92. (a) Eq. 16-21 leads to

$$E = \frac{1}{2}kx_m^2 \implies x_m = \sqrt{\frac{2E}{k}} = \sqrt{\frac{2(4.0)}{200}} = 0.020 \text{ m} .$$

(b) Since $T = 2\pi\sqrt{m/k} = 2\pi\sqrt{0.80/200} \approx 0.4$ s, then the block completes $10/0.4 = 25$ cycles during the specified interval.

(c) The maximum kinetic energy is the total energy, 4.0 J.

(d) This can be approached more than one way; we choose to use energy conservation:

$$E = K + U \implies 4.0 = \frac{1}{2}mv^2 + \frac{1}{2}kx^2 .$$

Therefore, when $x = 0.15$ m, we find $v = 2.1$ m/s.