

4. (a) The frequency of yellow sodium light is

$$f = \frac{c}{\lambda} = \frac{2.998 \times 10^8 \text{ m/s}}{589 \times 10^{-9} \text{ m}} = 5.09 \times 10^{14} \text{ Hz.}$$

(b) When traveling through the glass, its wavelength is

$$\lambda_n = \frac{\lambda}{n} = \frac{589 \text{ nm}}{1.52} = 388 \text{ nm.}$$

(c) The light speed when traveling through the glass is

$$v = f \lambda_n = (5.09 \times 10^{14} \text{ Hz})(388 \times 10^{-9} \text{ m}) = 1.97 \times 10^8 \text{ m/s.}$$