Pg 419: 22a), 23, 24

22a) $T_s = 2\pi\sqrt{\frac{m}{k}} \rightarrow k = \left(\frac{T_s}{2\pi}\right)^2 / m$ or $k = \frac{4\pi^2 m}{T_s^2}$

$k = \left(\frac{.25s}{2\pi}\right)^2 / .200kg = .007916 \rightarrow k = 126 N/m$

23) * need to determine k first

$\vec{F_s} = \vec{F_g} = (m \cdot g) = (.01kg \cdot 10 m/s^2) = .1N$

$\vec{F_s} = -kx \rightarrow k = \frac{\vec{F_s}}{x} = \frac{.1N}{.039} = 2.5 N/m$

$T_s = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{.025kg}{2.5 N/m}} = .63s$

24) * need to determine k first

$k = \frac{\vec{F}}{x} = \frac{mg}{x} = \frac{(320kg \cdot 10 m/s^2)}{(.008m)} = 400{,}000 N/m$

$T_s = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2.0 \times 10^{-3} kg}{400{,}000 N/m}} = .444s$

$T_s = .444s$

$F = \frac{1}{T_s} = \frac{1}{.444s} = 2.2 Hz$