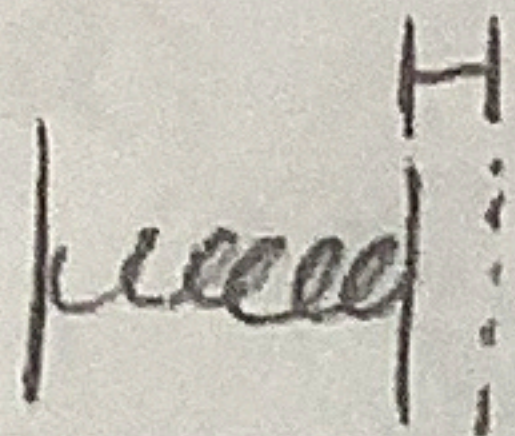


SW9

Karlle  
Pirrat

compressed 1.1cm



$$0 = \Delta E_{\text{int}} + \Delta KE + \Delta U_G + \Delta U_{\text{elastic}}$$

$$0 = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2 + mg(h_f - h_o) + \frac{1}{2} k (\Delta x_f)^2 - \frac{1}{2} k (\Delta x_o)^2$$

$$0 = \frac{1}{2} m v_f^2 - \frac{1}{2} k (\Delta x_i)^2 \quad \leftarrow \text{from compression to edge of table}$$

how far  
marble went

$$2.20 \text{ m} - 0.27 \text{ m} = 1.93 \text{ m}$$

$$k = \frac{m v_f^2}{(\Delta x_i)^2} = \frac{14(0.011)^2}{m} = 0.011 \sqrt{\frac{k}{m}}$$

horizontal

$$v_i = v_f = 0.011 \sqrt{\frac{k}{m}}$$

$$\Delta t = ?$$

$$\Delta x = 1.93 \text{ m}$$

$$\Delta x = v \Delta t$$

$$\Delta t = \frac{\Delta x}{v}$$

$$\Delta t = \frac{1.93}{0.011 \sqrt{\frac{k}{m}}}$$

$$\Delta t = 175.45 \sqrt{\frac{k}{m}}$$

vertical

$$\Delta y = x$$

$$v_i = 0$$

$$v_f =$$

$$a = -9.8$$

$$\Delta t = 175.45 \sqrt{\frac{k}{m}}$$

$$v_f = v_i + at$$

$$v_f = -9.8(175.45) \sqrt{\frac{k}{m}}$$

$$v_f = -1719.45 \sqrt{\frac{k}{m}}$$

$$v = \sqrt{(175.45 \sqrt{\frac{k}{m}})^2 + (-1719.45 \sqrt{\frac{k}{m}})^2}$$

$$v = \sqrt{30782.7 \left(\frac{k}{m}\right) + 2956523.95 \left(\frac{k}{m}\right)}$$

$$\Delta y = v \Delta t + \frac{1}{2} a \Delta t^2$$

$$\Delta y = h = \frac{1}{2} (-9.8) (175.45 \sqrt{\frac{k}{m}})^2 = -859.705 \frac{k}{m}$$

$$0 = \Delta E_{\text{int}} + \Delta KE + \Delta U_G + \Delta U_{\text{elastic}}$$

$$0 = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2 + mg \Delta h + \frac{1}{2} k (\Delta x_f)^2 - \frac{1}{2} k (\Delta x_i)^2$$

$$0 = \frac{1}{2} m \sqrt{30782.7 \left(\frac{k}{m}\right) + 2956523.95 \left(\frac{k}{m}\right)} mg \left(\frac{-859.705 k}{m}\right) - \frac{1}{2} k (0.011)^2$$

$$0 = \frac{1}{2} m \left( \frac{30782.7 k}{m} + 2956523.95 \right) - 8597.05 - 0.0000605 k$$

$$0 = \frac{1}{2} m \left( \frac{2987306.63 k}{m} \right) - 8597.05 - 0.0000605 k$$

$$8597.05 = 1493653.315 k \rightarrow k = 0.00576$$

$$\Delta x = 2 \text{ cm}$$

ran out of time