

PHYSICS 1020

Homework #3

(Due Feb. 21, 2018)

1. (KJF 15-3) A wave travels along a string at a speed of 280 m/s. What will be the speed if the string is replaced by one made of the same material and under the same tension but having twice the radius?
2. (KJF 15-30) The Sun emits electromagnetic waves with a power of 4.0×10^{26} W. Determine the intensity of electromagnetic waves from the Sun just outside the atmospheres of (a) Venus, (b) Mars, and (c) Saturn. Refer to the table of astronomical data inside the back cover of the textbook, or to Appendix L of the course handouts.
3. (KJF 15-34) What is the sound intensity level of a sound with an intensity of 3.0×10^{-6} W/m²?
4. (KJF 15-39) A rock band playing an outdoor concert produces sound at 120 dB 5.0 m away from their single working loudspeaker. What is the sound intensity level 35 m from the speaker?
5. (KJF 15-41) An opera singer in a convertible sings a note at 600 Hz while cruising down the highway at 90 km/hr. What is the frequency heard by
 - a. A person standing beside the road in front of the car?
 - b. A person standing beside the road behind the car?
6. (KJF 15-58) An earthquake produces longitudinal P waves that travel outward at 8000 m/s and transverse S waves that move at 4500 m/s. A seismograph at some distance from the earthquake records the arrival of the S waves 2.0 min after the arrival of the P waves. How far away was the earthquake? You can assume that the waves travel in straight lines, although actual seismic waves follow more complex routes.