

155.

Problem 20.51 (RHK)

The A string of a violin is a little too taut. Four beats per second are heard when it is sounded together with a tuning fork that is vibrating accurately at the pitch of concert A (440 Hz). We have to find the period of the vibration of the violin string.

Solution:

As the A string of the violin is a little too taut, the speed of sound in the string will be more than what is needed for it to vibrate at 440 Hz. As four beats per second are heard, the frequency of vibration of the violin string will be 444 Hz.

The period of vibration of the violin string is

$$T = \frac{1}{444} \text{ s} = 2.252 \times 10^{-3} \text{ s} = 2.252 \text{ ms.}$$