

**Problem 2.12**

A 20-Hz vibrator is activated at one end of a 6-m-long string. The first disturbance reaches the other end of the string in 1.2 s. How many wavelengths will fit on the string?

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**Solution**

The speed and frequency of the wave are given:  $\nu = 20 \text{ Hz}$  and  $v = \frac{6 \text{ m}}{1.2 \text{ s}} = 5 \text{ m/s}$ . Calculate the wavelength.

$$\lambda \nu = v \quad \rightarrow \quad \lambda = \frac{v}{\nu} = \frac{5 \frac{\text{m}}{\text{s}}}{20 \text{ Hz}} = 0.25 \text{ m}$$

Therefore, the number of wavelengths that can fit on the string is

$$\frac{6 \text{ m}}{0.25 \text{ m}} = 24.$$