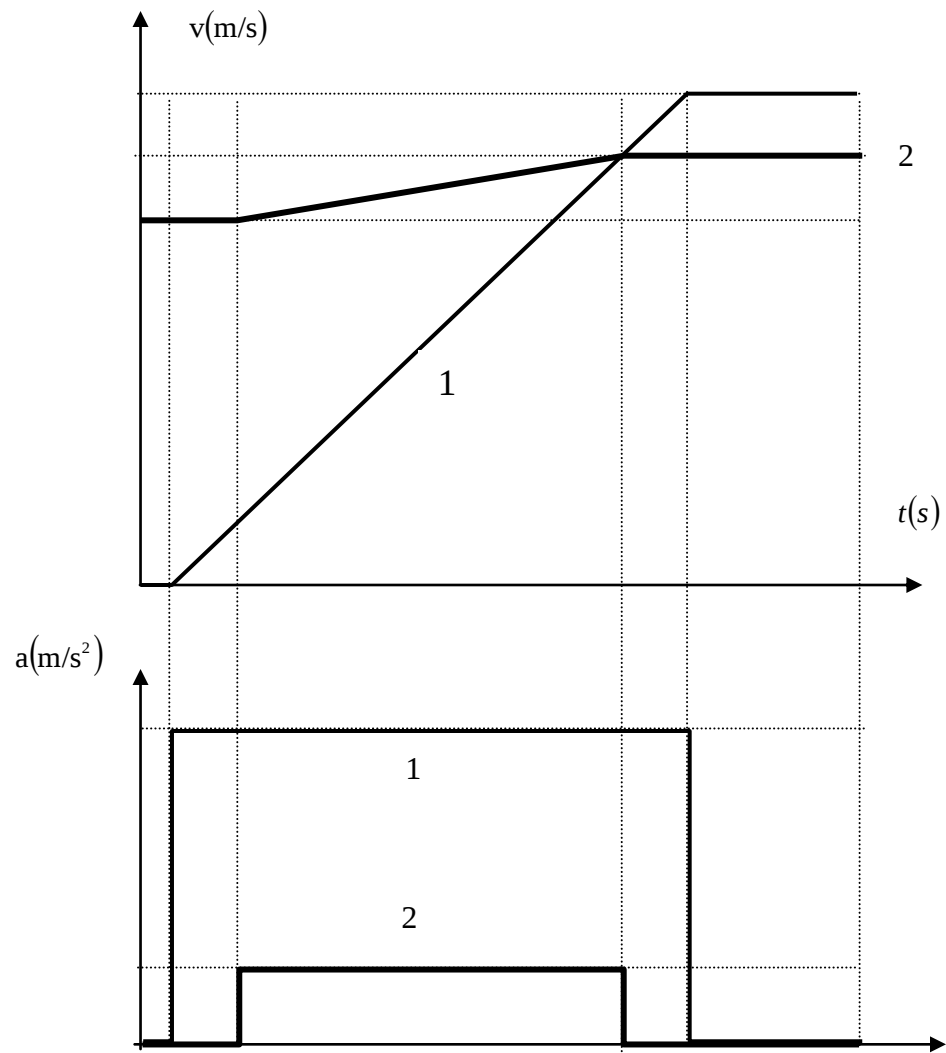


Fig. 1

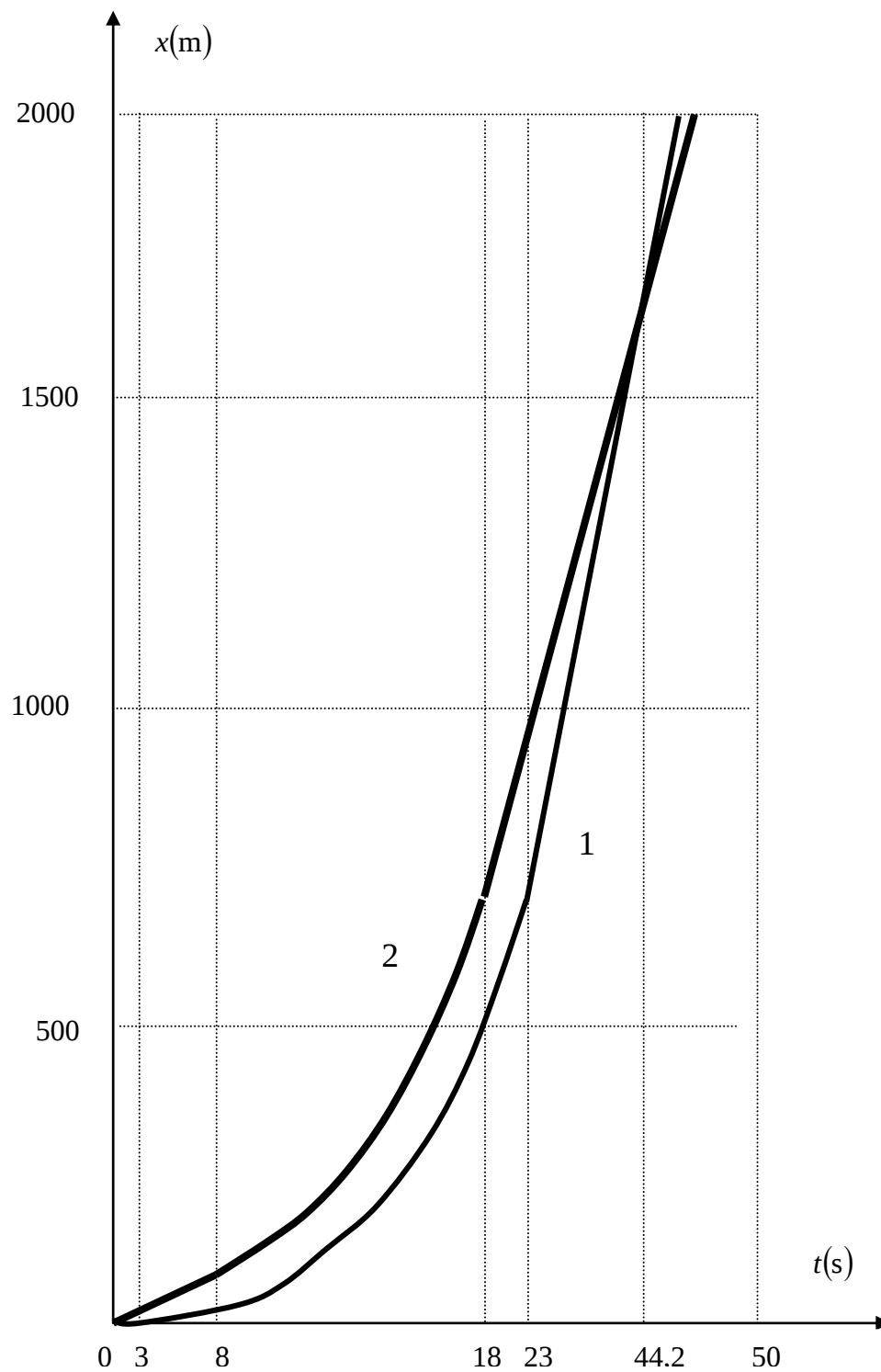


Fig. 2