

Extra Practice Problems for Chapter 11

$$(c = 2.998 \times 10^8 \text{ m/s}, h = 4.14 \times 10^{-15} \text{ eV}\cdot\text{s})$$

1. A sound wave is traveling with a speed of 348.5 m/s. What is the temperature of the air?
2. A sound wave is traveling in air at 16.7 °C. If its wavelength is 0.556 m, what is its frequency?
3. A sound wave is traveling in air at 21 °C. If its frequency is 955 Hz, what is its wavelength?
4. At rest, a horn produces waves with a frequency of 555 Hz. If it is speeding away from you at 23.5 m/s and you are at rest, what frequency do you hear? The temperature is 21 °C.
5. At rest, a siren produces waves with a frequency of 751 Hz. If the car with the siren is moving towards you at 19.4 m/s and you are headed towards it at 21.0 m/s, what frequency do you hear? The temperature is 21 °C.
6. You see a lightning bolt, and 1.7 seconds later, you hear the thunder. If the temperature is 17.2 °C outside, how far away did the lightning strike?
7. The wavelength of an electromagnetic wave is 575 nm. What is its frequency? If that light is yellow, would the frequency of blue light be higher or lower?
8. The frequency of a green light is 6.0×10^{14} Hz. What is its wavelength?
9. Light of wavelength 475 nm is shined on metal with a work function of 2.0 eV. What is the maximum kinetic energy of the electrons released?
10. Light is shined on a metal with a work function of 1.9 eV, and electrons are released with a maximum kinetic energy of 3.2 eV. What is the frequency of the light?