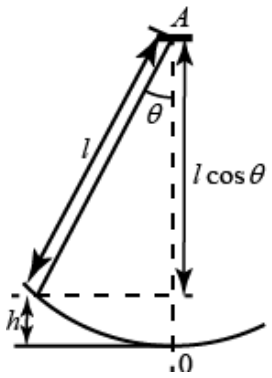
Problema 8.1

a)	$T=\frac{t}{N};\quad T=2\pi\sqrt{\frac{l}{g}};\quad l=l_1+l_2;$ **(1.0 p.)** $\frac{t}{N}=2\pi\sqrt{\frac{l_1+l_2}{g}}$ (1) **(0.5 p.)** $\frac{t}{N_1}=2\pi\sqrt{\frac{l_1}{g}}\Rightarrow l_1=\frac{t^2g}{4\pi^2N_1^2}$ (2) **(0.5 p.)** $\frac{t}{N_2}=2\pi\sqrt{\frac{l_2}{g}}\Rightarrow l_2=\frac{t^2g}{4\pi^2N_2^2}$ (3) **(0.5 p.)** Introducem (2) și (3) în (1) $\frac{t}{N}=2\pi\sqrt{\frac{t^2}{4\pi^2}\left(\frac{1}{N_1^2}+\frac{1}{N_2^2}\right)}\Rightarrow\frac{1}{N}=\sqrt{\frac{N_1^2+N_2^2}{N_1^2N_2^2}}$ **(1.0 p.)** $\Rightarrow\quad N=\sqrt{\frac{N_1^2N_2^2}{N_1^2+N_2^2}}=\sqrt{\frac{1600\cdot900}{1600+900}}=\sqrt{576}=24$ **(0.5 p.)**	**4.0 p.**
b)	$\Delta l=l_2-l_1=0,78$ m **(0.5 p.)** Pentru ideea de a lua raportul relatiilor (2) si (3): **(0.5 p.)** $\Rightarrow$ $\Rightarrow\quad\frac{l_2}{l_1}=\frac{N_1^2}{N_2^2}=\frac{1600}{900}\approx1,78\Rightarrow l_2=1,78l_1$ **(1.0 p.)** $\Delta l=1,78l_1-l_1=0,78l_1\Rightarrow l_1=\frac{\Delta l}{0,78}=1$ m **(0.5 p.)** $l_2=1,78l_1=1,78$ m **(0.5 p.)**	**3.0 p.**
c)	$l=l_1+l_2=2,78$ m, $E_p=E_c\quad mgh=\frac{mv^2}{2}$ **(1.0 p.)** Pentru reprezentarea schematică **(0.5 p.)** Din figură $h=l\left(1-\cos\theta\right)$ **(0.5 p.)** $gl\left(1-\cos\theta\right)=\frac{v^2}{2}$ **(0.5 p.)** $v=\sqrt{2gl\left(1-\cos\theta\right)}=\sqrt{2\cdot10\cdot2,78\left(1-0,5\right)}\approx$ $\approx5,27\ \frac{\text{m}}{\text{s}}$ **(0.5 p.)** 	**3.0 p.**
	Total max	**10.0 p.**