15)

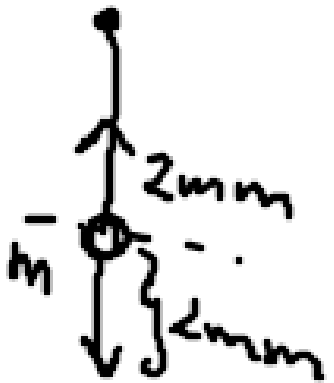
$m = 50\,g = 0'05\,kg$ $\quad A = 2\,mm = 0'002\,m$

$f = 25\,Hz$

$K = m\omega^2$

$T = 2\pi\sqrt{\frac{m}{K}}$

$f = \frac{1}{2\pi}\sqrt{\frac{K}{m}}$



$F = Kx$

$\omega = 2\pi \cdot f = 2\pi \cdot 25 = 50\pi \frac{rad}{s}$

$K = 0'05 \cdot (50\pi)^2 = 1233\,N/m$

$F = 1233 \cdot 0'002 = 2'47\,N$

19) $L = 30\,cm = 0'3\,m$ $\quad T\ ?\longrightarrow K\ ?$

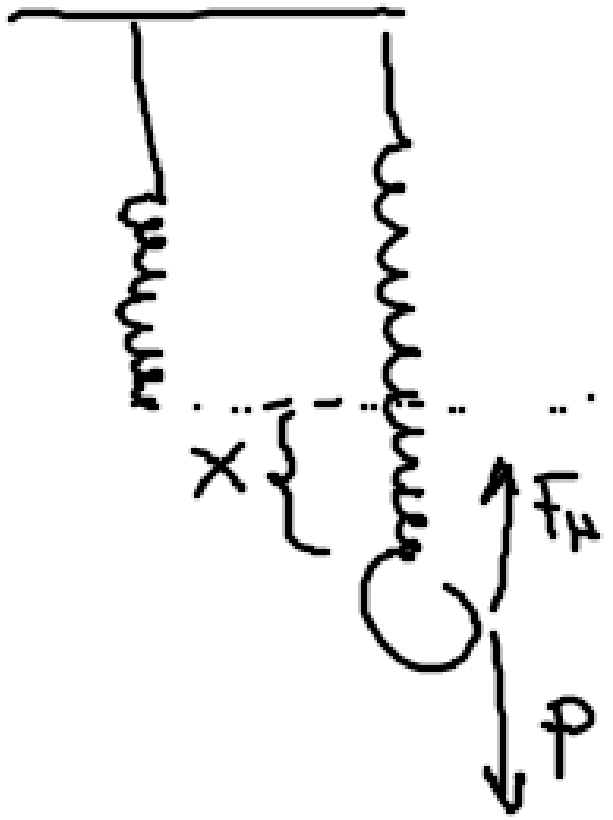
$m = 250\,g = 0'25\,kg$ $\quad L\ ?$

6 s en 10 oscilaciones.

$\frac{10}{6} = 1'6\ Hz \rightarrow f = 1'6\ Hz$

$w = 2\pi \cdot 1'6 = 3'2\pi\ rad/s$

$K = m \cdot w^2 = 0'25 \cdot (3'2\pi)^2 = 25\ N/m$

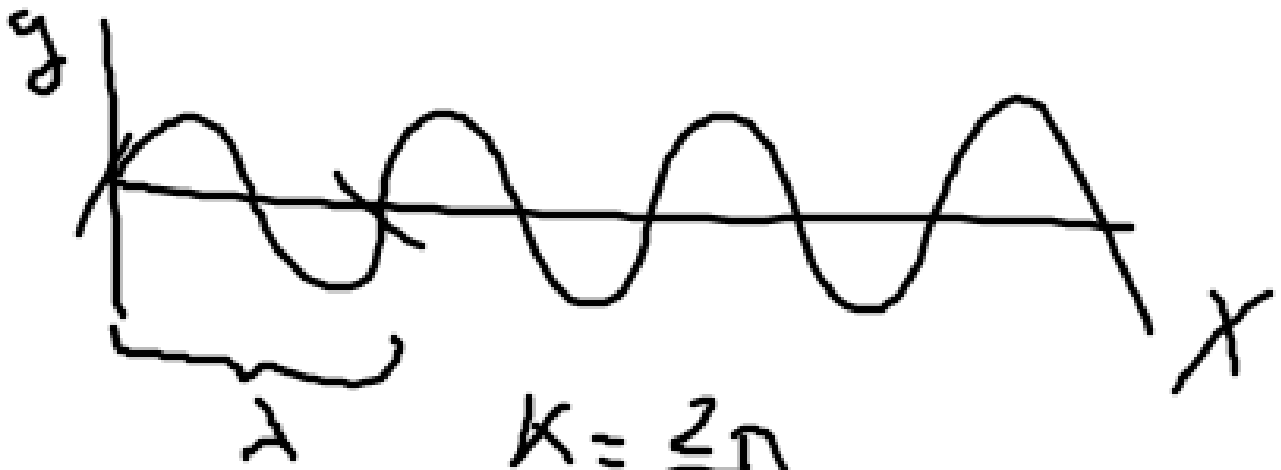


$$F_H = P$$

$$k \cdot x = m \cdot g$$

$$x = \frac{m \cdot g}{k}$$

$$x = \frac{0'25 \cdot 10}{25} = 0'1\,m$$



$$k = \frac{2\pi}{\lambda}$$

$$y = A \cdot \operatorname{sen}(\omega t - kx + \varphi_0)$$

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3) $y = 0'4 \cos(\underbrace{100t}_{\omega} - \underbrace{0'5x}_{k})$

a) λ, v $\qquad$ f $\qquad$ T

$k = \frac{2\pi}{\lambda} \rightarrow \lambda = \frac{2\pi}{k} = \frac{2\pi}{0'5} = 4\pi\ m$

$v = \frac{\lambda}{T} = \lambda f = 4\pi \cdot \frac{50}{\pi} = 200\ m/s$

$\omega = 2\pi \cdot f \Rightarrow f = \frac{\omega}{2\pi} = \frac{100}{2\pi} = \frac{50}{\pi}\ Hz$

c) $x = 20\,cm$, $t = 0'5\,s$

$\downarrow$

$x = 0'2\,m$

$$y = A \cdot \cos(\omega t + kx + \varphi_0)$$

$$V = -A \cdot \omega \operatorname{sen}(\omega t - kx + \varphi_0)$$

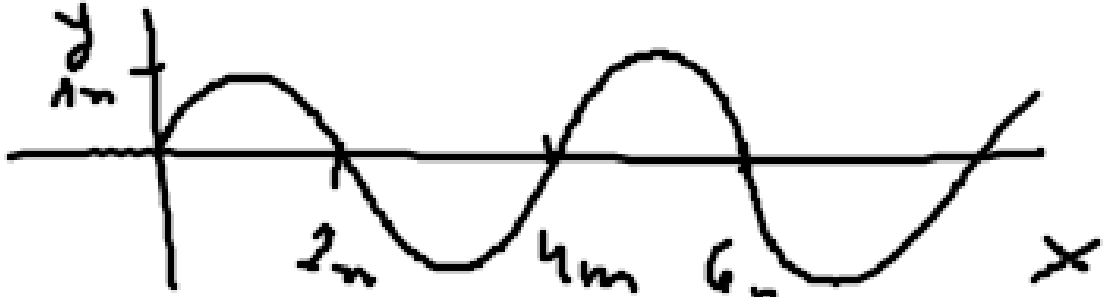
$$V = -0'4 \cdot 100 \cdot \operatorname{sen}(100t - 0'5x)$$

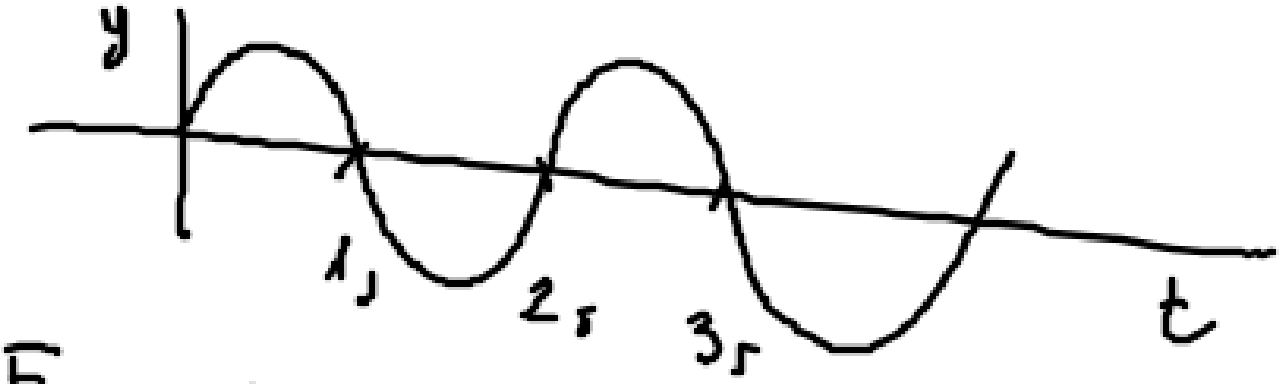
$$V = -40 \cdot \operatorname{sen}(100t - 0'5x)$$

$$V = -40 \cdot \operatorname{sen}(100 \cdot 0'5 - 0'5 \cdot 0'2)$$

$$V = -14'2\ m/s$$

		máx
y	$A \cdot \operatorname{sen}(\omega t - kx + \varphi_0)$	A
v	$A\omega \cdot \cos(\omega t - kx + \varphi_0)$	$A \cdot \omega$
a	$-A \cdot \omega^2 \cdot \operatorname{sen}(\omega t - kx + \varphi_0)$	$-A \cdot \omega^2$





$$v = \frac{\lambda}{T} = \frac{4}{2}$$

$$= 2\ m/s$$

Función de ondas $y = A \cdot \text{sen}(\omega t - kx + \varphi_0)$

$\lambda = 4 \rightarrow k = \frac{2\pi}{4} = 0'5\pi\ \text{rad/m}$

$\omega = \frac{2\pi}{T} = \frac{2\pi}{2} = \pi\ \text{rad/s}$

$A = 1m \quad \varphi_0 = 0$

$$y = 1 \cdot \text{sen}(\pi t - 0'5\pi x)$$

1) $y = 0'02 \cdot \operatorname{sen}(150 \cdot t + 120x)$

ω $\quad$ k

a) T, f, λ $\quad$ f $\quad$ λ

$$\omega = \frac{2\pi}{T} \rightarrow T = \frac{2\pi}{\omega} = \frac{2\pi}{150} = 0'042\,s$$

$$f = \frac{1}{T} = \frac{1}{0'042} = 23'8\,Hz$$

$$k = \frac{2\pi}{\lambda} \rightarrow \lambda = \frac{2\pi}{k} = \frac{2\pi}{120} = 0'052\,m$$

3] $y = 4 \cdot \sec\left(\frac{1}{}\right.$