276. Find the mass of a ball that oscillates at a period of 0.079 s on a spring with a constant of 63 N/m.

277. A dolphin hears a 280 kHz sound with a wavelength of 0.51 cm. What is the wave's speed?

278. If a sound wave with a frequency of 20.0 Hz has a speed of 331 m/s, what is its wavelength?

279. A sound wave has a speed of 2.42×10^4 m/s and a wavelength of 1.1 m. Find the wave's frequency.

280. An elastic string with a spring constant of 65 N/m is stretched 15 cm and released. What is the spring force exerted by the string?

281. The spring in a seat compresses 7.2 cm under a 620 N weight. What is the spring constant?

282. A 3.0 kg mass is hung from a spring with a spring constant of 36 N/m. Find the displacement.

283. Calculate the period of a 2.500 m long pendulum in Quito, Ecuador, where $a_g = 9.780$ m/s^2.

284. How long is a pendulum with a frequency of 0.50 Hz?

285. A tractor seat supported by a spring with a spring constant of 2.03×10^3 N/m oscillates at a frequency of 0.79 Hz. What is the mass on the spring?

286. An 87 N tree branch oscillates with a period of 0.64 s. What is the branch's spring constant?

287. What is the oscillation period for an 8.2 kg baby in a seat that has a spring constant of 221 N/m?

288. An organ creates a sound with a speed of 331 m/s and a wavelength of 10.6 m. Find the frequency.

289. What is the speed of an earthquake s-wave with a 2.3×10^4 m wavelength and a 0.065 Hz frequency?

Chapter 12 Sound

290. What is the distance from a sound with 5.88×10^{-5} W power if its intensity is 3.9×10^{-6} W/m^2?

291. Sound waves from a stereo have a power output of 3.5 W at 0.50 m. What is the sound's intensity?

292. What is a vacuum cleaner's power output if the sound's intensity 1.5 m away is 4.5×10^{-4} W/m^2?

293. Waves travel at 499 m/s on a 0.850 m long cello string. Find the string's fundamental frequency.

294. A mandolin string's first harmonic is 392 Hz. How long is the string if the wave speed on it is 329 m/s?

295. A 1.53 m long pipe that is closed on one end has a seventh harmonic frequency of 466.2 Hz. What is the speed of the waves in the pipe?

296. A pipe open at both ends has a fundamental frequency of 125 Hz. If the pipe is 1.32 m long, what is the speed of the waves in the pipe?

297. Traffic has a power output of 1.57×10^{-3} W. At what distance is the intensity 5.20×10^{-3} W/m^2?

298. If a mosquito's buzzing has an intensity of 9.3×10^{-8} W/m^2 at a distance of 0.21 m, how much sound power does the mosquito generate?

299. A note from a flute (a pipe with a closed end) has a first harmonic of 392.0 Hz. How long is the flute if the sound's speed is 331 m/s?

300. An organ pipe open at both ends has a first harmonic of 370.0 Hz when the speed of sound is 331 m/s. What is the length of this pipe?

Chapter 13 Light and Reflection

301. A 7.6270×10^8 Hz radio wave has a wavelength of 39.296 cm. What is this wave's speed?

302. An X ray's wavelength is 3.2 nm. Using the speed of light in a vacuum, calculate the frequency of the X ray.

303. What is the wavelength of ultraviolet light with a frequency of 9.5×10^{14} Hz?

304. A concave mirror has a focal length of 17 cm. Where must a 2.7 cm tall coin be placed for its image to appear 23 cm in front of the mirror's surface?

305. How tall is the coin's image in problem 304?

306. A concave mirror's focal length is 9.50 cm. A 3.0 cm tall pin appears to be 15.5 cm in front of the mirror. How far from the mirror is the pin?

307. How tall is the pin's image in problem 306?

308. A convex mirror's magnification is 0.11. Suppose you are 1.75 m tall. How tall is your image?

309. How far in front of the mirror in problem 308 are you if your image is 42 cm behind the mirror?

310. A mirror's focal length is −12 cm. What is the object distance if an image forms 9.00 cm behind the surface of the mirror?

311. What is the magnification in problem 310?

312. A metal bowl is like a concave spherical mirror. You are 35 cm in front of the bowl and see an image at 42 cm. What is the bowl's focal length?