67. (a) We use the result of exercise 58 to express γ in terms of the speed of sound $v = f\lambda$.

$$\gamma = \frac{Mv^2}{RT} = \frac{M\lambda^2 f^2}{RT} \ .$$

The distance between nodes is half of a wavelength $\lambda = 2 \times 0.0677\,\text{m}$, and the molar mass in SI units is $M = 0.127$ kg/mol. Consequently,

$$\gamma = \frac{(0.127)(2 \times 0.0677)^2(1400)^2}{(8.31)(400)} = 1.37 \ .$$

(b) Using Table 20-3, we find $\gamma = 5/3 \approx 1.7$ for monatomic gases, $\gamma = 7/5 = 1.4$ for diatomic gases, and $\gamma = 4/3 \approx 1.3$ for polyatomic gases. Our result in part (a) suggests that iodine is a diatomic gas.