32. (a) The energy at the turning point is all potential energy: $E = \frac{1}{2}kx_m^2$ where $E = 1.00$ J and $x_m = 0.100$ m. Thus,

$$k = \frac{2E}{x_m^2} = 200 \text{ N/m} .$$

(b) The energy as the block passes through the equilibrium position (with speed $v_m = 1.20$ m/s)is purely kinetic:

$$E = \frac{1}{2}mv_m^2 \implies m = \frac{2E}{v_m^2} = 1.39 \text{ kg} .$$

(c) Eq. 16-12 (divided by 2π) yields

$$f = \frac{1}{2\pi}\sqrt{\frac{k}{m}} = 1.91 \text{ Hz} .$$