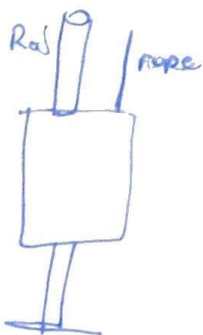


Practice Quiz 4

Problem 1



Your work transfers energy to the system. That energy can go into either kinetic, potential or thermal (energy leak)

work between things 1 & 2

$$W_{12} = \Delta KE_{12} + \Delta U_{12} + \Delta E_{th}$$

Here $\Delta E_{th} = W_{12} - \Delta KE_{12} - \Delta U_{12}$

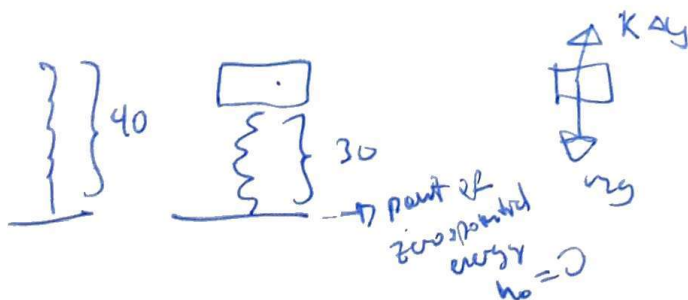
$$\Delta E_{th} = 100 - 50 - 20 = 30 \text{ J}$$

Problem 3

$$\frac{3}{4} n (30)^2 + \frac{1}{4} n (20)^2 + \frac{1}{4} n (20)^2$$

Problem 2

First, get K by doing a free-body diagram



$$K = \frac{mg}{\Delta y} = \frac{8 \times 9.81}{0.1}$$

$$= 784.8 \frac{\text{N}}{\text{m}}$$

Now use conservation of energy.

starts at rest $\Delta KE = 0$ ends at rest (maximum point of parabola) $\Delta KE = 0$ spring no compression at the end

$$\frac{1}{2} m v_0^2 + \frac{1}{2} K \Delta y_0^2 + mgh_0 = \frac{1}{2} m v_1^2 + \frac{1}{2} K \Delta y_1^2 + mgh_1$$

$$\frac{1}{2} K \Delta y_0^2 = mgh_1$$

$$\frac{1}{2} \frac{K \Delta y_0^2}{mg} = \frac{\frac{1}{2} 784.8 (0.1)^2}{8 \times 9.81} = 0.8 \text{ m}$$