Chapter 16

Problem 60

length of string $L = 5.00\,m$

velocity is $v = 30.00\,m/s$

Tension force is $F_T = 10.00\,N$

What is the mass of the string?

we know $v = \sqrt{\frac{F_T}{\mu}} \rightarrow v^2 = \frac{F_T}{\mu}$

$$\mu = \frac{F_T}{v^2} = \frac{10.00\,N}{(30.00\,m/s)^2} = 0.0111\,\frac{kg}{m}$$

Now $\mu = \frac{m}{L}$ so $m = \mu \cdot L$

$$m = \left(0.0111\,\frac{kg}{m}\right)(5.00\,m)$$

$$m = 0.0555\,kg$$

or

$$\boxed{m = 55.5\,g}$$