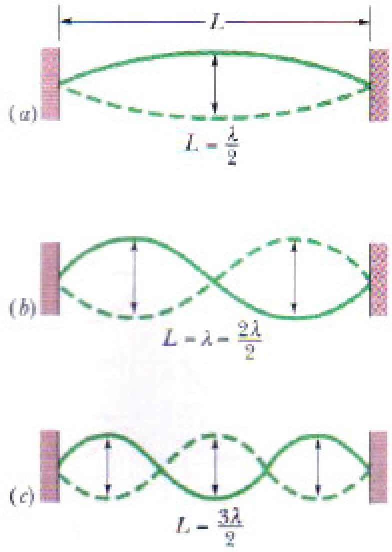
OSCILAÇÕES E ONDAS 2018/2 –EQUAÇÕES CAP 16

16.1	$D = \frac{v\Delta t}{2}.$
16.2	$y(x,t) = y_m \text{ sen } (kx - \omega t).$
16.3	$y(x,0) = y_m \text{ sen } kx.$
16.5	$k = \frac{2\pi}{\lambda}$ (número de onda).
16.8	$\omega = \frac{2\pi}{T}$ (freqüência angular).
16.9	$f = \frac{1}{T} = \frac{\omega}{2\pi}$ (freqüência).
16.10	$y = y_m \text{ sen } (kx - \omega t + \phi).$
16.11	$kx - \omega t = \text{constante}.$
16.12	$\frac{dx}{dt} = v = \frac{\omega}{k}.$
16.13	$v = \frac{\omega}{k} = \frac{\lambda}{T} = \lambda f$ (velocidade da onda).
16.14	$kx + \omega t = \text{constante},$
16.15	$y(x,t) = y_m \text{ sen } (kx + \omega t).$
16.16	$\frac{dx}{dt} = -\frac{\omega}{k}.$
16.17	$y(x,t) = h(kx \pm \omega t),$
16.19	$y = y_m \text{ sen } (kx - \omega t),$ (16-19)
16.20	$y(x,t) = y_m \text{ sen } (kx - \omega t).$ (16-20)
16.21	$u = \frac{\partial y}{\partial t} = -\omega y_m \cos(kx - \omega t).$
16.22	$v = C\sqrt{\frac{\tau}{\mu}},$
16.23	$F = 2(\tau \text{ sen } \theta) \approx \tau(2\theta) = \tau \frac{\Delta l}{R}$ (força),
16.24	$\Delta m = \mu \Delta l$ (massa),
16.25	$a = \frac{v^2}{R}$ (aceleração).
16.26	$v = \sqrt{\frac{\tau}{\mu}}$ (velocidade),
16.27	$dK = \frac{1}{2}\, dm\, u^2,$

16.28	$u = \frac{\partial y}{\partial t} = -\omega y_m \cos(kx - \omega t)$.
16.29	$dK = \frac{1}{2}(\mu\, dx)(-\omega y_m)^2 \cos^2(kx - \omega t)$.
16.30	$\frac{dK}{dt} = \frac{1}{2}\mu v \omega^2 y_m^2 \cos^2(kx - \omega t)$.
16.31	$\left(\frac{dK}{dt}\right)_{méd} = \frac{1}{2}\mu v \omega^2 y_m^2 [\cos^2(kx - \omega t)]_{méd} = \frac{1}{4}\mu v \omega^2 y_m^2$.
16.32	$P_{méd} = 2\left(\frac{dK}{dt}\right)_{méd}$
16.33	$P_{méd} = \frac{1}{2}\mu v \omega^2 y_m^2$ (potência média).
16.34	$F_{2y} - F_{1y} = dm\, a_y$.
16.35	$dm = \mu\, dx$.
16.36	$a_y = \frac{d^2 y}{dt^2}$.
16.37	$\frac{F_{2y}}{F_{2x}} = S_2$.
16.38	$\tau = \sqrt{F_{2x}^2 + F_{2y}^2}$.
16.45	$\frac{\partial^2 y}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2 y}{\partial t^2}$ (equação de onda).
16.46	$y'(x,t) = y_1(x,t) + y_2(x,t)$.
16.47	$y_1(x,t) = y_m \operatorname{sen}(kx - \omega t)$ E $y_2(x,t) = y_m \operatorname{sen}(kx - \omega t + \phi)$. **interferência**.
16.50	$\operatorname{sen}\alpha + \operatorname{sen}\beta = 2\operatorname{sen}\frac{1}{2}(\alpha + \beta)\cos\frac{1}{2}(\alpha - \beta)$.
16.51	$y'(x,t) = [2y_m \cos\frac{1}{2}\phi]\operatorname{sen}(kx - \omega t + \frac{1}{2}\phi)$.
16.52	$y'_m = \lvert 2y_m \cos\frac{1}{2}\phi \rvert$ (amplitude).
16.53	$y'(x,t) = 2y_m \operatorname{sen}(kx - \omega t)$ $(\phi = 0)$.
16.54	$y'(x,t) = 0$ $(\phi = \pi \text{ rad})$.
16.60	$y'(x,t) = [2y_m \operatorname{sen} kx]\cos\omega t$,
16.61	$kx = n\pi$, para $n = 0, 1, 2, \ldots$.
16.62	$x = n\frac{\lambda}{2}$ para $n = 0, 1, 2, \ldots$ (nós),

16.63	$kx = \frac{1}{2}\pi, \frac{3}{2}\pi, \frac{5}{2}\pi, \ldots$ $= (n + \frac{1}{2})\pi, \quad \text{para } n = 0, 1, 2, \ldots.$
16.64	$x = \left(n + \frac{1}{2}\right)\frac{\lambda}{2}, \quad \text{para } n = 0, 1, 2, \ldots$ (antinós).
16.65	$\lambda = \frac{2L}{n}, \quad \text{para } n = 1, 2, 3, \ldots.$
16.66	$f = \frac{v}{\lambda} = n\frac{v}{2L}, \quad \text{para } n = 1, 2, 3, \ldots.$
16.68	$\lambda = \frac{L}{2}.$
16.69	$u(x,t) = \frac{\partial y}{\partial t} = \frac{\partial}{\partial t}[(2y_m \text{ sen } kx)\cos\omega t] = [-2y_m\omega \text{ sen } kx] \text{ sen } \omega t.$
Ondas estacionárias	 As ondas estacionárias se formam apenas para certas freqüências de oscilação. *(Richard Megna/Fundamental Photographs)*