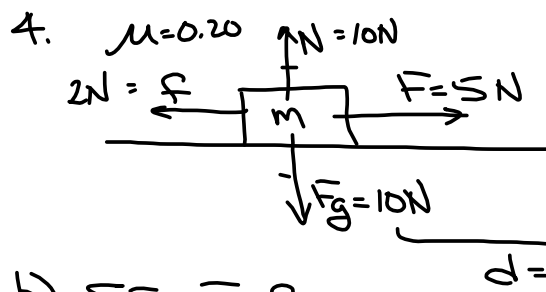


Homework questions?



$$\begin{aligned} a) W &= F_{\parallel} d \\ &= (5\text{N})(4.0\text{m}) \\ &= 20\text{J} \end{aligned}$$

$$m = \frac{F_g}{g} = \frac{10\text{N}}{9.807\frac{\text{m}}{\text{s}^2}} = 1.02\text{kg}$$

$$\begin{aligned} b) \Sigma F &= F - f = ma \\ 5 - 2\text{N} &= (1.02\text{kg})a \\ a &= \underline{2.94\frac{\text{m}}{\text{s}^2}} \end{aligned}$$

$$f = \mu N = (0.20)(10\text{N}) = 2.0\text{N}$$

$$\begin{aligned} c) v_f^2 &= v_i^2 + 2ad \\ &= 2(2.94\frac{\text{m}}{\text{s}^2})(4) \\ &= 23.5 \\ v_f &= \underline{4.9\frac{\text{m}}{\text{s}}} \end{aligned}$$

$$\begin{aligned} d) KE &= \frac{1}{2}mv^2 \\ &= \frac{1}{2}(1.02\text{kg})(4.9\frac{\text{m}}{\text{s}})^2 \\ &= \underline{12\text{J}} \end{aligned}$$

$$e) E_{\text{lost}} = W - KE_f = 20 - 12 = \underline{8\text{J}}$$

8



$$\begin{aligned} PE &= mgh = (2\text{ kg})(9.8\frac{\text{m}}{\text{s}^2})(1.25) = 24.5\text{ J} \\ KE &= \frac{1}{2}mv^2 = \frac{1}{2}(2\text{ kg})(1\frac{\text{m}}{\text{s}})^2 = 1\text{ J} \\ \hline E &= 25.5\text{ J} \end{aligned}$$

$$\begin{aligned} PE &= \ominus \\ KE &= \frac{1}{2}mv^2 = 25.5\text{ J} \end{aligned}$$

$$\begin{aligned} \frac{1}{2}(2)v^2 &= 25.5\text{ J} \\ v &= \underline{\underline{5.05\frac{\text{m}}{\text{s}}}} \end{aligned}$$

Energy removed by friction

From question 4(e) we can see we have lost 8J of energy. Why? Because of friction.

It turns out that the energy (heat) lost due to friction is given by

$$\underline{\underline{W_f = fd}}$$

Homework: #5, 6, 9, 11, 12, 13