

44. To oscillate in four loops means  $n = 4$  in Eq. 17-52 (treating both ends of the string as effectively “fixed”). Thus,  $\lambda = 2(0.90\text{ m})/4 = 0.45\text{ m}$ . Therefore, the speed of the wave is  $v = f\lambda = 27\text{ m/s}$ . The mass-per-unit-length is  $\mu = m/L = (0.044\text{ kg})/(0.90\text{ m}) = 0.049\text{ kg/m}$ . Thus, using Eq. 17-25, we obtain the tension:  $\tau = v^2\mu = (27)^2(0.049) = 36\text{ N}$ .