

P4B

$$\text{a) } E_{\text{potencial}; \max} = \frac{1}{2} k x_{\max}^2 = \frac{1}{2} \cdot 125 \cdot 0,12^2 = 0,90 \text{ J} \quad [0,3]$$

$$E_{\text{potencial}; \max} = E_{\text{cinetica}; \max} = 0,90 \text{ J} \quad [0,3]$$

$$E_{\text{cinetica}; \max} = \frac{1}{2} m v_{\max}^2 \Rightarrow v_{\max} = \sqrt{\frac{2 E_{\text{cinetica}; \max}}{m}} = \sqrt{\frac{2 \cdot 0,90}{0,2}} = 3,0 \frac{\text{m}}{\text{s}} \quad [0,4]$$

$$\text{b) } \omega = \sqrt{\frac{k}{m}} = 25,0 \frac{\text{rad}}{\text{s}} \quad [0,1]$$

$$\omega = 2\pi f \Rightarrow f = 3,98 \text{ Hz} \quad [0,1]; \quad T = \frac{1}{f} = 0,251 \text{ s} \quad [0,1]$$

$$x = A \sin(\omega t + \varphi) \quad [0,1]$$

$$\text{condicions inicials: } 0,12 = 0,12 \cdot \sin(\omega \cdot 0 + \varphi) \Rightarrow \sin \varphi = 1 \Rightarrow \varphi = \frac{\pi}{2} \text{ rad} \quad [0,2]$$

$$\text{Equació del moviment: } x = 0,12 \cdot \sin\left(25t + \frac{\pi}{2}\right) \quad (t \text{ en segons i } x \text{ en metres}) \quad [0,4] \text{ [si no posen}$$

unitats 0,3]

$$\text{Alternativament: } x = A \cos(\omega t + \varphi) \Rightarrow x = 0,12 \cdot \cos(25t)$$

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