GABARITO LISTA 2

1º) $E_M = \frac{1}{2}K.R^2 \Rightarrow E_M = \frac{1}{2}(130).(0,024)^2 = \boxed{3,744 \times 10^{-2} J}$

$K = 1,3 N/cm = 130 N/m$; $R = 2,4 cm = 0,024 m$

2º) $m = 0,500 kg$; $K = 20,0 N/m$

a) $R = 3 cm = 0,03 m$; $E_M = \frac{1}{2}(20).(0,03)^2 = \boxed{9 \times 10^{-3} J}$

b) $|v| = \omega . \sqrt{R^2 - x^2} \Rightarrow |v| = \sqrt{\frac{K}{m}} . \sqrt{R^2 - x^2} \Rightarrow \sqrt{\frac{20}{0,5}} . \sqrt{[(0,03)^2 - (0,02)^2]} = \boxed{0,141 m/s}$

$x = 2 cm = 0,02 m$

c) $E_M = K + U \Rightarrow K = E_M - U \Rightarrow K = 9 \times 10^{-3} - \frac{1}{2}Kx^2 \Rightarrow K = 9 \times 10^{-3} - \frac{1}{2}(20).(0,02)^2$

$\boxed{K = 5 \times 10^{-3} J}$; $\boxed{U = 4 \times 10^{-3} J}$

3º) $200 g = 0,2 kg$, $T = 0,250 s$, $E_M = 2,0 J$

a) $\omega^2 = \frac{K}{m} \Rightarrow K = \omega^2 . m$; mas $\omega = \frac{2\pi}{T}$; $\omega = \frac{2\pi}{0,25} = 25,132 rad/s$; $K = (25,132)^2 . 0,2$

$\boxed{K = 126,33 N/m}$

b) $E_M = \frac{1}{2}KR^2 \Rightarrow 2 = \frac{1}{2}.(126,33).R^2 \Rightarrow R = \sqrt{\frac{4}{(126,33)}} = \boxed{0,1779 m}$

4º) $m = 1,2 T = 1200 kg$; $K = 4,4 \times 10^6 N/m$, $x = 5,46 cm = 0,0546 m$

$E_A + \cancel{K}^0 = U_B + \cancel{K_B}^0 \Rightarrow K_A = U_B \Rightarrow \frac{1}{2}mv^2 = \frac{1}{2}Kx^2 \Rightarrow v^2 = \frac{K}{m}.x^2 \Rightarrow v = x . \sqrt{\frac{K}{m}}$

$v = 0,0546 . \sqrt{\frac{4,4 \times 10^6}{1200}} = \boxed{3,30 m/s}$

5º) $R = 4,35 cm$; $K = 180 N/m$ $m = 0,450 kg$

a) $E_M = \frac{1}{2}KR^2 \Rightarrow E_M = \frac{1}{2}180.(0,0435)^2 = \boxed{0,170 J}$, b) $v = \omega . R \Rightarrow v = \sqrt{\frac{180}{0,450}} . (0,0435)$ (20)

$\boxed{v = 0,87 m/s}$

c) $a_{max} = R . \omega^2 = (0,0435).400$

$\boxed{a_m = 17,4 m/s^2}$

6º) $K = 5800 N/m$; $M = 6,8 kg$; $m_1 = 8,0 g$; $v_B = 720 m/s$,

a) CONSERVAÇÃO DO MOMENTO

$m_B . v_{Bi} + M\cancel{v_i}^0 = m_B . v + Mv = 0 \Rightarrow v = \frac{m_B . v_{Bi}}{m_B + M} = \frac{(8 \times 10^{-3}) . 720}{6,808} = \boxed{0,846 m/s}$

b) $v = \omega . R \Rightarrow R = \frac{v}{\omega}$; $\omega = \sqrt{\frac{K}{m_T}} \Rightarrow \omega = \sqrt{\frac{5800}{6,808}} = 29,18 rad/s$

$R = \frac{0,846}{29,18} = \boxed{0,0289 m}$

7º) $R = 5 cm = 0,05 m$, TEMOS: $E_M = K + U$; $\frac{1}{2}KR^2 = \frac{1}{2}mv^2 + \frac{1}{2}Kx^2$;

$Kx^2 = K.R^2 - mv^2 \Rightarrow \div m \Rightarrow \frac{K}{m}x^2 = \frac{K}{m}R^2 - v^2$; COMO, $\omega^2 = \frac{K}{m}$ TEMOS $\Rightarrow$

$\Rightarrow \omega^2 . x^2 = \omega^2 R^2 - v^2 \Rightarrow$

$\omega^2 x^2 = \omega^2 R^2 - v^2$, EM $v_{MAX} = \omega . R$ PORÉM $v = \frac{v_{MAX}}{2}$; $\Rightarrow v = \frac{\omega . R}{2}$, ASSIM

$\omega^2 . x^2 = \omega^2 . R^2 - \frac{\omega^2 . R^2}{4} \Rightarrow x^2 = R^2 - \frac{R^2}{4}$; $x = \sqrt{\frac{4R^2 - R^2}{4}} = x = \sqrt{\frac{3R^2}{4}} \Rightarrow$

$x = \frac{R}{2} . \sqrt{3} \Rightarrow x = \frac{0,05}{2} . \sqrt{3} = \boxed{0,0433 m}$