

6. (a) The angular frequency is

$$\omega = \sqrt{\frac{k}{m}} = \sqrt{\frac{F/x}{m}} = \sqrt{\frac{8.0 \text{ N}}{(2.0 \times 10^{-3} \text{ m})(0.50 \text{ kg})}} = 89 \text{ rad/s} .$$

- (b) The period is  $1/f$  and  $f = \omega/2\pi$ . Therefore,

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{89 \text{ rad/s}} = 7.0 \times 10^{-2} \text{ s} .$$

- (c) From  $\omega = (LC)^{-1/2}$ , we obtain

$$C = \frac{1}{\omega^2 L} = \frac{1}{(89 \text{ rad/s})^2 (5.0 \text{ H})} = 2.5 \times 10^{-5} \text{ F} .$$