

# Chapter 16

# Problem 109

$$\mu = 0.0062 \text{ kg/m}$$

$$L = 3.00 \text{ m}$$

$$n = 100 \text{ mode}$$

$$F_T = 20.00 \text{ N}$$

What is the wavelength + frequency?

$$\lambda_{100} = \frac{2L}{n} = \frac{2(3.00 \text{ m})}{100} = 0.06 \text{ m}$$

$$v = \sqrt{\frac{F_T}{\mu}} = \sqrt{\frac{20.00 \text{ N}}{0.0062 \text{ kg/m}}} = \boxed{56.8 \frac{\text{m}}{\text{s}}}$$

from  $v = \lambda \cdot f$

$$f_{100} = \frac{v}{\lambda} = \frac{56.8 \text{ m/s}}{0.06 \text{ m}} = \boxed{947 \text{ Hz}}$$