

PHYSICS 1020

Homework #3

(Due Feb. 22, 2010)

1. (Giancoli 11-37) A sound wave in air has a frequency of 262 Hz and travels with a speed of 343 m/s. How far apart are the wave crests (compressions)?
2. (Giancoli 11-67) A tsunami of wavelength 250 km and velocity 750 km/h travels across the Pacific Ocean. As it approaches Hawaii, people observe an unusual decrease of sea level in the harbors. Approximately how much time do they have to run to safety? (In the absence of knowledge and warning, people have died during tsunamis, some of them attracted to the shore to see stranded fishes and boats.)
3. (Giancoli 12-8) What is the intensity (in W/m^2) of a sound at the pain level of 120 dB? Compare it to that of a whisper of 20 dB.
4. (Giancoli 12-9) What is the sound level (in dB) of a sound whose intensity is $2.0 \times 10^{-6} \text{ W/m}^2$?
5. (Giancoli 12-16) At a rock concert, a dB meter registered 130 dB when placed 2.8 m in front of a loudspeaker on the stage. (a) What was the power output of the speaker, assuming uniform spherical spreading of the sound and neglecting absorption in the air? (b) How far away would the sound level be a somewhat reasonable 90 dB?