74. (a) The wavelength of the sound wave is

$$\lambda = \frac{v}{f} = \frac{343\,\text{m/s}}{1000\,\text{Hz}} = 0.343\ \text{m}\ .$$

(b) From $\Delta p_m = v^2 \rho k s_m = 2\pi v \rho f s_m$ we find

$$s_m = \frac{\Delta p_m}{2\pi v \rho f} = \frac{10.0\,\text{Pa}}{(2\pi)(343\,\text{m/s})(1.21\,\text{kg/m}^3)(1000\,\text{Hz})} = 3.83 \times 10^{-6}\ \text{m}\ .$$

(c) The velocity of the particle is the derivative of the sinusoidal wave function with respect to time. Its maximum value is

$$v_\text{m} = 2\pi f s_m = (3.60 \times 10^{-6}\,\text{m})(2\pi)(1000\,\text{Hz}) = 2.41 \times 10^{-2}\ \text{m/s}.$$

(d) From Eq. 18-38, we obtain

$$L = \frac{\lambda}{2} = \frac{0.343\,\text{m}}{2} = 0.172\ \text{m}\ .$$