FEDERICO CESARI

$\boxed{3}$

Hp

$d = 2.52\,cm$
$m = 873\,kg$
$\ell = 42.6\,m$

$\nu = 0.3$
$Y = 200 \cdot 10^9\,N/m^2$

$$\sigma = \frac{F}{A} = Y\varepsilon \Rightarrow \varepsilon = \frac{F}{AY}$$

$$\varepsilon = \frac{\Delta\ell}{\ell} = \frac{F}{AY} \Rightarrow \Delta\ell = \frac{F\ell}{AY}$$

$$\Rightarrow \Delta\ell = \frac{F \cdot \ell}{\pi \frac{d^2}{4} Y} = \frac{4F\ell}{\pi d^2 Y} = 0.36\,m$$

b) $$\frac{\Delta r}{r} = -\nu \frac{\Delta\ell}{\ell} = 0.26\,\%$$

Th

a) $\Delta\ell$

b) $\frac{\Delta r}{r}$

$\boxed{5}$

Hp

$d = 15\,mm$
$F = 3.5 \cdot 10^3\,N$

$\ell_0 = 120\,mm$
$\Delta\ell = -11\,mm$
$\Delta r = -0.62\,mm$

a) $$E = \frac{\sigma}{\varepsilon} = \sigma \frac{\ell_0}{\Delta\ell} = \frac{F}{\pi \frac{d^2}{4}} \cdot \frac{\ell}{\Delta\ell} = 2.2 \cdot 10^8 \frac{N}{m^2}$$

c) $$\nu = -\frac{\Delta r}{r} \frac{\ell}{\Delta\ell} = 0.45$$

d) $$G = \frac{E}{2(1+\nu)} = 7.45 \cdot 10^7 \frac{N}{m}$$

Th

a) $E = \frac{\sigma}{\varepsilon} = \kappa \frac{\ell_0}{A}$

b) $G = \frac{E}{2(1+\nu)}$

c) ν

$\boxed{9}$

Hp

$A = 0.16\,m$
$\lambda = 2.1\,m$
$T = 1.8\,s$

$y(0,0) = 0.16\,m$

$$y = A\cos(kx - \omega t)$$

con
- $k = \frac{2\pi}{\lambda} = 2.99\,m^{-1}$
- $\omega = \frac{2\pi}{T} = 3.49\,s^{-1}$

$$\Rightarrow y = [0.16\,m] \cos[(2.99\,m^{-1})x - (3.49\,s^{-1})t]$$

$\boxed{11}$

Hp

$f = 25$ Hz

$\lambda = 0.24$ m

$A = 0.30$ m

Th

1) v

2) $y(x,t)$

1) $v = \lambda f = 6 \frac{m}{s}$

2) $y(x,t) = A \sin(kx - \omega t)$

con
- $k = 2\pi/\lambda = 26.2 \ m^{-1}$
- $\omega = 2\pi f = 157 \ s^{-1}$

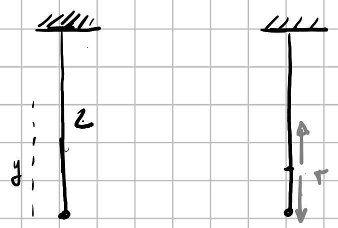
$\Rightarrow y(x,t) = (0.30 m) \sin\left[(26.2 m^{-1}) x - (157 s^{-1}) t\right]$

$\boxed{13}$

Hp

M

L



$\mu = \frac{M}{y}$

$T = Mg$

Th

1) Si dimostri che v dipende da y

2) che $t = 2\sqrt{L/g}$ @ onda percorre tutta fune

1) $v = \sqrt{\frac{T}{\mu}} = \sqrt{\frac{Mg}{M/y}} = \sqrt{gy}$

2) $\frac{dy}{dt} = \sqrt{gy} \Rightarrow \int_0^L \frac{dy}{\sqrt{gy}} = \int_0^t dt$

$\Rightarrow \frac{2}{g}\sqrt{gy}\Big|_0^L = t \longrightarrow t = \frac{2}{g}\sqrt{gL} = \sqrt{\frac{4}{g^2} gL} = \sqrt{4L/g} = 2\sqrt{\frac{L}{g}}$

Nessuno dei due risultati dipende da M